INDIANA COMMISSION *for* HIGHER EDUCATION

AGENDA

August 13, 2015

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INDIANA COMMISSION *for* HIGHER EDUCATION

JUNE COMMISSION MEETING
AGENDA

Wednesday, August 12, 2015

STRATEGIC PLANNING SESSION
10:00 A.M. – 3:00 P.M.*
Center for Visual and Performing Arts
1040 Ridge Road
Munster, IN 46321

CAMPUS TOUR
3:30 P.M. – 5:00 P.M.
Purdue University Calumet Tour
*Bus Departs from the CVPA 3:25 P.M.***

RECEPTION
5:00 P.M. – 6:00 P.M.
Commercialization and Manufacturing Excellence Center
7150 Indianapolis BLVD
Hammond, IN 46323

DINNER
6:00 P.M. – 8:00 P.M.
Commercialization and Manufacturing Excellence Center
7150 Indianapolis BLVD
Hammond, IN 46323
Bus Returns to the CVPA 8:10 P.M.

HOTEL ACCOMMODATIONS
Fairfield Inn and Suites
8275 Georgia Street
Merrillville, IN 46410

**Please note that all events take place on CENTRAL TIME*
** *Members and staff are encouraged to leave their vehicles at the CVPA until the conclusion of the campus events.*

Thursday, August 13, 2015

COMMISSION MEETING
Purdue University Calumet
Student Union and Library Building
2200 169th Street
Hammond, IN 46323

BREAKFAST
8:00 A.M. – 9:00 A.M.
Student Union and Library Building
Room with a View (First Floor)

WORKING SESSION
9:00 A.M. – 11:30 A.M.
Student Union and Library Building
Alumni Hall (Third Floor)

CALL IN INFORMATION:
Dial: 1-605-475-4700
PIN: 230295#

WiFi INFORMATION:
to be provided

WORKING SESSION TOPICS

- Student Loan Disclosure Guidance and Templates
- Ivy Tech review under HEA 1001-2015
- Scholars Report
- Return and Complete
- Committee Report Outs

COMMISSION MEMBER AND STAFF LUNCH
11:45 A.M. – 12:45 P.M.
Student Union and Library Building
Room with a View (First Floor)

COMMISSION MEETING
1:00 P.M. – 3:00 P.M.
Student Union and Library Building
Alumni Hall (Third Floor)

CALL IN INFORMATION:
Dial: 1-605-475-4700
PIN: 230295#

WiFi INFORMATION:
to be provided

I. Call to Order – 1:00 P.M. (*Central*)
Roll Call of Members and Determination of Quorum
Chair's Remarks
Officer Slate for 2015-2016
Commissioner's Report
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1. Master of Science and Ph.D. in Environmental and Ecological Engineering to be offered by Purdue University West Lafayette
2. Bachelor of Art and Bachelor of Science in Business Analytics to be offered by Ball State University
3. Master of Science in Quantitative Psychology to be offered by Ball State University
4. Bachelor of Science in Respiratory Therapy to be offered by the University of Southern Indiana
5. Master of Science in Sport Management to be offered by the University of Southern Indiana

6. Master of Arts in Second Language Acquisition, Policy, and Culture to be offered by the University of Southern Indiana

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   1. Vermont Street Parking Garage Facade Repair and Replacement – Indiana University Purdue University - Indianapolis
   2. Indiana University School of Medicine – Center for Drug Discovery – Wishard/Dunlap Building Lab Renovation – Indiana University Purdue University - Indianapolis
   3. Regional Campuses – Multi-Campus Special Repair and Rehabilitation for Deferred Maintenance – Indiana University East, Kokomo, Northwest, South Bend, and Southeast
   4. Old Crescent Renovation – Phase II – Indiana University Bloomington

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E. Media Coverage 161

V. Old Business

New Business

VI. Adjournment

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The next meeting of the Commission will be on **September 10, 2015, in Kokomo, Indiana.**

State of Indiana
Commission for Higher Education

Minutes of Meeting

Thursday, June 11, 2015

I. CALL TO ORDER

The Commission for Higher Education met in regular session starting at 1:00 p.m. Indiana-University-Purdue University Columbus, Columbus Learning Center, Room 1000, with Chairman Dennis Bland presiding.

ROLL CALL OF MEMBERS AND DETERMINATION OF A QUORUM

Members Present: Gerald Bepko, Dennis Bland, John Conant, Sarah Correll, Jon Costas, Susana Duarte de Suarez, Jud Fisher, Lisa Hershman, Allan Hubbard, Chris LaMothe, Chris Murphy, and Caren Whitehouse.

Members Absent: Dan Peterson, John Popp

CHAIR'S REPORT

Mr. Bland began his remarks by thanking Cummins Inc. and IUPUC leadership for their hospitality during yesterday's events and for hosting our meeting today. As many of you know, Officers for the positions of Chair, Vice Chair and Secretary of the Commission are voted in each year in August. I will be establishing a Nominating Committee of Commission members to meet and propose a Slate of Officers at our August meeting. I will be providing additional details to the committee membership but know that this meeting will be within the next couple of weeks.

Also, as a reminder, please plan on being available a day early next month to have a discussion on the Strategic Plan development. Details regarding the meeting logistics will be available soon, but this meeting will be in Hammond starting at 10:00 am, so if you need additional travel accommodations, please contact Liz or Joan. If you have any suggestions for the content of the new strategic plan, please contact Sarah Ancel.

COMMISSIONER'S REPORT

Commissioner Lubbers began her report stating that there are some staff announcements and transitions to share. Ms. Lubbers asked Christian Hines to stand up in the back of the audience and said that he has not been with the Commission for too long, not long enough, I might add, but we are losing him. He is going to Boston to attend law school at Harvard and that if I knew in advance when hiring him, and I will say that I suspected this would happen, that we would only get him for a matter of a short period of time I would hire him again in a heartbeat. For those of you who had a chance to work with him during the legislative session or in other ways, I have rarely seen someone who can hit the ground running with the kind of professionalism that Mr. Hines has offered. We hope the experience here has been so strong and so good in his

commitment to Indiana that you will come back home someday. We intend to follow your career and expect great things from you.

With that, there are a couple of other changes to announce, most of them in our outreach division. Tafrica Harewood who served as a liaison with K-12 schools and community partners resigned, and we're pleased that one of our current outreach coordinators, Miranda Scully, will be assuming the important role of School and Community Engagement Manager. Another reassignment within the Commission will serve us well is Rachel Meyer, who currently serves in the Student Support Center, will step into the role of Outreach Coordinator for the West Region. I'm calling out these positions for two reasons: one, I'm a strong advocate for hiring from within and providing new professional opportunities for all staff and these are two such examples. Secondly, both of these roles speak to the Commission's increasing focus on partnerships and community outreach. If we're going to reach our 60% goal, our best hope is to take our message to students, families and communities.

In that regard, I'm engaged in the spring tour, visiting College Success Coalitions throughout the state. We now have 75 counties with College Success Coalitions in operation. In the past couple weeks, I have met with the coalition members in Cass County (Logansport) and Steuben County (Angola) and next week we will be in Davies County. These partnerships are key to our efforts to talk about the alignment of higher education with local workforce needs and to highlight our Career Ready Campaign. On Tuesday of this week, we also honored an additional seven Hoosier counties for their coalition efforts at a special event in the Capitol Building.

Our Career Ready campaign and our efforts to prepare Hoosiers for 21st Century workforce needs align with the Indiana Chamber of Commerce's 2015 Employer Survey. Common themes in this year's survey: Indiana companies are prepared to grow but nearly three-quarters of the respondents (526) report that filling their employment needs is a challenge. Other results include: 58% expect their workforce to increase in the next 12 to 24 months; critical thinking skills and personal qualities, such as work ethic and willingness to learn were cited as the most challenging; in spite of a state and national focus on experiential learning opportunities for students, more than 200 of the 526 respondents said they do not have an internship program; while business-education partnerships have grown, a large gap remains with nearly 1/5 of the respondents unengaged with K-12 or higher education but would like to be.

I would like to emphasize Chairman Bland's comments about the development of our strategic plan and encourage any commission members who have thoughts about this process to contact me in preparation for the August meeting.

CONSIDERATION OF THE MINUTES OF THE MAY, 2015 COMMISSION MEETING

R-15-04.1 **RESOLVED:** That the Commission for Higher Education hereby approves the Minutes of the May, 2015 regular meeting (Motion – Murphy, second – Correll, unanimously approved)

II. PUBLIC SQUARE

A. Models for Competency-Based Degree Programs

Mr. Bland began the Public Square stating that at our last meeting we heard from Alison Kadlec, Senior Vice President with Public Agenda, to discuss Competency-Based Education (CBE). Today we will continue this series with a conversation on Models for Competency-Based Programs. He introduced our guest today, Stephanie Krauss, with the Forum for Youth Investment (FYI), a student advocacy group that works with state and local leaders to help disconnected young people succeed.

Ms. Krauss began by stating she has the opportunity to look at what it takes to get adolescents and adults ready for the demands of life by doing research and working with national organizations. She said that today her intention is to show what CBE looks like in practice. In her role with FYI, she spends half her time as the co-director of the Readiness Project looking across the nation at what competencies matter most for adolescents and adults to be ready for college, the workforce, life and what practices parents, professionals and other adults can be putting into play in the policies to help promote that. The other half of her time is working with institutional leaders across the United States to track the progress and rapid rise of CBE in higher education and to look at what needs to happen in policy and practice for this to be supported and sustained. As CBE grows, she looks at how to keep quality around it and shepherd this new growth to make sure that we are doing right by the students served.

Ms. Krauss reviewed what CBE is, its history and what it looks like across the country presently. As a philosophy, CBE has existed for a long time but reached a ticking point where historically we can view it at scale in ways never possible before. Learners, at whatever institution of learning, are able to progress based on what they know and can do instead of the time they've spent in class. So rather than the number of credits that they're signed up for or their enrollment status and a passing grade, progression happens as they become proficient in hopefully what matters most. These are competencies that are bundles of skills, habits and attitudes. They can be specialized to the field of study and they can also be cross-cutting, such as critical thinking, work ethic skills and things that employers are saying matter most.

In K-12 we think of this as seat time and in higher education, the Carnegie unit. For any young person in school who ends up in a different system or has to slow down or leave, often the math doesn't work that earns seat time and credit hours. We see this in higher education also in which someone is working, caring for someone at home and are unable to enroll full time or complete in the progression that looks like the proxy standard college student. At its highest but broadest form, all we are looking at is the design of schooling and learning where individuals progress when ready, as fast or slow as needed.

Ms. Krauss discussed what CBE in K-12 looks like across the nation. States across the country are putting policies into place that can support and sustain CBE. Missouri and Indiana in K-12 have a school flex formula and alternative funding formula that

are not encumbered by time. 39 states have some kind of waiver from that seat time model that districts can seek. New England has decided as a region to convert over to a competency-based system and have intermediaries that are helping states to make that transition.

In K-12 there are a couple of entry points to CBE. Young people who are under credited or disconnected will come into this kind of schooling because there is more flexibility. These are 17 or 18 year olds who have very little time before the state stops supporting their K-12 education and they have a lot of work to do. You will also see schools that are highly experiential, work-based, early college models that have a dual enrollment focus that will turn toward competency models because of its inherent connection toward more project-based or experiential learning that is more formed to support that kind of learning. It is important to recognize your pipeline traction because this is the next generation college student.

This also changes how we think about college and career readiness. If successful, you may end up with more equipped and ready college freshman. Ms. Krauss discussed what CBE looks like in higher education across the country. From a policy level perspective, Indiana is at the top of the pack. That doesn't mean Indiana has any force to go toward this, but from what can be identified, there are structures in place that is likely to support the start, scale and spread of CBE programs. There aren't as many regional trends across the country because in higher education, CBE is more likely to begin at the institutional level, whereas K-12 starts at the state level, an important distinction to make.

CBE in higher education started in its first wave in the 1970s with Dixie funding for a few institutions to support adult learners who are coming back from the military or work and back into college. There was a second wave when online learning had its first boom where you see institutions flourish and start to offer competency-based models. Now there is a third wave where there is increasingly more traditional institutions who are looking to convert their degree programs because they've realized although there is a completion agenda, often completion has become a proxy for competence. Individuals are leaving with credentials but not with all the competencies that matter for that field of study or work that they've been focused on in college. These tipping points are galvanized by new enablers. There is massive national traction and increased public and political will. There is technology in ways never before had to support components of this type of learning.

Ms. Krauss focused on Indiana and what it looks like in general as an outsider. We think about policy that might be able to support the start and the spread of CBE and if there are more nontraditional ways to support funding, modify tuition so it is not as encumbered in time-based mechanisms and how to support students who attend CBE schools with regard to transferability and credibility of their credentials. Indiana has within statute some flexibility in how funding and tuition is structured. Indiana also has great transfer and articulation policies. These are on-ramps into this type of learning that will make the path to CBE easier for Indiana.

Ms. Duarte De Suarez posed a question about the maps and policies Ms. Krauss described and the facilitation to move from a state that was symbolized as blue on the map to one that is at the top of the pack and symbolized as purple on the map. In response to Ms. Duarte De Suarez's question regarding if there is any reflection on the aggressive stand on bodies like the Indiana Commission for Higher Education that correlate to a state's success on that map, versus states that may not have an activist body like the Commission that compliments higher education, Ms. Krauss stated that in terms of the activity or advocacy of official bodies and the level of support for states to take this on, what they see is that statute and regulation matter most. The advocacy and activity of organized bodies is directly behind that. Because this is a nascent field, networks have emerged on the institutional, state or regional level. The ability to identify the organized body within the state that can pair up for either pipeline activities or be able to be in conversation with both institutions and other states as almost an unofficial community of practice that would open up resources and information sharing is an asset. With each state, depending on the fit or strength of the body to support in legislative matters or institutional capacity building, it will vary in just how much it will influence.

Ms. Krauss discussed concrete examples of what CBE looks like in practice. Ms. Kadlec's organization, Public Agenda, and Ms. Krauss are being supported to do a national landscape scan trying to identify within this emergent space what the shared design elements are among the healthy and robust designs. The shared design elements of such CBEs is that they are learner-centered, have proficient and prepared graduates; coherent, competency-driven program and curriculum design; clear, cross-cutting and specialized competencies; measurable and meaningful assessments; engaged faculty and external partners; flexible staffing roles and structures; embedded process for continuous improvement; enabling and aligned business processes and systems; new or adjusted financial models. The ten shared elements she discussed show up all the time in quality CBE models and are great indicators but the practice is still emerging but the need and demand has accelerated considerably.

In response to Mr. Murphy's question regarding whether there was transferability in credits from a CBE system to a seat time system, Ms. Krauss stated that because of the reliance on financial aid for students who attend college and for the universities, for the most part right now, we see most institutions back-mapping their transcripts to a credit-based system for ease of transfer and financial aid. She said it also has a burden on time and effort because it is a translation. For the institutions that convert back from the CBE system to the credit-based system you shouldn't see any penalty on the student experience for transfer. It is at the state level, and with regard to Indiana, because of the strength of the transfer and articulation policies it will be easier than for states that do not already have that structure in place. Vendors are also stepping in to help with algorithms to make some of the conversion easier and to reduce the time and effort of faculty or staff.

In response to Mr. LaMothe's question regarding the assessment system and what exactly it measures, Ms. Krauss said that they know at the design level that assessments must measure what matters the most and it needs to be meaningful to

not just the student but the field of study or work that the credential is geared toward. The assessments take different forms across institutions, some use Scantrons, testing centers and proctors. Others use experiential, highly interactive assessments or experiential projected based assessments. What is consistently happening is one of two things with regard to mastery, sometimes called proficiency or performance-based, it will measure either the progression toward the level of competence that a learner needs to reach for that particular course or credential or the final proficiency of a competency. This is still evolving so rapidly that there is huge diversity in practice, but the most important piece is that the grades are no longer conflated with other unrelated factors that don't touch learning. The grades or the assessments should measure learning, rather than, for example, participation if it's not attached to communication competency. They should be true reflections of what was learned.

Mr. LaMothe followed up by saying one of the reasons he asked the questions is because one of the challenges in higher education across the country, and certainly in Indiana, relates to quality. In response to Mr. LaMothe's question of whether there was a design in the development of CBE to get that consistency of quality as it is implemented, Ms. Krauss stated that the best hope of CBE is one that's planned with the end in mind. It is important to establish what the credential prepares for and, with precise measures, what are the competencies that should accompany this credential. Planning with the end in mind, understanding what the structure of the program is and the time you have, the progressions and parts of learning that can get someone to that competency is important. From an access standpoint, no matter the individual, there must be multiple pathways that bring them to it and multiple ways to demonstrate competency and how we test for it.

Dr. Conant stated that in Indiana there is a core transfer list of courses that is the same at all schools and someone at each school looks at the competency required, the learning objectives and what students can do after they finish the class. In response to Dr. Conant's question asking how CBE is different than that system where quality is standardized to learning objectives and content as a statewide system, Ms. Krauss said that it is across the delivery and pedagogical aspects of CBE and recognizing in that scale and spread, it's not educational quality but organizational viability. The question becomes how you maintain the consistency and fidelity over time and then how you finance and support it.

Dr. Conant said that we review a section of them every year that goes through curriculum coordinators at each university and is within the traditional way that we provide assessment. Dr. Krauss said that to the level that students are moving forward based on what they know and can do and can enroll flexibly no matter their circumstances to get there, then you are well on your way. It is based on competence and not this confluence of other factors.

Dr. Conant stated that where he is most confused is with the difference in what she calls competency and what we have always called learning objectives. Dr. Krauss responded that it is a combination of both the specialized and cross-cutting competencies and determining what is competent in theory for the credential and

then what is probable or nice to have and then trying to delineate between the two. Understanding across different majors or disciplines, what are the mindsets and skillsets that need to be enforced and embedded into the curriculum and the do so with intention. Great teachers and faculty think with the end in mind. Access and quality are critical to ensure that no matter what happens in a student's life during a certain time period, are they able to continue moving forward and not be penalized because it is the learning that matters, not the time or location and do they have the requisite skills to be able to access that kind of learning.

In response to Ms. Duarte De Suarez's question about how CBE works with prior learning assessment (PLA) and how the two models fit, Ms. Krauss said that PLA is a wonderful addition to the programming because it takes into account what they already know and can do and because enrollment status or time spent in class or to degree are less important than the learning that engages and gauges precisely where they are and then puts them into a place of appropriate challenge. PLA pipelines them to the degree where actual learning is happening. This varies from more traditional syllabi that can sometimes be more inflexible in progression. Ms. Krauss views having a state policy in Indiana as very beneficial policy lever in the state.

III. BUSINESS ITEMS

A. Academic Degree Programs for Full Discussion

1. Bachelor of Science in Transdisciplinary Studies to be offered by Purdue University West Lafayette

Candiss Vibbert, Assistant Vice President for Engagement, and Jeff Evans, Associate Professor of Electrical and Computer Engineering Technology, presented this item.

In response to Mr. LaMothe's question as to whether or not this would cut across multiple colleges at the university as a cross-disciplinary approach, Dr. Evans stated yes in terms of the competency pieces. Faculty from Liberal Arts and from Science are participating in this and helping to put this together.

In response to Mr. LaMothe's question if it is centered in a particular college, Dr. Evans responded that it is centered in the Polytechnic Institute at Purdue West Lafayette.

In response to Ms. Correll's question if all of these will map back to traditional credit hours, Dr. Evans said yes. He said the model they've adopted is a close comparison to what Alverno College, a small women's college in Milwaukee, Wisconsin. They use essentially traditional courses so there is a transcript. For various institutional, legal, financial aid related reasons, there is the notion of credit and credit hours so students will take courses and other forms of learning.

In response to Ms. Correll's question if she is in this degree and decides to transfer and go to the College of Science or another degree, will this map back to credits, Dr. Evans stated absolutely it will. Students at Purdue University can take traditional courses and the transferability mechanism will work.

In response to Ms. Correll's question if the expectation is that this will be a mix of both the competency-based courses and the traditional coursework or is the expectation that you will go through the whole program as competency-based, Dr. Evans stated that the degree requirements, the state 120 minimum credit hours, in addition to the nine course requirement of satisfying the competencies. There are two pieces to this and in some respect we have decoupled them. There are two courses each semester that are highly experiential and project-based in nature and part of their purpose is to be the assessment mechanism and the connecting of the dots between the scaffolding that is produced in the students' coursework and the competencies, basically mapping those two together.

In response to Mr. Murphy's question regarding the 300 level and 400 level disciplinary knowledge if it is within a particular discipline or open to any discipline, Dr. Evans said that students will be advised to pursue one or more technical disciplines in addition to one or more disciplines on the humanities side.

In response to Mr. Murphy's question requesting clarification as to why the word transdisciplinary was chosen versus interdisciplinary, multidisciplinary or crossdisciplinary, Dr. Evans said that was a great question and distributed an article he wrote in August of 2014 ("Purdue Polytech crosses disciplinary boundaries via transdisciplinarity", *Purdue Polytechnic Institute news*, Issue 5) that dives into what each tends to mean. Often, things are considered interdisciplinary with fields that are close together, such as biology and chemistry. Transdisciplinary refers to things that are not that close, for example, if someone is trying to solve a technical problem there is a need to have technical knowledge. But depending on where that technical problem is occurring, that individual may need to know about the culture, history, religion and politics of that area. It is highly student driven and the mentor's job is to focus on the student's intrinsic motivation and the application to be accepted into the program is based on an evaluation for self-determination. The notion of transdisciplinary is extremely wide and involves technologies and science as well as humanities and culture.

In response to Ms. Whitehouse's question regarding whether there are significant differences between independent study worked out between the student, faculty member and in conjunction with an advisor, Dr. Evans said that it differs in that they are looking across a wide girth of competencies from discipline-specific competencies to cross-cutting skills.

Dr. Bepko stated that President Daniels was interviewed by Intech Magazine and said that one of the most important things is innovation. Dr. Evans responded that one of the sub-competencies they use is creative thinking and he agrees that innovation is definitely important.

Dr. Sauer gave the staff recommendation.

R-15-04.2 **RESOLVED:** That the Commission for Higher Education approves the recommendation of the Bachelor of Science in Transdisciplinary Studies to be offered by Purdue University West Lafayette consistent with this agenda item. (Motion – Murphy, second – Fisher, unanimously approved)

B. Academic Degree Programs for Expedited Action

1. Bachelor of Science in Game Design to be offered by Indiana University Bloomington
2. Bachelor of Arts in Media to be offered by Indiana University Bloomington
3. Master of Science in Informatics to be offered by Indiana University-Purdue University Indianapolis (IU)
4. Bachelor of Science in Unmanned Systems to be offered by Indiana State University

R-15-04.3 **RESOLVED:** That the Commission for Higher Education approves by consent the following academic degree programs, in accordance with the background information provided in this agenda item.

- Bachelor of Science in Game Design to be offered by Indiana University Bloomington
- Bachelor of Arts in Media to be offered by Indiana University Bloomington
- Master of Science in Informatics to be offered by Indiana University-Purdue University Indianapolis (IU)
- Bachelor of Science in Unmanned Systems to be offered by Indiana State University (Motion – Bepko, second – Fisher, unanimously approved)

C. Capital Projects for Full Discussion

1. Indiana University – Construction of the School of Informatics and Computing on the Bloomington Campus

Dr. Tom Morrison presented this item. Mr. Hawkins presented the staff recommendation.

R-15-04.4 **RESOLVED:** That the Commission for Higher Education approves by consent the following capital projects, in accordance with the background information provided in this agenda item:

- Indiana University – Construction of the School of Informatics and Computing on the Bloomington Campus (Motion – Murphy, second – Hubbard, unanimously approved)

2. Indiana University – Wells Quad Renovation

Dr. Morrison presented this item.

In response to Dr. Conant's question how they balance the desire of students for fancy facilities and the desire of parents to keep costs down, what the range of residential housing costs is and where this fits in the range, Dr. Morrison stated that a strong concern of their trustees is to always keep that balance in mind for the residence hall system. He said that it is not in the best interest of creating community to build high end residence halls. The residence halls are diverse and the range of fees is relatively tight and house just under 14,000 students on campus.

In response to Mr. Murphy's question as to what the student population is, Dr. Morrison said approximately 42,000, one third living on campus.

In response to Dr. Bepko's question regarding how many students live off campus and what the diversity of housing is like off campus, Dr. Morrison said approximately 30,000 students live off campus in a diverse range of housing from high end to basic accommodations.

Mr. Hawkins presented the staff recommendation.

R-15-04.5 **RESOLVED:** That the Commission for Higher Education approves by consent the following capital projects, in accordance with the background information provided in this agenda item:

- Indiana University – Wells Quad Renovation (Motion – Bepko, second – Correll, unanimously approved)

D. Capital Projects for Expedited Action

1. Indiana University Bloomington – Indiana Memorial Union Biddle Hotel Guest Rooms Renovation
2. Purdue University West Lafayette – Agricultural and Life Sciences Building
3. Vincennes University – Center for Science, Engineering and Mathematics

R-15-04.6 **RESOLVED:** That the Commission for Higher Education approves by consent the following capital projects, in accordance with the background information provided in this agenda item:

- Indiana University Bloomington – Indiana Memorial Union Biddle Hotel Guest Rooms Renovation
- Purdue University West Lafayette – Agricultural and Life Sciences Building
- Vincennes University - Center for Science, Engineering and Mathematics (Motion – Fisher, second – Hubbard, unanimously approved)

E. 2015-2017 Indiana/Ohio Reciprocity Agreement – Expedited

R-15-04.7 **RESOLVED:** That the Commission for Higher Education approves by consent the 2015-2017 Indiana/Ohio Reciprocity Agreement, in accordance with the background information provided in this agenda item. (Motion – Murphy, second – Bepko, unanimously approved)

F. Commission for Higher Education Fiscal Year 2016 Spending Plan – Expedited

R-15-04.8 **RESOLVED:** That the Commission for Higher Education approves by consent the Commission for Higher Education Fiscal Year 2016 Spending Plan, in accordance with the background information provided in this agenda item. (Motion –

Murphy, second – Bepko, unanimously approved)

G. Updated Regional Campus Policy and IPFW Policy – Expedited

Mr. Murphy commented that the policy talks about IPFW balancing the campus between Purdue and IU and that it's the number of students on both campuses that leads to the decision to designate it as a metropolitan university. He suggested that the Commission keeps in mind that this may lead to local organizations and others who will try to encourage a much stronger involvement form Purdue so they can achieve the same results.

R-15-04.9 **RESOLVED:** That the Commission for Higher Education approves by consent the Updated Regional Campus Policy and IPFW Policy, in accordance with the background information provided in this agenda item. (Motion – Bepko, second – Correll, unanimously approved)

IV. INFORMATION ITEMS

A. Academic Degree Programs Awaiting Action

B. Academic Degree Program Actions Taken by Staff

C. Capital Projects Awaiting Action

D. Media Coverage

V. NEW BUSINESS

There was none.

VI. OLD BUSINESS

There was none.

VII. ADJOURNMENT

The meeting was adjourned at 2:57 P.M.

_____
Dennis Bland, Chair

_____
Susana Duarte De Suarez, Secretary

COMMISSION FOR HIGHER EDUCATION
Thursday, August 13, 2015

PUBLIC SQUARE **Competency-Based Education**

Background

As the Commission engages in discussions related to competency that will guide the development of the 2015 Strategic Plan, it will have the opportunity to hear from our partners as a three-part series. The third of these sessions is with Allison C. Bell, Ph.D. with HCM Strategists, LLC.

HCM Strategists is a public policy and advocacy consulting firm focused on advancing effective solutions in health and education. HCM utilizes a network of relationships at the state and federal level to work collaboratively with nonprofits, foundations and corporations.

Supporting Documents

(1) Allison C. Bell, Ph.D. Bio

Alli Bell

Senior Associate, HCM Strategists

Alli Bell is a talented education policy analyst with a passion for public policy driven by sound research. She works with several of HCM's higher education clients, including Lumina Foundation. She believes that all students should receive the academic and financial support they need to attend college and meet their educational goals.

A native of San Diego, Alli comes from a long line of teachers who helped to educate some of the nation's most disadvantaged students. Stories of her mother's work with students along the U.S.-Mexico border imparted in Alli a keen understanding of the hurdles that many students face in accessing quality education. At the same time, Alli experienced first-hand how high school experiences can discourage students from pursuing ambitious postsecondary goals – an experience that impressed upon her the importance of providing students the tools and resources they need to succeed.

These early influences stoked Alli's passion for ensuring that higher education systems better serve the needs of students. After graduating from Stanford University with a bachelor's degree in sociology, Alli earned her master's degree in education and her Ph.D. in higher education from the University of Michigan. She has focused on working with states and individual school systems to ensure that they offer students affordable, accessible and high-quality postsecondary education.

Prior to joining HCM, Alli served as an Associate Research Scientist at the National Center for Education Statistics, where she oversaw the collection of the Integrated Postsecondary Education Data System (IPEDS) Graduation Rates and Fall Enrollment components. Before that, she was a policy analyst for the State Higher Education Executive Officers Association (SHEEO). In that role, she managed the State Higher Education Finance Report, collecting and analyzing state financial data, compiling annual higher education finance reports and collaborating with state policy makers.

An outdoor enthusiast, Alli enjoys camping, hiking and skiing, but saves her competitive spirit for sailboat racing. Alli has teamed with family members in a 59-boat sailing race from California to Hawaii, placing ninth overall and third in their division. Alli currently resides in Washington, D.C.

COMMISSION FOR HIGHER EDUCATION
Thursday, August 13, 2015

BUSINESS ITEM A: **Indiana's Proposed High School Diploma Requirements**

Staff Recommendation

That the Commission approve the proposed requirements for Indiana's "College & Career Ready" and "Workforce Ready" high school diplomas.

Background

In 1994, the Indiana Commission for Higher Education and State Board of Education jointly adopted the state's Core 40 high school diploma in an effort to better prepare Hoosier students for postsecondary education and employment. The Indiana General Assembly subsequently made completion of Core 40 a graduation requirement for all students beginning with those who entered high school in the fall of 2007. The legislation included an opt-out provision that enabled students to graduate with the General Diploma with the permission of their parents and local school. The legislation also made Core 40 a minimum college admission requirement for the state's public four-year universities beginning in the fall of 2011.

In 2014, the Indiana General Assembly charged the Indiana Career Council with reviewing the state's Core 40 and General Education diploma requirements and making recommendations to strengthen these expectations for all Hoosier students. Co-chaired by the Superintendent of Public Instruction and Commissioner for Higher Education, the revision process was informed by national research and input from educators, employers, policymakers, community leaders and the general public. The resulting *"College & Career Ready"* and *"Workforce Ready"* diplomas build upon the strengths of Indiana's current diplomas with increased academic rigor and more explicit expectations for focused career exploration and college planning.

Supporting Documents

(1) Proposed "College & Career Ready" and "Workforce Ready" Diplomas *(August 4, 2015)*

(2) Resolution to Adopt Indiana's High School Diploma Requirements *(August 13, 2015)*

Indiana's

College & Career Ready*

High School Diploma

FINAL DRAFT: 8/4/15

Takes effect beginning with students who enter high school in 2018-2019 (class of 2022).

Minimum 44 Total Credits

English/ Language Arts

8 credits

Including literature, composition, speech/communications **or** other state-approved alternative

Mathematics

8 credits (All Indiana students must be enrolled in a math course or state-approved alternative during each year of high school.)

Calculus Sequence	Quantitative Reasoning Sequence	Technical Math Sequence
2 credits: Algebra I	2 credits: Algebra I	2 credits: Algebra I
2 credits: Geometry	2 credits: Algebra II **or** Geometry	2 credits: Algebra II, Geometry **or** Math 10
2 credits: Algebra II	2 credits: Geometry **or** Algebra II	4 credits: Technical Math **or** state-approved alternative
2 credits: Pre-Calculus **and** Trigonometry	2 credits: Quantitative Reasoning **or** Probability & Statistics	

[NOTE: College-bound students who plan to attend (or transfer to) a four-year college should complete either the Calculus or Quantitative Reasoning course sequence, depending on their postsecondary program of study. Integrated Math I, II and III may be completed as an alternative to Algebra I, Geometry and Algebra II.]

Science

6 credits

2 credits: Biology I
2 credits: Chemistry I, Physics I **or** Integrated Chemistry-Physics
2 credits: Any science course **or** state-approved alternative

[NOTE: Students in a **STEM Pathway**** should complete **8 science credits, including a laboratory component**.]

Social Studies

6 credits

2 credits: U.S. History
2 credits: World History/Civilization **or** Geography/History of the World
1 credit: U.S. Government
1 credit: Economics, Consumer Economics **or** Global Economics

Health & Wellness

3 credits

2 credits: Physical Education
1 credit: Health & Wellness

College & Career Readiness

8 credits

1 credit: Preparing for College & Careers (Should be completed by the end of 9th grade.)
1 credit: Personal Financial Responsibility
6 credits: College & Career Readiness Sequence (with graduation capstone***)

[NOTE: **College & Career Readiness Sequences** may include **Academic** courses, **Career & Technical Education** courses, **Early College** credits, **Fine Arts** courses, **Advanced Coursework** or other coursework aligned with a student's College & Career Pathway Plan. Students may earn 6 credits in a single sequence or 8 credits in two sequences.]

- College-bound students who plan to pursue a **One-Year Certificate** or **non-transferrable Two-Year College Degree** should complete a College & Career Readiness Sequence that includes Career & Technical Education and/or Dual Credit courses.
- College-bound students who plan to pursue a **Four-Year College Degree** or **transferrable Two-Year College Degree** should complete a College & Career Readiness Sequence that includes Advanced Placement, Career & Technical Education, and/or priority Dual Credit courses listed in Indiana's Core Transfer Library.]

Directed Electives

5 credits

Fine Arts
World Languages (College-bound students should complete **at least 4 credits** in the **same World Language**.)
Additional Academic **and/or** Career & Technical Education courses

College & Career Ready Diploma with Honors

College & Career Ready Diploma with Honors graduates must complete a **minimum of 48 credits**, earn a cumulative **Grade Point Average of at least 3.0** on a 4-point scale, earn a **grade of "C" or better in all courses that count toward the diploma** and **complete at least two** of the following:

1) **Advanced Coursework:** Earn at least 4 Advanced Placement **or** International Baccalaureate credits and take corresponding exams
2) **Arts & Culture:** Complete at least 6 World Language credits **and** 2 Fine Arts credits
3) **Career Credential:** Complete an Industry-Recognized Certification, One-Year Certificate **or** state-approved alternative
4) **College Credit:** Earn at least 6 transcripted college credits
5) **College Entrance Exam:** Earn a minimum composite ACT **or** total SAT score (established by the Indiana Commission for Higher Education)

***Indiana's College & Career Ready Diploma is the default diploma track for all Hoosier students. Graduating with less than the default diploma requires formal parental consent and school principal certification.**

****Science, Technology, Engineering and Math (STEM) ***Graduation capstone could include a college/career credential, a project- or work-based learning experience, or other state-approved alternative.**

Indiana's

Workforce Ready*

High School Diploma

FINAL DRAFT: 8/4/15

Takes effect beginning with students who enter high school in 2018-2019 (class of 2022).

Minimum 40 Total Credits

English/ Language Arts	**8 credits** Including literature, composition, speech/communications or other state-approved alternative
Mathematics	**6-8 credits** (All Indiana students must be enrolled in a math course or state-approved alternative during each year of high school.) 2 credits: Algebra I 2 credits: Algebra II, Geometry **or** Math 10 (with teacher approval based on diagnostic results) 2-4 credits: Technical Math **or** state-approved alternative [NOTE: Students who must retake a math course in high school may graduate with 6 credits in math courses or a state-approved alternative. Integrated Math I, II and III may be completed as an alternative math sequence to Algebra I, Geometry and Algebra II.]
Science	**4 credits** 2 credits: Biology I 2 credits: Any science course **or** state-approved alternative
Social Studies	**4 credits** 2 credits: U.S. History 1 credit: U.S. Government 1 credit: Any social studies course **or** state-approved alternative
College & Career Readiness	**8 credits** 1 credit: Preparing for College & Careers (Should be completed by the end of 9th grade.) 1 credit: Personal Financial Responsibility 6 credits: College & Career Readiness Sequence (with graduation capstone) [NOTE: **College & Career Readiness Sequences** may include **Academic** courses, **Career & Technical Education** courses, **Early College** credits, **Fine Arts** courses, **Advanced Coursework** or other coursework aligned with a student's **College & Career Pathway Plan**. Students may earn 6 credits in a single sequence or 8 credits in two sequences.]
Health & Wellness	**3 credits** 2 credits: Physical Education 1 credit: Health & Wellness
Electives	**5-7 credits**

Graduation Capstone

Workforce Ready Diploma graduates must complete <u>at least one</u> of the following (aligned with their chosen College & Career Pathway Plan):

1) **Career Credential:** Complete an Industry-Recognized Certification, One-Year Certificate **or** state-approved alternative
2) **Career Experience:** Complete a project-based capstone **or** work-based learning experience
3) **College Credit:** Earn at least 3 transcripted college credits

***Indiana's College & Career Ready Diploma is the default diploma track for all Hoosier students. Graduating with the Workforce Ready Diploma requires formal parental consent and school principal certification. Unless a student's Individualized Education Plan (IEP) indicates otherwise, determinations that permit a student to graduate with the Workforce Ready Diploma should be made no earlier than the end of 10th grade.**

INDIANA COMMISSION for HIGHER EDUCATION

DRAFT

Resolution to Adopt Indiana's High School Diploma Requirements

August 13, 2015

WHEREAS, the Indiana General Assembly called upon the Indiana Career Council to make recommendations regarding revisions to the state's high school diploma requirements; and

WHEREAS, Indiana's high school diploma requirements define the knowledge and skills Hoosier graduates need to succeed in college and careers; and

WHEREAS, the proposed revisions to Indiana's high school diploma requirements were developed as part of a coordinated statewide effort, co-chaired by the Superintendent of Public Instruction and Commissioner for Higher Education; and

WHEREAS, the proposed high school diploma requirements were informed by national best-practice research and invaluable feedback from educators, employers, policymakers, community leaders, and the general public; and

WHEREAS, the proposed *"College & Career Ready"* and *"Workforce Ready"* diplomas build upon the strengths of Indiana's current diplomas to ensure that Hoosier students are prepared to meet the expectations of employers and education beyond high school; and

WHEREAS, the proposed *"College & Career Ready"* and *"Workforce Ready"* diplomas would replace the state's existing Core 40 and General Education diplomas, respectively, beginning with Hoosier students entering high school in 2018 (graduating class of 2022);

NOW THEREFORE BE IT RESOLVED, that

I. **The Indiana Commission for Higher Education approves the proposed requirements for Indiana's *"College & Career Ready"* and *"Workforce Ready"* high school diplomas;**

II. **The Commission recommends that the Indiana State Board of Education and Indiana General Assembly adopt the proposed diploma requirements; and**

III. **The Commission commits to working with educators and employers across Indiana to ensure that local schools and communities have the capacity and support necessary to meet these expectations for the benefit of all Hoosier students.**

COMMISSION FOR HIGHER EDUCATION
Thursday, August 13, 2015

BUSINESS ITEM B: **Bachelor of Science and Ph.D. in Intelligent Systems Engineering to be offered by Indiana University Bloomington**

Staff Recommendation That the Commission for Higher Education approve Bachelor of Science and Ph.D. in Intelligent Systems Engineering to be offered by Indiana University Bloomington in accordance with the background discussion in this agenda item and the Program Description.

Background

Review Process. These programs have been discussed twice by the Academic Affairs and Quality (AA&Q) Committee (May 26 and July 22) and once by the full Commission (June 11 morning Working Session). The Commission also posed two rounds of questions to Indiana University and one set of questions to Purdue University, the formal responses to which were a part of these discussions.

In addition to testimony from Indiana University, the Commission received oral testimony from Purdue University, Cook Group, the Naval Surface Warfare Center at Crane, and Tinderbox. At the July 22 meeting of the AA&Q Committee, Dr. Paul Peercy, Dean Emeritus of the College of Engineering at the University of Wisconsin at Madison, responded via conference call to questions from Commission members about the IU proposals.

Commission members had an opportunity to review several reports cited by Indiana University in its proposal, including: the *Report of the IU Bloomington Engineering Task Force* (2014); *An Assessment of the Proposal To Create a Department of Engineering at Indiana University Bloomington* (2015), also known as the Blue Ribbon Report; *Strategic Plan for Economic and Community Prosperity in Southwest Central Indiana* (2014), which was prepared by Battelle; and the *Central Indiana Tech Workforce Study* (2015) published by Techpoint.

Similar Programs in Indiana. At present, in the ***independent*** or private not-for-profit sector, seven institutions (Indiana Tech, Rose-Hulman Institute of Technology, Taylor University, Trine University, the University of Evansville, the University of Notre Dame, and Valparaiso University) offer ABET accredited baccalaureate engineering programs. Only one university (the University of Notre Dame) offers a doctoral degree in engineering.

No institution in the proprietary or private for-profit sector offers an accredited baccalaureate engineering program or a doctoral program in engineering.

Within the public sector, six institutions (IUPUI, IPFW, Purdue West Lafayette, Purdue Calumet, Purdue North Central, and USI) offer ABET-accredited baccalaureate engineering programs, and only one institution (Purdue West Lafayette) offers doctoral degree programs in engineering. In FY2014, these institutions awarded a total of 1,855 baccalaureate engineering degrees and 297 doctoral degrees in engineering.

Related Programs at IU Bloomington. The proposed B.S. and Ph.D. programs will be offered through the School of Informatics and Computing, whose offerings include baccalaureate and graduate programs in Informatics. In FY2014, the B.S. in Informatics enrolled 1,382 headcount students and graduated 211. In that same year, the Ph.D. in Informatics enrolled 99 students and produced 11 graduates. The University reports that it has over 100 faculty with engineering degrees in a variety of academic units throughout the campus.

Key Issues. Consideration of the proposed programs raised a number of key issues for the Commission, including the focus and scope of the programs, mission differentiation, and collaboration among IU Bloomington and Purdue West Lafayette campuses.

Focus and Scope

Indiana University has repeatedly indicated that it is committed to what the IU Board of Trustees has termed a "highly focused program in intelligent systems engineering." The University identifies three specializations within the baccalaureate program and six specific areas of focus within the Ph.D. Furthermore, the University has disavowed any intention of creating a school or college of engineering (the programs will be housed in the School of Informatics and Computing) or offering programs in traditional or infrastructure-intensive engineering disciplines.

In an effort to signify the focused nature of these programs, IU has changed the names of proposed B.S. and Ph.D. programs to "Intelligent Systems Engineering," a name suggested in the IU Task Force report that served as a basis for the proposals (the programs were originally proposed simply as "Engineering" programs).

Mission Differentiation

Until 2003, when the Commission approved a general engineering program for the University of Southern Indiana, Purdue University had the exclusive mission for engineering in the public sector (the engineering programs at IUPUI are offered by Purdue University). Engineering programs have never been offered by Indiana University, and would mark a significant expansion of its mission, even if the programs are highly focused and not a step toward establishing a school of engineering with an array of programs.

Indiana University reports that it is the only member of the Association of American Universities (AAU) that does not offer engineering and that several AAU institutions that did not previously offer engineering have moved recently to do so. The University regards the addition of engineering programs as a strategy to enable its existing strengths to be leveraged in new directions, enhance its overall research capabilities.

In response to questions by Commission members, Dr. Peercy expressed his belief that natural science and engineering disciplines are converging, with distinctions between them blurring, if not disappearing. He also stated his view that if we were creating a major research university from scratch today, engineering would certainly be included in the portfolio of programs the institution offered.

From a Commission perspective, the key question is whether proposed new programs represent necessary or unnecessary duplication of programmatic resources within the public sector. Especially with the Ph.D. program, a refined form of this question is whether the addition of the program, with its inevitable draw on significant state and University resources, will markedly enhance the research and development capabilities of the University and the state, thereby outweighing the investment of resources needed to implement the programs. The University's case is persuasive, leading to the conclusion that these programs would not constitute an unnecessary duplication of resources.

Collaboration

Considerable time was spent by the Commission exploring the possibility of creating an engineering presence on the Bloomington campus through collaboration with Purdue University West Lafayette. Purdue, in fact, proposed two potential models this collaboration: (1) "IU hosts a Purdue Engineering presence on the Bloomington campus" or (2) "Purdue and IU create a joint Ph.D. program in select areas of engineering, focusing on areas where the institutions' complementary strengths create new opportunities for both institutions and for the State."

Indiana University responded by indicating that in the first instance, the home campus manages the program and research, not the host campus, and that joint programs "would represent an entirely new level of complexity with instruction, curriculum, administration, and accreditation – with no obvious benefit to students or the research enterprise.

Key Understandings and Expectations. The Commission understands the University is not planning to add concentrations to the baccalaureate degree beyond the three described in the proposal (bioengineering, computer/cyber-physical systems engineering, and nanoscale systems engineering) and is not planning to add areas of focus to the Ph.D. beyond the six described in the proposal (bioengineering, computer engineering, cyber-physical systems, environmental engineering, molecular and nanoscale engineering, and neuro-engineering). The Commission expects that any addition or alteration to or re-naming of these concentrations or areas of focus must first be approved by the Commission, either through routine staff action or through a new program proposal.

The Commission understands that the University is not presently proposing that the proposed programs be offered at the IUPUI campus. The Commission expects that the offering of any significant coursework in support of these programs on the IUPUI campus will not occur in advance of the University submitting a new program proposal to the Commission for approval.

In her May 22 letter to Presidents Daniels and McRobbie, Commissioner Lubbers asked the two Presidents to think about whether "we need to find new ways to leverage the respective strengths of our two premier public university research campuses to benefit the State and our students." The Commission understands that both Presidents have acted upon this invitation and that high-level meetings of the academic leadership of the Universities have taken place on how the Bloomington and West Lafayette campuses might collaborate more closely, with teams assembled to focus initially on three areas: engineering, the life sciences, and IUPUI. The Commission expects that this work will continue in earnest and, as it does, the two Universities will engage with the Commission on these matters. The Commission further expects that Indiana and Purdue Universities will make a joint, formal progress report to the Commission not later than May 2016.

Supporting Documents

(1) Program Description – Bachelor of Science in Intelligent Systems Engineering

(2) Program Description – Ph.D. in Intelligent Systems Engineering

(3) Indiana University Responses (June 9 and July 20, 2015) and Purdue Reponses (July 20, 2015) to Commission Questions

Bachelor of Science (B.S.) in Engineering
Offered on the
Bloomington Campus, Indiana University

April 15, 2015

1 Characteristics of the Program

Campus Offering Program:	Bloomington
Scope of Delivery:	Bloomington
Mode of Delivery:	Classroom
Other Delivery Aspects:	None
Academic Unit Offering Program:	School of Informatics and Computing

2 Rationale for the Program

Indiana University is the only one of the 62 AAU universities (60 in the U.S.) that does not have any type of engineering program. As our society and economy have become far more technological, and as the scientific and technological emphases of Indiana University Bloomington (IUB) have evolved and matured, IU Bloomington can no longer fulfill its mission to its students, faculty, state, and nation without an engineering program. There are two major reasons for this which we expand upon immediately below:

1. Having engineering at IU Bloomington is vital for economic development in Indiana.
2. Having engineering is crucial to realizing the full potential of a broad spectrum of ongoing research and education at IU Bloomington.

We thus propose a Bachelor of Science degree in Engineering. The B.S. requires successful completion of General Education requirements for the Bloomington Campus, math and science foundations, engineering core courses, and one engineering area of concentration. The concentration areas are: 1. Bioengineering, 2. Computer/Cyber-Physical Systems Engineering, and 3. Nanoscale Systems Engineering. See Appendix B for more details about the proposed program. The B.S. degree will be distinguished both by these special foci, and by the content of the Engineering Core which accents a design-centered approach

to engineering. The core also includes two IT oriented courses: 1. Signals, Systems, and Control and 2. Intelligent Systems. The latter course provides an ideal IT related application context for system design, signal processing, and control theory. Our Engineering Core does not follow the more traditional static/mechanics/thermodynamics approach and is distinctly more IT/Intelligent Systems oriented.

2.1 Institutional Rationale

Establishing a new engineering program ab initio offers some very special opportunities to students. In particular, it allows the program to focus on a modern set of engineering topics as well as building in crucial components that have become highly important in recent years or decades, but are considerably harder to retrofit into existing programs. These include: multidisciplinarity, both within and beyond engineering disciplines; creating a culture and program design that intentionally enhances student and faculty diversity; an educational orientation towards building and design; an educational design that facilitates international experiences; a research and education orientation that incorporates modern information technology areas such as intelligent systems, big data, and user experience; and a research and educational orientation that considers the interplay between technology and society and draws upon IU Bloomington's great strengths in the social sciences and humanities.

Although IU Bloomington does not offer engineering degrees, a large amount of engineer- ing and engineering-related work goes on at the campus. Over 100 faculty members, research scientists and post-docs as well as many graduate students have engineering degrees. Many of these people are doing engineering-related research in areas of biology, biochemistry, chemistry, environmental sciences, informatics and computing, optometry, physics, psychological and brain sciences, and additional disciplines. In many cases, their work is limited by not having engineering students and faculty with whom they can collaborate. Adding an engineering program would strengthen the current research programs of these faculty members and allow them to pursue broader research and funding opportunities and attract additional students. Correspondingly, engineering faculty members at IU Bloomington would have a very strong base of engineering-related science to build upon and collaborate with, as well as relevant work in business, law, and other fields. These collaborations would contribute significantly to undergraduate and graduate engineering education as well as engineering research.

2.2 State Rationale

The current and future national and international economy demands that all major universities contribute to economic development in at least three ways: Producing graduates who are educated to become part of the technological and business workforce; engaging in partnerships with industry and government around technology and business issues; and contributing to the vitality of the economy through technology transfer. A recent study (dated June 2014, released Nov. 2014) funded by the Lilly Endowment and prepared by the Battelle Technology Partnership Practice, entitled *Strategic Plan for Economic and Community Prosperity*

in Southwest Central Indiana highlights this need. It recommends, "*Expand and/or develop IU Bloomington offerings in applied engineering, applied technologies, science, and systems engineering design and development areas, working in consultation with industry partners and NSWC Crane.*" (NSWC Crane is the Naval Surface Warfare Center located in Crane, Indiana 50 miles southwest of Bloomington.) It expands upon this recommendation: "*A key concern among many of the SWC Indiana's regional clusters is their ability to innovate, increase their productivity, and in certain instances move up the value chain within their clusters. A related issue voiced by industry leaders is the lack of engineering expertise in the region. While most companies and organizations in the region requiring engineering talent have relationships with either Purdue University or other regional engineering schools (typically by hiring graduates), the distance often limits potential further interactions and partnerships. It was also cited that the lack of any engineering or applied technology "connection point" with IU Bloomington makes it more difficult for regional manufacturers to find avenues in which to engage the University. An opportunity exists to launch an exploratory dialog between industry leaders within key SWC Indiana clusters, NSWC Crane, and the leadership of IU Bloomington to explore the possibilities of bridging this current gap in educational programming, talent generation, and applied research/technical assistance within the region.*" This recommendation is strongly echoed by major industry proximate to IU Bloomington. In addition to NSWC Crane, which employs over 3,000 naval personnel and thousands of contractors including over 2,000 scientists, engineers, and technicians, this includes Cummins and Cook Group. Cummins (headquartered in Columbus, IN (36 miles east of Bloomington)), is a company of approximately 48,000 employees worldwide that designs, manufactures, distributes, and services diesel and natural gas engines and related technologies. The Cook Group is a group of companies, headquartered in Bloomington and employing about 9,000 people worldwide, which primarily manufacture medical devices.

2.3 Evidence of Labor Market Need

(i) National, State, or Regional Need

In addition to employment opportunities and need illustrated by the examples of Crane, Cook Group, and Cummins above, as well as Eli Lilly, Dow AgroSciences, Boston Scientific, Baxter and many other companies in Indiana and the Midwest, we anticipate that the uniqueness of the program, the reputation of the School of Informatics and Computing and the excellence of residential undergraduate experience in Bloomington will attract students from other parts of Indiana and neighboring states. Given the ubiquity of networked sensor devices and wearable and/or mobile computing gadgets and the clear shift in industry towards fabrication of small-scale IT-enabled and con- trolled devices we anticipate that the local, and state level demand will only increase in the coming years. The B.S. curriculum (see Appendix B) is designed with these paradigm shifts in technology in mind.

(ii) Preparation for Graduate Programs or Other Benefits

Students will be well-positioned to continue their graduate education in any of the six concentration areas through our own Master's and Ph.D. in Engineering programs

as well as pursue their graduate education anywhere else in the country or in the world. The elective study abroad component of the program will give international experience to a select group of students who might later decide to continue their graduate studies overseas. We have also been working with Ash Soni, Executive Associate Dean for Academic Programs at the Kelley School of Business to design an accelerated (4+1) BSE/MBA program for our graduates. This option will be very attractive to those students who wish to enrich their technical and engineering knowledge with business/managerial skills. Moreover, we have been working with Donald Kuratko, Executive & Academic Director of the Johnson Center for Entrepreneurship & Innovation to design a joint Engineering Entrepreneurship certificate to be conferred by the School of Informatics and Computing.

The Physics Department at Indiana University Bloomington offers an alternative to the traditional Bachelor of Science degree in physics curriculum through the Applied Physics option. We have been working with Rob de Ruyter, Chair of the Physics Department on the design of a minor in Applied Physics for the proposed engineering program. This practical minor will prepare students for high-tech jobs in industry and medicine and is an excellent precursor to graduate programs in engineering and other applications of physics. It is yet another example of the multidisciplinary strength of the engineering program and defi es an organic relation between the engineering program and the College of Arts and Sciences.

(iii) **Employer Survey and Indiana DWD and US Department of Labor Data**

We anticipate that many of our graduates will be hired in the state of Indiana through organizations like the ones mentioned above (Crane NSWC, Cook Group, Cummins, Eli Lilly, Dow AgroSciences, Boston Scientific, Baxter) among many other companies in the state. We also anticipate a sizeable portion of our graduates will be hired in adjoining Midwest states, and that some will be hired in other major states with large technology industries such as California and Texas.

The table below combines state/national annual mean wage data from Bureau of Labor Statistics Occupational Employment and Wages from May 2013 (http://www.bls.gov/oes/) with projection data drawn from Hoosiers by the Numbers (http://www.hoosierdata.in.gov/).

Occupation Title	2012	2022	% Change	Indiana	National
Architectural and Engineering Managers	4,027	4,371	8.5	$112,280	$136,540
Architecture and Engineering Occupations	49,508	53,202	7.5	$68,980	$80,100
Biomedical Engineers	874	979	12.0	$65,460	$93,960
Computer Hardware Engineers	435	469	7.8	$81,390	$106,930
Electrical Engineers	2,743	2,826	3.0	$80,520	$93,380
Electronics Engineers, Except Computer	2,616	2,546	-2.7	$86,190	$97,870
Industrial Engineers	8,042	8,563	6.5	$71,450	$83,390
Materials Engineers	1,294	1,371	6.0	$84,600	$89,930
Engineers, All Other	2,282	2,543	11.4	$79,450	$94,310

Note that three of the highest projection areas are associated with Biomedical, Computer Hardware, and Materials Engineering which are closely related to the concentration areas in our program (see Appendix B).

(iv) **Letters of Support** (see Appendix A)

- *John Graham*, Dean, School of Public and Environmental Affairs
- *Idalene Kesner*, Dean, Kelley School of Business
- *Donald Kuratko*, Executive & Academic Director of The Johnson Center for Entrepreneurship & Innovation
- *Austen Parrish*, Dean and James H. Rudy Professor of Law
- *Larry Singell*, Executive Dean, College of Arts and Sciences

3 Cost and Support for the Program

3.1 Costs

(i) **Faculty and Staff**

We expect that the engineering program (both undergraduate and graduate) initially will require 20-25 new, dedicated engineering faculty members.

We also anticipate that the program would have a fairly large number of affiliated appointments (either adjunct or dual) from faculty currently in science and technology fi including biology, chemistry, computer science, environmental science, informatics, mathematics, physics, psychological and brain sciences, public health, statistics and other disciplines. These faculty members would play a key role in helping to develop the program as the core faculty are being hired, and would continue to play a role in undergraduate education.

Moreover, we are planning to hire 1-3 clinical instructors in the fi two years who have been practicing engineers in related fi to our program and will be heavily involved in undergraduate teaching and will be critically helpful in design-oriented and/or studio/lab-based classes.

The positions that will be needed at the outset include one or two laboratory mangers and an undergraduate advisor/coordinator. In addition, it is assumed there will be some leverage from a higher level unit for key areas including career services and development, likely requiring the hiring of an additional career services staff member.

(ii) **Facilities**

The educational programs will require a minimum of four or fi e teaching laboratories that support 25-50 students each, both for specialized courses such as signals, systems, and control, fabrication lab, and other design-oriented courses, and for general project and capstone courses. The initial course offerings will utilize at least three classrooms full time. The campus currently is building several fabrication laboratory facilities

(primarily in the School of Informatics and Computing) and the engineering program will lead to the need to expand the capacity of these.

A rough calculation is that at standard IU office and student lab sizes, the personnel mentioned above (including students) require about 10,000 gross square feet (gsf) of space. Teaching laboratories require about 5,000 gsf. Classroom space could require an additional 3,000 gsf if there is not available capacity on campus and fabrication lab expansion another 2,000 gsf. This leads to an estimate of 25,000 gsf of space to house the program in its early years. This space will be ready near the time of the fi incoming class of 2016.

In addition, it should be noted that facilities outside of the School of Informatics and Computing will require considerable capital investments. For example, the Bioengi- neering Concentration will require students to take a cohort of courses in Biology (BIOL L112, L211, and L323) as well as Chemistry (CHEM 117, CHEM 127 and/or CHEM 383) all of which are currently oversubscribed with large waiting lists. This will require careful attention and adequate support in terms of staffing, as well as laboratory space and equipment. The College of Arts and Sciences will therefore need campus support regarding these needs to be in a position to fully and productively support the B.S. in Engineering.

(iii) **Other Capital Costs (e.g., equipment)**

All lab and project based classes will require electrical and mechanical equipment, including fabrication material and measurement instruments. A separate budget has been set aside to meet such expenses.

3.2 Support

The teaching support for the fi year of the curriculum (see Appendix B) is already in place. There are four courses that need to be designed for the freshman class and the syllabi for three out of four courses are already under preparation, all of which have available faculty at this time. The remaining fourth class (an engineering elective offered in semester 2) is supposed to offer a preview of all concentration areas with hands-on projects. The development of this course may require the presence of some new faculty. In the following years, with the new faculty in place we will have enough support for all our engineering course offerings.

We propose a tentative special fee of $1,000/year above baseline tuition to support the program.

4 Similar and Related Programs

4.1 List of Programs and Degrees Conferred

(i) **Similar Programs at Other Institutions**

Purdue University and University of Southern Indiana are the only two universities in the state of Indiana that offer a similar (in title) degree to our proposed B.S. degree:

A B.S. in General Engineering (under Multidisciplinary Engineering) in the case of Purdue, and a B.S. in Engineering in the case of University of Southern Indiana. The proposed IU degree is signifi tly diff t from both and thus adds significantly to the educational offerings in the STEM disciplines, and engineering in particular, that are available to Indiana students and support innovation and application. Despite obvious and necessary similarities in capstone design and some computer area courses the program we are proposing distinguishes itself from both Purdue and Southern Indiana in the content of the Engineering Core which is heavily design oriented with two technical courses that introduce signals, systems, and control as part of the core and contextualize these techniques in the area of Intelligent Systems. Our Engineering Core does not follow the more traditional static/mechanics/thermodynamics approach and is distinctly more IT/Intelligent Systems oriented. This latter orientation is further emphasized in the Computer/Cyber-Physical Systems Engineering concentration area which is hence diff rent from more traditional computer engineering curricula at Purdue and Southern Indiana. Moreover, this focus logically extends existing areas of strength at IU, bringing to the existing areas a focus on making and application.

University of Southern Indiana does not offer Nano-engineering or Bioengineering, we thus compare our related concentration areas to those at Purdue University.

The main focus of Purdue's courses for their School of Biomedical Engineering and the Bioengineering program they support is in biomechanics. The concentration area we propose here is geared towards bioprocessing and relates more to environmental engineering (especially sustainability) and nano-bio/synthetic-bio. Moving forward we envision more integration of this area with Cyber-physical systems and nano areas with applications and projects in environmental engineering and public health.

Purdue's Nano-engineering program has multiple tracks: nanotechnology for electrical, mechanical, or materials focused students. These tracks build on an engineering core and some design/labs courses. Despite possible content overlap and similarity in one or two courses with our Nanoscale Systems Engineering area, the IU and Purdue tracks are fundamentally diff t in the composition of the engineering core to which they relate and upon which they build the concentration area. IU's core is design-centred with two technical courses that emphasize signals, systems, and control in the context of cyber-physical and intelligent systems. This provides for a unique interdisciplinary approach with a distinct IT orientation. In addition, IU's Nano concentration has more required classes (six) that are explicitly nanotechnology related with nanoscale at the center of every course. In particular, IU's Year 2 is fundamentally diff t from all three tracks of Purdue's program, with an emphasis on the scientific principles that underlie a diversity of nanoscale materials, including those organic and biologically based.

Our proposed Nano concentration uniquely integrates concepts from electrical and materials engineering with nanoscience to prepare students to work with cyber-physical systems or other responsive intelligent systems that include nanoscale building blocks. Our proposed nanotechnology track would also build on IU's strong traditions in the physical sciences, equipping students to adapt to and design with new nanomaterials

(inorganic, organic, and biological) as they become available.

In all of these ways, the proposed IU degree does not duplicate existing programs, but rather expands the engineering options available in Indiana for education, research, and innovation. Importantly, it builds on strengths in Informatics and design that have been developed at IU–with significant state support–for nearly two decades, allowing those strengths to be better leveraged in applied learning and research.

(ii) **Related Programs at the Proposing Institution**

There are no engineering programs at IUB. However, there are many disciplines, such as biology, biochemistry, chemistry, environmental sciences, informatics and computing, optometry, physics, psychological and brain sciences that can contribute to and will benefit from having such an engineering program on Bloomington campus.

4.2 List of Similar Programs Outside Indiana

The engineering programs at Franklin W. Olin College of Engineering, Smith College, Swarthmore College, Harvey Mudd have been constant sources of inspiration for our curricular design. Thus each is similar to our program in one or more dimensions but overall our program as a whole is distinct from all of these in fundamental ways.

4.3 Articulation of Associate/Baccalaureate Programs

An appropriate articulation pathway will be designed once the engineering program gets started.

4.4 Collaboration with Similar or Related Programs on Other Campuses

We envision future collaboration with Purdue School of Engineering and Technology at IUPUI.

5 Quality and Other Aspects of the Program

See Appendix B for degree requirements and a sample study plan.

5.1 Exceeding the Standard Expectation of Credit Hours

N/A.

5.2 Program Competencies or Learning Outcomes

Student learning outcomes are adopted from ABET Criterion 3. Student Outcomes (a-k). Student outcomes describe what students are expected to know and be able to do by the time

of graduation. These relate to the knowledge, skills, and behaviors that students acquire as they progress through the program. These are:

a. An ability to apply knowledge of mathematics, science, and engineering

b. An ability to design and conduct experiments, as well as to analyze and interpret data

c. An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

d. An ability to function on multidisciplinary teams

e. An ability to identify, formulate, and solve engineering problems

f. An understanding of professional and ethical responsibility

g. An ability to communicate effectively

h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

i. A recognition of the need for, and an ability to engage in life-long learning

j. A knowledge of contemporary issues

k. An ability to use techniques, skills, and modern engineering tools necessary for engineering practice

5.3 Assessment of learning outcomes

Assessment is one or more processes that identify, collect, and prepare data to evaluate the attainment of student learning outcomes and program educational objectives. Effective assessment uses relevant direct, indirect, quantitative and qualitative measures as appropriate to the objective or outcome being measured. Appropriate sampling methods may be used as part of an assessment process. Here are a few assessment methods we plan to use:

1. Specific exam questions on core courses measuring the ability to apply science and mathematics knowledge.

2. Specific items on experiment and project reports measuring the ability to conduct experiments and analyze data and carefully document the work.

3. Specific programming projects and questions to measure ability to solve engineering problems algorithmically.

4. Specific quiz problems administered during lab sessions to measure ability to use engineering tools.

5. Class presentations in some classes to measure effectiveness of communication.

5.4 Licensure and Certification

N/A

5.5 Placement of Graduates

Students will have full access to the office of Career Services of the School of Informatics and Computing which has had a stellar track record in the last few years. Students will have access to Spring and Fall career fairs with over 100 companies in attendance during each fair, they will also use the Simplicity system which provides a convenient and highly functional access to employer's job listing, résumé posting, and job search. Career services will offer multiple workshops, professional development courses, mock interviews, etc. throughout the year to help with the placement of our graduates. There will be a new hire in the career services dedicated to engineering students and employer development.

5.6 Accreditation

The Accreditation Board for Engineering and Technology (ABET) requires general and domain specific criteria. For the degree of Engineering there are no specific requirements. The proposed bachelor's degree fully complies with the general criteria specified by ABET. The program will become eligible for accreditation in 2020.

6 Projected Headcount and FTE Enrollments and Degrees Conferred

We anticipate an incoming class of 50 students in Fall 2016. We plan to grow the major to 500 in the fi 6 years.

Year	2016/17	2017/18	2018/19	2019/20	2020/21	2121/22	2022/23
New Students	50	80	125	125	125	125	125
Cumulative	50	130	255	380	455	500	500
Degrees Conferred	0	0	0	50	80	125	125

Appendix A. Letters of Support

INDIANA UNIVERSITY

SCHOOL OF PUBLIC AND
ENVIRONMENTAL AFFAIRS

March 11, 2015

Dean Robert Schnabel,
School of Informatics and Computing
919 E. 10th Street
Room 210

Bloomington, IN 47405

RE: Letter of support for BS and PHD programs in engineering Dear

Dean Schnabel,

I am pleased to offer the support of the Office of the Dean in the School of Public and Environmental Affairs for the development of BS and PhD degrees in engineering on the Bloomington campus. The stature of IUB as a major international research university will be clearly enhanced by a 'high-tech' engineering program that offers synergies with the existing strengths of Bloomington science programs and also serves local, regional, and national labor markets.

Although SPEA's involvement will likely be greatest in the PhD track in environmental engineering, I expect that there may be opportunities for courses in our existing undergraduate curriculum that will also benefit engineering students in the BS degree program, particularly with respect to sustainability, public policy, and understanding the complex, societal impacts of technological development.

The environmental engineering track of the PhD program has obvious mutual benefits for the research and teaching activities of our environmental science faculty. A number of these faculty members have degrees in engineering or related scientific fields and would like to participate in the engineering program as affiliated faculty. I have learned that they believe offering a PhD in Engineering might allow them to recruit desirable students from a different pool, more easily pursue novel research areas, and ultimately be more competitive for external funding from federal and industrial sources.

In summary, we are highly supportive of the proposed program and I look forward to development of ways that the School of Public and Environmental Affairs might collaborate with the engineering program as these new degrees are developed.

Sincerely,

D. Graham, Pll.D.
Dean

Office of the Dean Bloomington, IN 47405-1701 (812) 855-1432 (812) 855-5058 fax (812) 855-6234

KELLEY SCHOOL OF BUSINESS

INDIANA UNIVERSITY
Office of the Dean

March 9, 2015

Dean Robert B. Schnabel
School of Informatics & Computing
Indiana University
919 E. 10th Street, Room 210
Bloomington, IN 47405

Dear Bobby,

It is our pleasure to offer this letter of support for the two newly proposed programs for the IU Bloomington campus – BS in Engineering and Ph.D. in Engineering. The Kelley School participated in the creation of these initiatives through the work of Executive Associate Dean Ash Soni, who has also signed this letter of support. For both of the proposed programs, we have reviewed the rationales, the expected learning outcomes, the expected costs, and the projections of enrollments, and we are convinced that.these programs will contribute individually and collectively **in** significantly positive ways to the academic environment at IU Bloomington. Also, after examining similar programs elsewhere relative to demand, it is clear that an additional high quality undergraduate and doctoral program of the types proposed here would benefit the broader environment.

We are particularly excited by the opportunity to have the Kelley School join **in** supporting the students enrolled in the newly proposed engineering programs. At the undergraduate level in particular, we can see the possibility of students majoring in engineering and adding a business minor. Based on our experience with candidates applying for our masters programs, we know that this is a valuable combination, and one that will attract the best and brightest students to Indiana University. We offer many courses that fit within the field of engineering proposed, and we would be delighted to offer more sections of these courses if needed to accommodate the undergraduate engineering students.

We hope the proposals for the BS and Ph.D. in Engineering will be well received by all levels at the University and beyond. The Kelley School supports this effort in full, and we look forward to a successful launch one day soon. Finally, if you should have other questions or need additional information, please do not hesitate to contact us.

With kind regards,

Idalene F. Kesner

Dean, Kelley School
Frank P. Popoff Chair of Strategic Management

Ash Soni

Executive Associate Dean, Kelley School
The John & Esther Reese Professor

1275 E. Tenth Street Bloomington, IN 47405-1703 (812) 855-8489 .fax (812) 855-8983

KELLEY SCHOOL OF BUSINESS
INDIANA UNIVERSITY
Johnson Center for Entrepreneurship & Innovation

1275 E. 10TH STREET - BLOOMINGTON, IN 47405 PH 812. 855.4248 - FAX 812.855.2751 WWW.KELLEY.INDIANA.EDU/JCEI

RE: Bachelor of Science in Engineering

To Whom It May Concern:

I am writing this memo in support of the newly proposed Bachelor of Science in Engineering degree. As the Executive & Academic Director of the Johnson Center for Entrepreneurship & Innovation at the Kelley School of Business, I believe this degree can be very beneficial to our entire campus as the world of technology increases its pace at an exponential rate.

From the Kelley School perspective, our students are extremely interested in understanding the technology side of entrepreneurship. I have visited with the Associate Dean of the School of Informatics and Computing to discuss the various ways that a collaborative effort could be beneficial to students at the Kelley School.

In that vein we have explored the potential design of a joint Engineering Entrepreneurship certificate to be conferred by the School of Informatics and Computing. Because we already developed and now offer a Customized Cross Campus Certificate in Entrepreneurship that emanates from the Kelley School, I believe this unique joint certificate in Engineering Entrepreneurship (or Technology Entrepreneurship) would be a major asset in fully developing our entrepreneurship students and increasing the "entrepreneurial mindset" on the IU-Bloomington campus.

With these thoughts in mind, I fully support the newly proposed bachelor's degree in engineering.

Sincerely,

Dr. Donald F. Kuratko
The Jack M. Gill Distinguished Chair of Entrepreneurship; Professor of Entrepreneurship; Executive & Academic Director Johnson Center for Entrepreneurship & Innovation
The Kelley School of Business Indiana University – Bloomington Bloomington, IN 47405

MAURER SCHOOL OF LAW
INDIANA UNIVERSITY
Bloomington

March 17, 2015

Dean Robert Schnabel
School of Informatics and Computing
Indiana University, Informatics East 210 919
E. 10th Street
Bloomington, IN 47408

Re: Letter of Support for Engineering Degree Proposals

Dear Bobby,

This letter is written on behalf of the law school to enthusiastically support the proposals to establish B.S. and Ph.D. degrees in engineering. Professor Mark Janis, who heads the law school's Center for Intellectual Property Research and served on the engineering task force, joins me in supporting these new degrees and has also signed this letter.

The law school strongly supports the University's efforts to establish a targeted new program in engineering on the Indiana University Bloomington campus that builds on existing IU strengths (in areas such as information technology, for example) and complements engineering programs already established at other institutions in the state. We view the creation of an engineering program as: (1) important in strengthening IU's reputation among our peer institutions, which all have engineering programs; (2) providing a broader array of educational opportunities and assisting in recruiting excellent students to our campus; and (3) as a way for the University to make additional contributions to state and local economic development. An engineering program will help bolster and stimulate various other collaborative research programs and projects, as well as expand the campus's ability to generate grant support for its research activities. As we understand it, Indiana University Bloomington remains the only AAU institution without an engineering program – we view that absence as problematic for a top tiered research university such as ours. Lastly, Indiana and its increasingly technology-driven economy faces a growing need for leaders with engineering backgrounds, and a new engineering program could help address that need. The establishment of a B.S. in Engineering and a Ph.D. in Engineering are therefore welcomed by the law school.

The law school is particularly supportive of the proposed degrees. Increasingly the law school recruits students with engineering backgrounds into its intellectual property law and other technology- based law programs. Students with an engineering background and a law degree are also exceptionally competitive in the job market. As a result, the law school has already partnered with top engineering schools throughout the country, including those at Purdue, Rose-Hulman, Georgia Tech, and Iowa State, and a with a number of foreign technology-focused law schools. We would welcome the opportunity to establish a similar partnership on our own campus.

Moreover, we also see the potential for a number a potential cooperative teaching and research initiatives between the engineering program and the law school's Center for Intellectual Property Research. For example, the Center is developing patent law curriculum suitable for undergraduate engineering students in a range of courses from introductory freshman engineering courses through upper-level engineering design courses. Integrating intellectual property and entrepreneurship studies deeply into an undergraduate engineering curriculum, and offering optional minors or certificates, would

distinguish IU's engineering programs from many others, and would align well with campus strategic objectives. It may also present an opportunity for collaborative interdisciplinary work in engineering education that may be of interest to external funding sources. In addition, the Center's research activities in areas such as the legal protection of big data and design protection for GUI's may have a close nexus with research in the new engineering program, and could serve as focal points for seeking new grant funding.

In sum, the law school supports the degree proposals. We look forward to partnering with the engineering program and hope that the new degrees are established quickly.

Sincerely,

Austen L. Parrish
Dean and James H. Rudy Professor of Law
Indiana University Maurer School of Law

Sincerely,

Mark Janis
Robert A. Lucas Chair of Law
Director, Center for Intellectual Property Research

COLLEGE OF
ARTS AND SCIENCES
INDIANA UNIVERSITY
Office of the Executive Dean
Bloomington

March 17, 2015

Dr. Robert Schnabel
Dean, School of Informatics and Computing
Indiana University
Bloomington, IN 47405 Dear

Dean Schnabel:

I would like to communicate with this brief letter my strong support for the development of an Engineering BS degree and PhD in the School of Informatics and Computing (SOIC) at Indiana University Bloomington. It is my view that the development of Engineering is not only important for the future of SOIC, but it is also central to the success of the College. In particular, the chairs of Chemistry, Physics, and Biology have indicated to me that the presence of Engineering on campus will greatly enhance their ability to seek external funding: in particular, both NIH and NSF grants increasingly require Engineering faculty to be included as investigators to demonstrate the translational nature of the research, which is critical for a successful proposal. An Engineering program is also synergistic with strong Chemistry, Physics and Biology departments because these fields are collectively necessary to attract and train top PhD students in each of these fields. A BA in Engineering will also afford an opportunity for our science faculty to teach the important science gateway courses for Engineering students, which will improve the student credit hours in the sciences. In addition, the opportunity for our undergraduate students in the sciences to take engineering courses may well improve their subsequent job opportunities. Thus, the development of an Engineering program in SOIC is unambiguously a positive development for the Division of Sciences in the College.

It is also the case that the development of Engineering in SOIC could well have wider benefits to the College. For example, the College is in the process of forming a new School of Art and Design and it is highly likely that the Engineering faculty in the program will benefit from both the computer-design and architecture-design faculty in this new school. Our undergraduate and MFA students would also benefit from the opportunity to take IT related engineering courses at both the undergraduate and graduate level. Thus, the committee charged with writing the document detailing the aspects of the new school to the Board of Trustees has indicated the importance of an Engineering Program to the success of this new school.

Overall, the College is enthusiastic about the presence of Engineering at IUB and sees this new program as an opportunity to further partner with the SOIC. Thus, as the Executive Dean of the College, I enthusiastically endorse the development of the Engineering Program in the SOIC. I and the College faculty look forward to working with you in the near future to help in the development of this new program.

Sincerely,

Larry D. Singell
Executive Dean

Appendix B. B.S. in Engineering

Bachelor of Science degree in Engineering will be conferred by the School of Informatics and Computing (SoIC). This B.S. degree requires completion of a minimum of 120 credit hours of coursework. The B.S. degree requires successful completion of General Education (GenEd) requirements for the Bloomington Campus, math and science foundations, engineering core courses, 2 engineering electives, 4 general electives, and one engineering area of concentration.

All ENGR-coded courses below are new and will be designed by program faculty. The prerequisite requirements for the existing IUB courses below will be reconfigured for engineering students.

IUB General Education Common Grounds Requirements

Foundations: English Composition	3 cr
Foundations: Mathematical Modeling (satisfied by Math and Science Foundations)	0 cr
World Languages and Culture (multiple possibilities)	6 cr
Arts and Humanities (two courses)	6 cr
Social and Historical Studies (two courses)	6 cr
Natural and Mathematical Sciences (satisfied by Math and Science Foundations)	0 cr
Total	**21 cr**

IUB General Education Shared Goals Requirements

Intensive Writing	Any approved relevant course on campus	3 cr
Diversity & Ethics	Any approved relevant course on campus	3 cr
Total		**6 cr**

Math and Science Foundations

Mathematics	MATH M211 Calculus I, MATH M212 Calculus II, MATH M343 Diff. Eqns with App. I	11 cr
Physics	PHYS P221 Physics I, PHYS P222 Physics II	10 cr
Elective, choose three or two 5 cr	MATH M311 Calculus III, ENGR Prob and Stat Methods for Eng., other Math and Stat courses CHEM C117, CHEM C127, other science courses	9 cr
Total		**30 cr**

Engineering Core

Innovation and Design	3 cr
Cyber-physical Design	3 cr
Programming for Engineers	3 cr
Signals, Systems, and Control	4 cr
Intelligent Systems	4 cr
Professional Development	1 cr
Capstone Design I	3 cr
Capstone Design II	3 cr
Total	**24 cr**

Engineering Electives (2 courses from the list below[1])

Engineering for Good	Incorporates experience abroad for 1-2 weeks, students will work on projects with faculty and working engineers on a real world project	3 cr
Engineering Design Process	Product management, Entrepreneurship, Patents, and IP, in collaboration with Kelley School and Law School	4 cr
Engineering Challenges in the 21st Century	new course	3 cr
History of Engineering	new course	3 cr
Sustainability	Any approved relevant course on campus	3 cr
Human-Centered Design & Engineering	new course	3 cr
Engineering Seminar	Research experience	3 cr
Signals and Information Processing in Living Systems	PHYS P317	3 cr
Explore Engineering	An introduction to concentration areas through hands-on projects in each area	2 cr
Other courses		

Concentration Areas

Each concentration area requires 18-21 credit hours. These areas are: 1. Bioengineering, 2. Computer/Cyber-Physical Systems Engineering, 3. Nanoscale Systems Engineering.

Bioengineering Concentration

Bioengineering is a broad fi with many subdisciplines. Drawing on existing campus expertise, we propose to focus on areas related to bioprocess engineering, environmental engineering (with SPEA and School of Public Health), and in programs related to nanotechnologies (with Chemistry). New and future courses by bioengineering track faculty will focus

[1]This is an illustrative list of the kinds of courses that qualify as engineering electives.

on IT-enabled and cyber-physical systems for imaging and sensors used in medical/biological and environmental applications.

Area Requirements: Engineering Core + the following

(i) *Year 1*

- Introductory Biology, Biological Mechanisms: BIOL L112 (3 cr)
- Biochemistry: Either CHEM C117 (3 cr) with CHEM C127 lab (2 cr) OR Chemistry of Living Systems: CHEM C383 (3 cr)

(ii) *Year 2*

- Molecular Biology: BIOL L211 (3 cr)
- Molecular Biology Lab: BIOL L323 (3 cr)

(iii) *Year 3*

- Cell Biology: BIOL L312 (3 cr)
- Microbial Physiology and Biochemistry: BIOL M350 (3 cr)

(iv) *Year 3/4 Electives*

- Cell Biology Lab BIOL L313 (2 cr)
- Microbial Physiology Lab BIOL M360 (2 cr)
- Environmental Biology BIOL L350 (3 cr)
- Microbial Ecology BIOL L472
- Laboratory in Macromolecular Production BIOT T425
- Structure, Function, and Regulation of Biomolecules BIOT T440
- Virology BIOL M430
- Virology Lab BIOL M435
- Digital Imaging and Analysis (and Lab), *new course*

Computer/Cyber-Physical Systems Engineering Concentration

Modern computing systems are increasingly large, complex, and heterogeneous; they must be highly reliable, responsive, and secure. Contemporary computer engineers should be comfortable with this entire software and hardware "stack" from embedded processors and operating systems to network switches and their control software, to large-scale processing systems. They must be able to evaluate this stack from a variety of perspectives including performance, reliability, and security.

Cyber-Physical Systems (CPS), has emerged in the last decade as a distinct intellectual discipline. Loosely defi as smart networked systems with embedded sensors and actuators that are designed to interact with the physical world and support real-time, guaranteed performance in safety-critical applications. As a discipline, CPS spans traditional engineering areas including computer engineering, communications, and control as well as Computer Science areas including networking, distributed systems, and security. CPS application areas span agriculture, civil engineer, defence, energy, healthcare, manufacturing, and transport. At Indiana University, CPS bridges traditional computer science strengths in security, networking, and formal verification with environmental science, neuroscience, cognitive science, and signal processing in biological systems.

The importance of CPS as a distinct discipline is articulated in key federal reports released by the Presidents Council of Advisors on Science and Technology and the NITRD (the national program which coordinates networking and IT R&D efforts for a number of federal agencies). These in turn led to the creation of a major multi-agency research program in CPS led by the National Science Foundation.

Area Requirements: Engineering Core + the following

(i) *Required*

- ENGR Software Carpentry (1 cr)
- ENGR Circuit fab and testing (1 cr)
- CSCI C335 Computer Structures (4 cr)
- CSCI P442 Digital Systems (4 cr)
- ENGR System Software (4 cr)

(ii) *Electives up to 21 credit hours*

- ENGR Principles of CPS (4 cr)
- CSCI B441 Digital Design (4 cr)
- ENGR Digital System Architecture (4 cr)
- ENGR Designing the Internet of Things (4 cr)
- ENGR FabLab (1 cr)
- ENGR Security for CPS (4 cr)

Nanoscale Systems Engineering Concentration

Building from the precision of molecular and nanoscale building blocks, new materials and responsive/adaptive platforms can be designed to translate advances from physics, chemistry, biology, and computational sciences into functional tools. The scope of molecular and nanoscale engineering is broad. Promising areas for emphasis that connect to existing strengths at IU include engineering quantum technologies and nanomanufacturing via self-assembly. Both areas go beyond Moore's law and facilitate the manufacturing of chemical and biological sensors, opto-electronic switches, and higher density storage platforms. These areas build on existing strengths in self-assembly (chemistry and biochemistry), molecular and nanoscale design (chemistry, physics, and biochemistry), and simulation (School of Informatics and Computing, mathematics, physics, and chemistry).

Area Requirements: Engineering Core + the following

(i) *Year 1*

- Principles of Chemistry and Biochemistry + lab:
  CHEM C117 (3 cr) and CHEM C127 (2 cr)
- Introduction to Nanotechnology (3 cr) or Nanoengineering Seminar (1 cr), *new courses*

(ii) *Year 2*

- Nanomaterial Design I: Chemical and Biochemical Principles (3 cr): CHEM C420 (Advanced and Nanoscale Materials)
- Nanomaterial Design II: Physical Principles (3 cr), *new course*

(iii) *Years 3/4*

- Electronic Devices and Circuits for NanoEngineers (3 cr), *new course*
- Design and Fabrication of Nanoscale Systems (3 cr), *new course*
- Characterization of Nanoscale Systems (3 cr): CHEM C416 (Surface Analysis and Surface Chemistry)
- Modeling of Nanoscale Systems (3 cr), *new course*

Sample Plan of Study[2]

First Year

Semester 1

ENGR	Innovation and Design	3 cr
MATH M211	Calculus I	4 cr
PHYS P221	Physics I	5 cr
ENGR	Programming for Engineers	3 cr
Total		**15 cr**

Semester 2

MATH M212	Calculus II	4 cr
ENGR	Cyber-physical Design	3 cr
ENGR	Eng. Elective	2 cr
IUB	Elective	3 cr
IUB	English Composition	3 cr
Total		**15 cr**

Second Year

Semester 3

ENGR	Signals, Systems, and Control	4 cr
IUB	Math & Sci. Elective	3 cr
ENGR	Area I	3 cr
PHYS P222	Physics II	5 cr
Total		**15 cr**

Semester 4

IUB	Math & Sci. Elective	3 cr
MATH M343	Diff.Eqns with App.I	3 cr
IUB	Intensive Writing	3 cr
IUB	A&H	3 cr
ENGR	Area II	3 cr
Total		**15 cr**

Third Year

Semester 5

ENGR	Intelligent Systems	4 cr
ENGR	Area III	3 cr
ENGR	Prof. Dvlp.	1 cr
IUB	World Culture I	3 cr
IUB	Math & Sci. Elective	4 cr
Total		**15 cr**

Semester 6

ENGR	Area IV	3 cr
ENGR	Area V	3 cr
IUB	Ethics	3 cr
IUB	World Culture II	3 cr
ENGR	Eng. Elective	3 cr
Total		**15 cr**

Fourth Year

Semester 7

ENGR	Area VI	3 cr
IUB	S&H	3 cr
IUB	Elective	3 cr
IUB	Elective	3 cr

Semester 8

ENGR	Capstone Design I	3 cr	**Total**	**15 cr**

IUB	Elective	3 cr
IUB	Elective	3 cr
IUB	S&H	3 cr
IUB	A&H	3 cr
ENGR	Capstone Design II	3 cr
Total cr		**15**

[2]This is a generic plan where concentration area courses are noted as Area I, Area II, etc. It only suggests one possible study plan.

Program Proposal:

Ph.D. in Engineering To Be Offered by Indiana University Bloomington

1 *Characteristics of the Program*

1. Campus Offering Program: Bloomington
2. Scope of Delivery: Bloomington
3. Mode of Delivery: Classroom
4. Other Delivery Aspects: None
5. Academic Unit(s) Offering Program: School of Informatics and Computing

2 *Rationale for the Program*

1. Institutional Rationale

The proposed Ph.D. program is a component of a larger and concerted effort to establish the highest quality engineering education at Indiana University Bloomington. A Ph.D. program is a necessary component of an academic department at any world-class research institution such as IU Bloomington. In addition to supporting the research mission of the institution, a Ph.D. program also allows IU to support undergraduate education at the expected level of quality, as well as to attract new engineering faculty of the caliber consistent with IU's stature. The pressing need to establish formal engineering education at Indiana University Bloomington is recognized in the recently approved (December 2014) "Bicentennial Strategic Plan for Indiana University" under Bicentennial Priority Eight.

Indiana University is the only member (out of 62) of the Association of American Universities that does not offer any type of engineering program. As our society and economy continue to become far more technological, and as the scientific and technological emphases of Indiana University Bloomington continue to evolve and mature, Indiana University Bloomington can no longer fulfill its mission to its students, faculty, state, and nation without engineering. Engineering is essential for three major reasons:

3 An engineering program at IU Bloomington is vital for economic development in Indiana;
4 Engineering as a discipline is crucial to realizing the full potential of a broad spectrum of ongoing research and education at IU Bloomington; and
5 The presence of an engineering program is vital to recruiting excellent students and faculty in other (related and unrelated) disciplines to IU Bloomington.

In spite of not having engineering departments or degrees, there is a large amount of engineering-related research and many engineering-trained faculty members at IU Bloomington. In addition, any number of programs would significantly benefit from the presence of Engineering and the synergies that it would enable. This situation has become far more pronounced in the last 15 years, as IU Bloomington has evolved from having a Department of Computer Science with less than 25 faculty, to a School of Informatics and Computing

(including computer science) which is one of the largest and broadest in the nation, with nearly 90 tenure track faculty members in Bloomington. Overall, IU Bloomington has over 60 tenure track faculty members with one or more degrees in engineering, with the largest numbers in the School of Informatics and Computing, the Kelley School of Business, and the School of Public and Environmental Affairs.

IU Bloomington intends to build its engineering program around areas of engineering that share the following characteristics:

1. Utilization of existing campus research strengths in areas of science and technology, from informatics and computing, biology, chemistry, physics, psychological and brain sciences, environmental science and health, and other fields;
2. Focus on smaller scale, often mobile, often personal/consumer technologies and devices, as opposed to engineering that involves large-scale infrastructure and addresses massive structures, plants or systems;
3. Incorporation of modern information technology approaches including big data, computational modeling, intelligent systems, and user interface design;
4. Incorporation of design principles that make use of synergies in hardware and software, possibly guided by implementations observed in living systems.

The engineering program will initially focus on six overlapping areas that share the four characteristics mentioned above:

l. Bioengineering;
m. Computer Engineering;
n. Cyber-Physical Systems;
o. Environmental Engineering;
p. Molecular and Nanoscale Engineering; and
q. Neuro-Engineering.

The Ph.D. in Engineering will be constructed to include tracks related to each of the featured areas in the program. One possible pathway into the program is to enter with an M.S. in a related science or technology field.

2. State Rationale

The strategic plan *Reaching Higher, Achieving More* notes: "The imperative to increase Hoosier's education level demands a bold vision and a comprehensive strategy for reinventing post-secondary education." The overall Engineering Program at Indiana University Bloomington materializes from just such vision and strategy, leading to a modern, dynamic program in critically important STEM fields. *Reaching Higher, Achieving More* further calls for higher education that is student-centered, mission-driven, and workforce-aligned. The Ph.D. program is crucial for delivering an engineering education at IU Bloomington that fulfills the *Reaching Higher, Achieving More* call to focus on three metrics that are primarily a concern for undergraduate education: completion, productivity, and quality.

In a broader context, the proposed program aligns with the key drivers identified in *Indiana Vision 2025*, a comprehensive, multi-year initiative to provide direction, leadership, and a long-

range economic development strategy for the state of Indiana to help ensure the prosperity of Hoosiers. Amongst its strategic goals is to increase the proportion of Indiana residents with postsecondary credentials in STEM-related fields to "Top 5" status internationally. It states: "*developing human potential through education, training and exposure to new ways of thinking and doing things is of paramount importance, especially given current demographic trends.*" The proposed program, built on interdisciplinary collaborations in STEM fields, offers education and training in a new way of thinking about and practicing engineering, in synchrony with how the 21st century has redefined the field. It will increase the proportion of Indiana residents with postsecondary credentials in STEM fields.

3. Evidence of Labor Market Need

- **National, State, or Regional Need**

The current and future national and international economy demands that all major universities contribute to economic development in at least three ways: producing graduates who are educated to become part of the technological and business workforce; engaging in partnerships with industry and government around technology and business issues; and contributing to the vitality of the economy through technology transfer.

In accordance with the stature of Indiana University as a major international research university, the program will serve labor market needs locally, regionally, and nationally. The graduates of the program will have unique skill sets and be qualified to work at research institutions as well as in governmental and industrial settings, including, for example, the biomedical and pharmaceutical, manufacturing, environmental, defense, and financial industries. Historically, graduates of Ph.D. programs in engineering and information technology have had an inclination towards entrepreneurship; a tendency, which, when nurtured by opportunities afforded by the Kelley School of Business and coupled with the state-level economic climate, can result in both new high-tech companies in Indiana and the enhancement of business opportunities for current employers.

Regionally, the program will contribute to the economic development by creating a link between Indiana University Bloomington and regional industry partners. Several notable examples of such regional industry partners include: Naval Surface Warfare Center (NSWC) Crane, located 50 miles southwest of Bloomington in Crane, Indiana. NSWC Crane employs over 3,000 naval personnel and thousands of contractors including over 2,000 scientists, engineers, and technicians; Cummins, Inc., a company of approximately 48,000 employees worldwide headquartered in Columbus, IN (36 miles east of Bloomington) that designs, manufactures, distributes, and services diesel and natural gas engines and related technologies; and the Cook Group, headquartered in Bloomington and employing about 9,000 people worldwide, that primarily manufactures medical devices.

- **Preparation for Graduate Programs or Other Benefits**

N/A – this is a terminal degree

- **Summary of Indiana DWD and/or U.S. Department of Labor Data**

It is not possible to readily extract data specifically for Ph.D. in engineering disciplines. This difficulty is further compounded by the fact that graduates of the proposed program will be unique and do not fit in the traditional engineering categories such as those used by US Bureau of Labor Statistics. Nonetheless, there is sound evidence that there is a demand for such professionals.

First, there is a strong demand for engineering professionals in Indiana. According to the Indiana Department of Workforce Development, of the eleven Indiana regions, eight list the category "Engineers" as one of the top 50 fastest-growing, high-wage jobs of today and tomorrow (civil engineers and operational engineers are considered separately) (Hoosier Hot 50). In fact, in six of these regions, "engineers" are in the top 25 jobs. In region 8, which includes Monroe County, the engineering profession ranks fifth, with projected growth of 14%. This region, home to a core campus of Indiana University, also benefits from the presence of major employers NSWC Crane, Cook Group and Cummins. Second, the statewide Hoosier Hot 50 list includes seven professions that require doctoral or professional degrees, one of which is 'medical scientist' with a projected growth exceeding 20%. Notably, this is the only research profession on the list. This is an indicator of the need for the highest level of education such as provided by the proposed program. Of the initial six interdisciplinary areas of emphasis of the proposed program, half will produce graduates with direct applicability to medical research (bioengineering, neuro-engineering, molecular and nano-scale engineering).

While the graduates of the proposed program will not hold a degree in a specific area of practice (but rather a Ph.D. in Engineering), based on their area of concentration some conclusions can be drawn from the US Bureau of Labor Statistics employment data for engineers in corresponding areas of practice. Bioengineering as a discipline is expected to exhibit a 21% increase in employment through 2016. This is much higher than the national average of 9% growth. This growth is attributed both to technological advances in medicine and engineering, and to the large number of baby boomers who are starting to increase the demand for quality, innovative medical services. Employment of environmental engineers is projected to grow 15% from 2012 to 2022, faster than the average for all occupations. Computer engineering comprises software and hardware engineering. This includes Computer and Information Research Scientists, an occupation that requires a doctoral or professional degree for which data is available from the

- Bureau of Labor Statistics. Their employment is projected to grow 15% from 2012 to 2022. Computer and Information Research Scientists are also likely to enjoy excellent job prospects. There are a limited number of Ph.D. graduates in these disciplines each year. As a result, many companies report difficulties finding these highly skilled workers. Postsecondary Engineering Teachers, another occupation that most commonly requires doctoral or professional degrees, are also expected to be in demand as the enrollment in technical fields at postsecondary institutions continues to rise. The projected growth in this area reaches 19%.

- **National, State, or Regional Studies**

A recent study (dated June 2014, released Nov. 2014) funded by the Lilly Endowment and prepared by the Battelle Technology Partnership Practice, entitled "Strategic Plan for Economic and Community Prosperity in Southwest Central Indiana" highlights this need. It recommends, "*Expand and/or develop IU-Bloomington offerings in applied engineering, applied technologies, science, and systems engineering design and development areas, working in consultation with*

industry partners and NSWC Crane."

It expands upon this recommendation: "*A key concern among many of the SWC Indiana's regional clusters is their ability to innovate, increase their productivity, and in certain instances move up the value chain within their clusters. A related issue voiced by industry leaders is the lack of engineering expertise in the region. While most companies and organizations in the region requiring engineering talent have relationships with either Purdue University or other regional engineering schools (typically by hiring graduates), the distance often limits potential further interactions and partnerships. It was also cited that the lack of any engineering or applied technology 'connection point' with IU Bloomington makes it more difficult for regional manufacturers to find avenues in which to engage the University. An opportunity exists to launch an exploratory dialog between industry leaders within key SWC Indiana clusters, NSWC Crane, and the leadership of IU-Bloomington to explore the possibilities of bridging this current gap in educational programming, talent generation, and applied research/technical assistance within the region.*"

(The links to the documents cited in this section, including the regional study by Battelle Technology Partnership Practice, can be found in Appendix 1. Tables describing Engineering careers mapped to the Ph.D. track can be found in Appendix 2.)

- **Surveys of Employers or Students and Analyses of Job Postings**

N/A

- **Letters of Support**

The following letters of support are attached to this proposal:

- Idalene F. Kesner, Dean and Ash Soni, Executive Associate Dean, Indiana University Kelley School of Business
- Austen L. Parrish, Dean and Mark Janis, Director of Center for Intellectual Property Research, Indiana University Maurer School of Law
- John D. Graham, Dean, Indiana University School of Public and Environmental Affairs
- Larry D. Singell, Executive Dean, Indiana University College of Arts and Sciences

3 *Cost of and Support for the Program*

1. Costs

- **Faculty and Staff**

The Engineering Program will have a fairly large number of affiliated appointments (either adjunct or dual) from faculty currently in science and technology fields including biology, chemistry, computer science, environmental science, informatics, mathematics, physics, psychological and brain sciences, public health, statistics, and other disciplines. Some of these faculty members will move to the Engineering Department once it is established as a unit. The current Indiana University faculty members will play a key role in helping to develop the

program as the new dedicated engineering core faculty are being hired, and would continue to play an ongoing role in the program. We expect that the engineering program (both undergraduate and graduate) will require 20-25 new, dedicated engineering faculty members. This engineering faculty will be hired over the period of three to four years in clusters to support each of the six tracks, or areas of concentration, listed in section 2 a.

As suggested by the Engineering Task Force in its report, the hiring strategy may involve a unique approach based on inviting engineering faculty to apply to IU Bloomington in clusters of two to four faculty, in partnership with an identified group of current IU faculty, and with this entire group of prospective and current faculty focused on starting a new research and education center at IU Bloomington. This will have the advantages of accelerating the pace of hiring, assuring outstanding quality hires, augmenting the ability of new faculty to become engaged quickly in excellent research and education at Indiana University, and increasing the recognition of the new engineering program.

It is likely that it will take three to four years to hire 20-25 new faculty members. Ideally, the initial hiring will be half to two-thirds at the senior level as building a new program is too heavy of a demand on untenured faculty, and the center approach requires senior leadership. Faculty hires will require ample individual startup packages in addition to the center packages, to help build their laboratories and groups and add to the inducement to join a new program. Staff needs will include one or two laboratory managers.

- **Facilities**

The educational programs will require a minimum of four or five teaching laboratories, both for specialized courses such as systems, signals and control, fabrication laboratory, and other design-oriented courses, and for general project and capstone courses. The initial course offerings also will utilize at least three classrooms full time. The campus currently is building several fabrication laboratory facilities (primarily in the School of Informatics and Computing) and the engineering program will require that the capacity of these be expanded.

A rough calculation is that at standard IU office and student lab sizes, the personnel mentioned above (including undergraduate and graduate students) require about 10,000 gross square feet (GSF) of space. Teaching laboratories require about 5,000 GSF. Classroom space could require an additional 3,000 GSF if there is not available capacity on campus and fabrication lab expansion another 2,000 GSF. This leads to an estimate of 25,000 GSF of space to house the program in its early years. This space will be ready near the time of first incoming class of 2016.

In addition, it should be noted that facilities outside of the School of Informatics and Computing will require considerable capital investments. This will require careful attention and adequate support in terms of staffing, as well as laboratory space and equipment. The College of Arts and Sciences will therefore need campus support regarding these needs to be in a position to fully and productively support course and lab work in the Engineering program.

- **Other Capital Costs (e.g. Equipment)**

All lab and project based classes will require electrical and mechanical equipment, including fabrication material and measurement instruments. A separate budget has been set aside to meet such expenses.

2. Support

(iii) Nature of Support (New, Existing, or Reallocated): New

The support for the first year is already in place. The incoming first year cohort of Ph.D. students is expected to consist of Ph.D. students transferring with the newly hired engineering faculty, and/or students entering the program with an earned M.S. in a related field. Support for Ph.D. students will typically be in two forms; students will be supported as RAs on faculty research money while others will be supported as AIs, the number of which will be determined by the demand from the various undergraduate and Masters courses taught in the School. As outlined in section 5, advanced course work is not prescribed; rather, it is determined by the student's advisory committee. In subsequent years the engineering faculty in each track will play an active role in designing the curriculum, notably at the M.S. level, which will open the program to students holding B.S.

(iv) Special Fees above Baseline Tuition

None

4 *Similar and Related Programs*

1. List of Programs and Degrees Conferred

- **Similar Programs at Other Institutions**

Of Indiana higher education institutions, only Purdue University and the University of Notre Dame offer Ph.D.-level engineering education. Both programs are strong, with Purdue University ranking as one of the top engineering schools in the country and the world, and both adhere to a model typical of large engineering schools. Specifically, they confer the Ph.D. degree in traditional engineering areas of practice, e.g., civil or mechanical engineering. Students apply to an engineering department, which largely defines their specialty.

The proposed program is unique in that it is a "Ph.D. in Engineering," with an emphasis on a novel, multidisciplinary overlap with Computer Science and Informatics. Given IU's leadership and strength in Computer Science and Informatics, coupled with the pervasiveness of information technology as an essential component of all disciplines, the proposed engineering program at IU will be well placed to be a pioneering and model program nationwide (much as the Informatics program has been). Students apply to the Ph.D. program and choose a specific track in the program, corresponding to one of the six areas of concentration listed in 2a.

- **Related Programs at the Proposing Institution**

There are no engineering programs currently at Indiana University Bloomington. However, Indiana University hosts existing programs in the related subject domains including: computer science and informatics, biology, environmental science involving atmospheric and aquatic chemistry, environmental health, cognitive science, chemistry, physics, astronomy, optometry, mathematics, etc. In many of these programs, existing research activities by faculty offer unique opportunities for rapid development of new and applied collaborative opportunities that will be mutually beneficial to the proposed program.

2. List of Similar Programs Outside Indiana

(iv) Harvard School of Engineering and Applied Sciences (Ph.D. in Engineering Sciences)

(v) Thayer School of Engineering at Dartmouth (Ph.D. in Engineering Sciences)

There are numerous engineering programs outside Indiana, but like Purdue University, they typically award Ph.D. degrees in traditional areas of specialization, and students apply to a specific engineering department. Regionally, these institution include, e.g., the University of Illinois at Urbana-Champaign, The Ohio State University, and nationally Massachusetts Institute of Technology, Stanford, Berkeley, California Institute of Technology, Carnegie Mellon, Georgia Tech, Texas A&M, Southern Methodist University, Columbia, etc. It is worth noting that even at these traditional engineering institutions, there has been an increased attention to interdisciplinary collaboration. Some of this increased inter- and multidisciplinary activity is driven by a greater emphasis by federal funding agencies such as the National Science Foundation and the Department of Energy.

The closest programs to the one proposed here are the graduate programs at Harvard and Dartmouth. Both emphasize interdisciplinary aspects of engineering and, instead of traditional engineering departments, have tracks and/or areas of research. They do not award Ph.D. degrees in a specific research area. The Dartmouth program also integrates professional skills and entrepreneurship.

3. Articulation of Associate/Baccalaureate Programs

N/A

4. Collaboration with Similar or Related Programs on Other Campuses

N/A

5 *Quality and Other Aspects of the Program*

1. Credit Hours Required/Time To Completion

(v) Credit hours required: 90

(vi) Time to completion: 4-6 years, depending on whether students enter with a B.S. or M.S.

The program is unique and interdisciplinary, fostering collaborative research among engineers and scientists from various disciplines. Initially, the program offers six tracks corresponding to the areas of concentration listed in 2a. Course requirements for each track will be determined by the core engineering faculty in each track. Any mandatory courses in the subject matter will be at M.S. level; post-M.S. course work is not prescribed, but determined by the student's advisory committee.

One possible pathway is entering the Ph.D. program with an earned M.S. in a field related to a concentration area (such as Computer Science, Physics, Biology, Chemistry, Environmental Science, Psychological and Brain Sciences). Students entering the program with a M.S. Degree may transfer up to 30 credit hours towards their Ph.D., per university regulations, upon recommendation of the department and with the approval of the dean. The transferred credit hours should demonstrate basic competency in applied science and engineering pertinent to the student's intended Ph.D. area of concentration. At least 24 credit hours have to be completed at the department administering the program, with a grade average of B+ (3.3). This is in addition to the University Graduate School requirement of a B (3.0) average for all courses taken. Each Ph.D. track will include advanced coursework drawn both from the engineering program and the affiliated science and technology departments/schools that are partners in these areas.

A second possible pathway is entering the Ph.D. program with an earned B.S. in a field related to a concentration area as described above. In this case, once students complete the requirements for an MS Degree they will be able to receive a Master of Science in Engineering (described below) while on the path towards a Ph.D.

The required courses include following categories:

- Applied Mathematics and Computing (2-3 courses)
- Courses to build breadth of knowledge in engineering and applied science (2-3 courses)

- Courses to gain depth of knowledge in the chosen concentration area (4 courses)

These courses will typically be taken during the first two or three years of the student's program, often in fulfillment of an M.S. degree. Additionally, Ph.D. students in the program will be required to participate in special topics seminars and an engineering Ph.D. professional skills course that includes training in the ability to communicate solutions to policy makers and the general public. Illustrative examples of courses for tracks in Computer Engineering, Cyber-Physical Systems, and Environmental Engineering are shown in the Appendix.

As part of the Engineering program, there will be a Master of Science in Engineering degree. This degree is needed in order to provide recognition for the work done by those students who may, at some point in time, complete all of the required coursework for the PhD degree, but fail to successfully write and defend a dissertation. Without this Masters degree option, the Engineering program would be unable to recognize the substantial work completed by these students. There will be no direct admits to this degree program; it will only be an option available to students enrolled in the Ph.D. in Engineering degree.

Because this degree will be awarded to students who complete the required coursework for the Ph.D. in Engineering, but do not write a dissertation, and because we will not admit any new students into this degree program, we anticipate the number of Masters degrees conferred to be low.

All doctoral students at Indiana University must complete a minor. The engineering program provides three options: external minor, internal minor, and individualized minor. Internal and individualized minors require approval of the student's advisory committee.

- External Minor: A student may complete an external minor awarded by another Indiana University Bloomington school, department, or graduate program that is approved by the engineering program. A student opting for an external minor must follow the requirements of the external department.
- Internal Minor: A student may complete at least 12 engineering credits, in courses other than reading and research, and in an area other than the student's specialization. The area and the courses must be approved by the student's advisory committee.
- Individualized Minor: To complete an individualized interdisciplinary minor a student must take at least 12 credits spanning at least two Indiana University departments/degree programs, to be recommended by the student's advisory committee and approved by the engineering program in advance of any course work.

The engineering program offers three independent study courses:

- Y790 credits are taken before formal approval of candidacy.
- Y890 credits are only allowed after all candidacy paperwork has been processed, and are for dissertation research.
- G901 is only allowed after candidacy and completion of the required 90 credits.

If the Independent Study supervisor is outside of the Engineering Faculty, a student will need to find an Engineering faculty member to co-supervise the project and co-sign the form. The Engineering faculty member must assess the student's work at the end of the semester and submit

the grade for the course.

A sample timetable with milestones is presented in Appendix 4.

2. Exceeding the Standard Expectation of Credit Hours

N/A

3. Program Competencies or Learning Outcomes

As the recipients of the highest academic degree awarded by a university, the graduates of the proposed program will be equipped with skills and abilities to pursue highest level independent research in engineering in their chosen area of concentration, and serve as educators at postsecondary institutions of learning.

The graduates of the program will acquire the following:

- Advanced level competency in engineering principles, applied mathematics, and science pertinent to their area of concentration
- Substantial scholarship evident from breadth of knowledge of engineering
- Depth of knowledge and demonstrated ability to conduct an independent, original research in the chosen area of concentration

4. Assessment

The students in the program will be subject to all requirements of the University Graduate School. The graduate students will have to maintain an average grade B in all courses, and B+ in the courses taken in the department.

Program competencies will be assessed as follows

Learning outcome 1: Advanced level competency in engineering principles, applied mathematics, and science pertinent to their area of concentration.

Assessment of advanced level competency:

- Successfully completing graduate courses comprising the program of study
- Successful completion of qualifying examination
- Annual evaluation by faculty of student progress
- Successful placements in the engineering field or in the academy

Learning outcome 2: Substantial scholarship evident from breadth of knowledge of engineering

Assessment of substantial scholarship:

- Successfully completing a doctoral minor
- Development of a record of publication including peer reviewed articles, conference papers, and/or posters
- Successful completion of research projects with engineering faculty

Learning outcome 3: Depth of knowledge and demonstrated ability to conduct independent, original research in the chosen area of concentration

Assessment of depth of knowledge and ability to conduct independent research:

- Successfully demonstrating the ability to conduct an independent research project from initial planning to fruition
- Experience in grant writing
- Successful defense of Ph.D. dissertation proposal
- Successful preparation and public defense of a Ph.D. dissertation

In addition to assessment of learning outcomes at the level of individual courses, there are three major program assessments:

- Qualifying Examination: Written and oral qualifying examinations are required in the major area for all doctoral students. The core and breadth requirements in the curriculum will be integrated into the design of the qualifying exam to ensure that students obtain an exposure to a variety of sub-disciplines. The qualifying examination will typically be administered by the end of the second semester of the student's second year in the program. This examination is administered by the Advisory Committee and is expected to have a written and an oral component. If failed, the exam may be retaken once, by the end of the third year.
- Thesis Proposal: The thesis proposal is submitted and defended after the completion of the qualifying examination. It consists of an oral presentation covering a submitted written research plan for the dissertation. This examination is given by the Research Committee. Upon finishing the thesis proposal, the completed Dissertation Proposal

form, with "pass" or "fail" clearly marked, and signed by the Research Committee, should be submitted.

- Dissertation Defense: A written elaboration of significant original research must be successfully presented to the Research Committee in a defense of dissertation as described in the Graduate School Bulletin. An oral defense meeting, open to the public, is required.

Assessment of post-graduate outcomes will involve an exit survey, to find out what types of employment (academic, industry, public sector) graduates have secured and a follow-up survey three years after graduation, to find out how their careers have developed. These data will be compared to the Survey of Doctorate Recipients, a "longitudinal biennial survey conducted since 1973 that provides demographic and career history information about individuals with a research doctoral degree in a science, engineering, or health (SEH) field from a U.S. academic institution" (NSF, 2015).

Informal means of assessment include submitting and presenting conference papers, successfully publishing articles, engaging in research projects with faculty and designing and completing independent research projects.

5. Licensure and Certification

N/A

6. Placement of Graduates

Graduates of the program will be qualified to work as postsecondary teachers and researchers in academia, government, and industry in their area of concentration. Initially, the areas of concentration will consist of the six tracks: bioengineering, computer engineering, cyber- physical systems, environmental engineering, molecular and nano-scale engineering, and neuro-engineering, and may be expanded as the program grows. The graduates will have access to Indiana University Career Services, and, if interested in career in academia, their placement will proceed through the usual academic channels.

7. Accreditation

N/A

6 *Projected Headcount and FTE Enrollments and Degrees Conferred*

The projected headcount and degrees conferred is summarized in the table below.

NEW ACADEMIC DEGREE PROGRAM PROPOSAL SUMMARY						
Institution/Location:	Indiana University Bloomington					
Program:	Ph. D. in Engineering					
Proposed CIP Code:	14.0101					
Base Budget Year:	2014-15					
		Year 1	Year 2	Year 3	Year 4	Year 6
		2016-17	2017-18	2018-19	2019-20	2020-21
Enrollment Projections (Headcount)						
Full-tijme Students		6	14	24	34	50
Part-time Students		-	-	-	-	-
		6	14	24	34	50
Enrollment Projections (FTE)						
Full-tijme Students		5	11	18	26	38
Part-time Students		-	-	-	-	-
		5	11	18	26	38
Degree Completion Projection		-				10

NEW ACADEMIC DEGREE PROGRAM PROPOSAL SUMMARY						
Institution/Location:	Indiana University Bloomington					
Program:	Master of Science in Engineering					
Proposed CIP Code:	14.0101					
Base Budget Year:	2014-15					
		Year 1	Year 2	Year 3	Year 4	Year 6
		2016-17	2017-18	2018-19	2019-20	2020-21
Enrollment Projections (Headcount)						
Full-tijme Students		-	40	110	170	200
Part-time Students		-	-	-	-	-
		-	40	110	170	200
Enrollment Projections (FTE)						
Full-time Students		-	30	73	110	125
Part-time Students		-	-	-	-	-
		-	30	73	110	125
Degree Completion Projection		-		40	70	100

Ph.D. in Engineering To Be Offered by Indiana University Bloomington

Appendix 1: Documents referenced in Section 2: Rationale for the Program

2.a. Institutional Rationale:

Trustees of Indiana University. (2014). Bicentennial Strategic Plan for Indiana University https://strategicplan.iu.edu/

Office of the President. (2015). Principles of Excellence. http://pres.iu.edu/vision/principles-of-excellence/index.shtml

2.b. State Rationale:

Indiana Chamber of Commerce. (2012). Indiana Vision 2025: A Plan for Hoosier Prosperity http://www.indianachamber.com/index.php/studies-reports/indiana-vision-2025

ICHE. (2012). Reaching Higher, Achieving More http://www.in.gov/che/files/2012_RHAM_8_23_12.pdf

2.c. Evidence of Labor Market Need:

Bureau of Labor Statistics. (2012). Occupational Outlook Handbook. http://www.bls.gov/ooh/computer-and-information-technology/computer-and-information-research-scientists.htmnce

Indiana Department of Workforce Development. (2015). Hoosiers by the Numbers http://www.hoosierdata.in.gov/

Indiana Department of Workforce Development. (2015). Hoosier Hot 50 Jobs. https://netsolutions.dwd.in.gov/hh50/RegionalDownloads.aspx

Battelle Technology Partnership Practice. (2014). Strategic Plan for Economic and Community Prosperity in Southwest Central Indiana. Lilly Endowment. http://cicpindiana.com/wp-content/uploads/2014/11/PreambleStrategicPlanEconomicCommunityDevelopSWCIN11-25-14.pdf

Appendix 2: Engineering occupations mapped to Ph.D. tracks

Occupation	Degree required	Relevant tracks	Projected growth	Federal or State data
Computer & Information Research Scientist	Ph.D.	Computer engineering Cyber-physical systems	15 %	Federal
Postsecondary Engineering Teacher	Ph.D.	Bioengineering Computer engineering Cyber-physical systems Environmental engineering Molecular & nanoscale engineering Neuro-engineering	19 %	Federal
Medical Scientist	Ph.D.	Bioengineering Molecular and nanoscale engineering Neuro-engineering	20+ %	Indiana
Bioengineer	n/a	Bioengineering	21 %	Federal
Environmental engineer	n/a	Environmental engineering	15 %	Federal

Federal data from U.S. Bureau of Labor Statistics, focusing on occupations requiring Ph.D., where available.

State data from Indiana Department of Workforce Development.

Regional ranking of "engineers" and projected job growth in Hoosier Hot jobs

Region	Ranking of "engineers"	Projected growth
8 (includes Monroe County)	# 5	14 %
5 (includes Indianapolis)	#17	14 %
1	#28	7 %
2	#22	5 %
3	> #50	n/a
4	#37	3 %
6	#24	8 %
7	#17	6 %
9	> #50	n/a
10	> #50	n/a
11	#7	10 %

Appendix 3: Letters of Support

(attached separately)

Appendix 4: Faculty and Staff, Detail (This appendix should contain a list of faculty with appointments to teach in the program.)

There are currently 51 affiliated faculty from 12 different departments at IUB.

Name	Rank	Email	Affiliation
Shahzeen Attari	Assistant Professor	sattari@indiana.edu	SPEA
Lane Baker	Associate Professor	lanbaker@indiana.edu	Chemistry
Randall Beer	Professor	rdbeer@indiana.edu	Computer Science
Katy Borner	Professor	katy@indiana.edu	Info and Library Sci
Geoffrey Brown	Professor	geobrown@indiana.edu	Computer Science
David Crandall	Assistant Professor	djcran@indiana.edu	Computer Science
Rob de Ruyter	Professor	deruyter@indiana.edu	Physics
Trevor Douglas	Professor	trevdoug@indiana.edu	Chemistry
Bogdan Dragnea	Professor	dragnea@indiana.edu	Physics
Douglas Edmonds	Assistant Professor	edmondsd@indiana.edu	Geology
Nathan Ensmenger	Associate Professor	nensmeng@indiana.edu	Informatics
Funda Ergun	Associate Professor	fergun@indiana.edu	Computer Science
Darren Ficklin	Assistant Professor	dficklin@indiana.edu	Geography
Amar Flood	Associate Professor	aflood@indiana.edu	Chemistry
Geoffrey Fox	Professor	gcf@indiana.edu	Informatics
Esfandiar Haghverdi	Associate Professor	ehaghver@indiana.edu	Computer Science
Ronald Hites	Professor	hitesr@indiana.edu	Chemistry/SPEA
Tae Hee Hwang	Assistant Professor	taehee@indiana.edu	Geography
Srinivasan S. Iyengar	Associate Professor	iyengar@indiana.edu	Chemistry
Stephen Jacobson	Professor	jacobson@indiana.edu	Chemistry
Mark Janis	Professor	mdjanis@indiana.edu	Maurer Law
Apu Kapadia	Assistant Professor	kapadia@indiana.edu	Computer Science
Andrew Lumsdaine	Professor	lums@cs.indiana.edu	Computer Science
Anne Massey	Professor	amassey@indiana.edu	Kelley
Mike Mattioli	Associate Professor	mmattiol@indiana.edu	Maurer Law
Eden Medina	Associate Professor	edenm@indiana.edu	Informatics
Steve Myers	Associate Professor	samyers@indiana.edu	Computer Science
Sharlene Newman	Associate Professor	sdnewman@indiana.edu	Psychological/Brain Sci.
Kimberly Novick	Assistant Professor	knovick@indiana.edu	SPEA
Gerardo Ortiz	Professor	ortizg@indiana.edu	Physics
Franco Pestilli	Assistant Professor	franpest@indiana.edu	Psychological/Brain Sci.
Flynn Picardal	Professor	picardal@indiana.edu	SPEA
Feng Qian	Assistant Professor	fengqian@indiana.edu	Computer Science
Luis Rocha	Professor	rocha@indiana.edu	Informatics
Cenk Sahinalp	Professor	cenk@sfu.ca	Computer Science
Sidney Shaw	Associate Professor	sishaw@indiana.edu	Biology
Richard Shiffrin	Professor	shiffrin@indiana.edu	Psychology/Cog Sci
Katie Siek	Assistant Professor	ksiek@indiana.edu	Informatics
Sara Skrabalak	Professor	sskrabal@indiana.edu	Chemistry

Ashok Soni	Professor	soni@indiana.edu	Kelley
Olaf Sporns	Professor	osporns@indiana.edu	Psychology
Thomas Sterling	Professor	tron@indiana.edu	Computer Science
Stephen Tait	Assistant Professor	tait@indiana.edu	Chemistry
Philip Stevens	Professor	pstevens@indiana.edu	SPEA
Martin Swany	Associate Professor	swany@indiana.edu	Computer Science
Yi Yi	Assistant Scientist	yiyi@indiana.edu	Chemistry
Chen Yu	Associate Professor	chenyu@indiana.edu	Psychology
Yan Yu	Assistant Professor	yy33@indiana.edu	Chemistry
Adam Ward	Assistant Professor	adamward@indiana.edu	SPEA
Jeffrey White	Professor	whitej@indiana.edu	Geology
Shixiong Zhang	Assistant Professor	sxzhang@indiana.edu	Physics

Appendix 5: Sample Engineering Ph.D. Time Table and Checklist

The timetable is designed to guide the students to finish their Ph.D. study in six years. Students will be evaluated every semester in the first two years, then, annually, to determine whether satisfactory progress is made.

Year 1	Task
Semester 1	Take courses towards fulfilling major and minor course requirements Transfer credits if applicable Identify research interests
Semester 2	Continue enrollment towards fulfilling major and minor course requirements Start research involvement via Independent Study (E790) or RAship Identify faculty advisor Identify minor area Start discussing with faculty advisor about forming Advisory Committee
Milestone	Form advisory committee
Year 2	
Semester 1	Continue enrollment towards fulfilling major and minor course requirements Conduct research under the guidance of Advisory Committee
Semester 2	Final coursework to fulfill major course requirements Schedule and take Qualifying Exam You must finished all major course before you can take Qualifying Exam Courses seven years old and older must be revalidated.
Milestone	Fulfill major course requirements Pass Qualifying Exam
Year 3	
Semester 1	Final coursework to fulfill minor course requirements Apply for Ph.D. Candidacy
Semester 2	Continue Enrollment (Y790) From Research Committee
Milestone	Acquire Ph.D. candidacy Form Research Committee Publish research papers and present papers at conferences
Year 4	
	Continue Enrollment (Y890)

	You can register for Y890 after you acquire Ph.D. Candidacy Define research topic and start Ph.D. Research under the guidance of Research Committee Continue Ph.D. research Keep publishing
Milestone	Research publications and conference presentations
Year 5	
	Continue Enrollment You can register for Y901 after you have completed 90 credits You can register for Y901 for up to six semesters before you need to return to Y890 Thesis proposal
Milestone	Defend thesis proposal
Year 6	
	Dissertation defense At least six months after thesis proposal At least 30 days after dissertation announcement If dissertation defense is held more than seven years after passing Qualifying Exam, the Qualifying Exam needs to be revalidated Submission of the dissertation Apply for degree
Milestone	Pass dissertation defense

Appendix 6: Example Eligible Course Lists

1. Computer Science

CSCI Course Number	Course Name
A521	Computing Tools for Scientific Research
A546	User-Interface Programming
P515	Specification and Verification
B534	Distributed Systems
P536	Operating Systems
B538	Networking
B541	Hardware Systems Design I
B542	Hardware Systems Design II
B543	Computer Architecture
B644	Very Large Scale Integration
P545	Embedded and Real Time Systems
B573	Scientific Computing
B673	Advanced Scientific Computing
B649	Introduction to High Performance Computing
B689	Computational Photography
P565	Software Engineering I
P566	Software Engineering II
B555	Machine Learning
B561	Advanced Database Concepts
B629	Modern Compiler Design

B581	Computer Graphics
B582	Image Synthesis
B657	Computer Vision

2. **Mathematics**

Math Course Number	Course Name
M415	Complex Variables
M441-442	PDEs with Applications I-II
M447-448	Mathematical Models and Applications I-II
M463	Probability Theory
M511-512	Real Variables I-II
M513-514	Complex Variables I-II
M540-541	PDEs I-II
M542	Nonlinear PDEs
M544-545	ODEs I-II
M548	Mathematical Methods for Biology
M553	Cryptography
M560	Applied Stochastic Processes
M571-572	Numerical Methods I-II
M671-672	Numerical Differential and Integral Equations I-II

3. **Physics**

Physics Course Number	Course Name
P460	Modern Optics
P526	Principles of Health Physics and Dosimetry
P540	Digital Electronics
P541	Analog Electronics
P548	Mathematical Methods for Biology
P570	Accelerator Physics
P572	Radiation Oncology Physics
P575	Intro to BioPhysics
P576	Intro to Medical Diagnostic Imaging
P578	Radiation BioPhysics
P582	Biological and Artificial Neural Networks
P583	Signal Processing and Information Theory in Biology

4. Environmental Engineering

SPEA Course Number	Course Name
E515	Fundamentals of Air Pollution
E518	Vector Based GIS
E520	Environmental Toxicology
E536	Environmental Chemistry
E539	Aquatic Chemistry
E543	Environmental Management
E544	Subsurface Microbiology and Bioremediation
E552	Environmental Engineering
E554	Groundwater Flow Modeling
E555	Topics in Environmental Science
E560	Environmental Risk Analysis
E564	Organic Pollutants: Environmental Chemistry & Fate
E570	Environmental Soil Chemistry
E589	Practicum in Environmental Science
E625	Research in Environmental Science
E680	Seminar in Env. Science & Policy
E890	PhD Thesis: Env. Science

Appendix 7: Sample Track Curricula

a. Computer Engineering

- Applied Mathematics and Computing
  - Numerical Methods
  - Probability
  - Real Variables
- Breadth
  - Digital Signal Processing
  - Control Theory
  - Stochastic Processes
- Depth
  - Computer Architecture
  - Embedded Systems
  - Distributed Systems
  - Networking

b. Cyber-Physical Systems

- Applied Mathematics and Computing
  - Numerical Methods
  - Probability

- Real Variables

- Breadth
  - Computer Architecture
  - Parallel and Distributed Systems
  - Stochastic Processes
- Depth
  - Digital Signal Processing
  - Optimal Control
  - Linear and Nonlinear Circuits
  - VLSI

COLLEGE OF
ARTS AND SCIENCES
INDIANA UNIVERSITY
Office of the Executive Dean
Bloomington

March 17, 2015

Dr. Robert Schnabel
Dean, School of Informatics and Computing
Indiana University
Bloomington, IN 47405

Dear Dean Schnabel:

I would like to communicate with this brief letter my strong support for the development of an Engineering BS degree and PhD in the School of Informatics and Computing (SOIC) at Indiana University Bloomington. It is my view that the development of Engineering is not only important for the future of SOIC, but it is also central to the success of the College. In particular, the chairs of Chemistry, Physics, and Biology have indicated to me that the presence of Engineering on campus will greatly enhance their ability to seek external funding: in particular, both NIH and NSF grants increasingly require Engineering faculty to be included as investigators to demonstrate the translational nature of the research, which is critical for a successful proposal. An Engineering program is also synergistic with strong Chemistry, Physics and Biology departments because these fields are collectively necessary to attract and train top PhD students in each of these fields. A BA in Engineering will also afford an opportunity for our science faculty to teach the important science gateway courses for Engineering students, which will improve the student credit hours in the sciences. In addition, the opportunity for our undergraduate students in the sciences to take engineering courses may well improve their subsequent job opportunities. Thus, the development of an Engineering program in SOIC is unambiguously a positive development for the Division of Sciences in the College.

It is also the case that the development of Engineering in SOIC could well have wider benefits to the College. For example, the College is in the process of forming a new School of Art and Design and it is highly likely that the Engineering faculty in the program will benefit from both the computer-design and architecture-design faculty in this new school. Our undergraduate and MFA students would also benefit from the opportunity to take IT related engineering courses at both the undergraduate and graduate level. Thus, the committee charged with writing the document detailing the aspects of the new school to the Board of Trustees has indicated the importance of an Engineering Program to the success of this new school.

Overall, the College is enthusiastic about the presence of Engineering at IUB and sees this new program as an opportunity to further partner with the SOIC. Thus, as the Executive Dean of the College, I enthusiastically endorse the development of the Engineering Program in the SOIC. I and the College faculty look forward to working with you in the near future to help in the development of this new program.

Owen Hall 790 E. Kirkwood Avenue Bloomington, IN 47405-7104 (812) 855-1646 fax (812) 855-2060

Sincerely,

Larry D. Singell
Executive Dean

KELLEY SCHOOL OF BUSINESS
INDIANA UNIVERSITY
Office of the Dean

March 9, 2015

Dean Robert B. Schnabel
School of Informatics & Computing
Indiana University
919 E. 10th Street, Room 210
Bloomington, IN 47405

Dear Bobby,

It is our pleasure to offer this letter of support for the two newly proposed programs for the IU Bloomington campus – BS in Engineering and Ph.D. in Engineering. The Kelley School participated in the creation of these initiatives through the work of Executive Associate Dean Ash Soni, who has also signed this letter of support. For both of the proposed programs, we have reviewed the rationales, the expected learning outcomes, the expected costs, and the projections of enrollments, and we are convinced that these programs will contribute individually and collectively in significantly positive ways to the academic environment at IU Bloomington. Also, after examining similar programs elsewhere relative to demand, it is clear that an additional high quality undergraduate and doctoral program of the types proposed here would benefit the broader environment.

We are particularly excited by the opportunity to have the Kelley School join in supporting the students enrolled in the newly proposed engineering programs. At the undergraduate level in particular, we can see the possibility of students majoring in engineering and adding a business minor. Based on our experience with candidates applying for our masters programs, we know that this is a valuable combination, and one that will attract the best and brightest students to Indiana University. We offer many courses that fit within the field of engineering proposed, and we would be delighted to offer more sections of these courses if needed to accommodate the undergraduate engineering students.

We hope the proposals for the BS and Ph.D. in Engineering will be well received by all levels at the University and beyond. The Kelley School supports this effort in full, and we look forward to a successful launch one day soon. Finally, if you should have other questions or need additional information, please do not hesitate to contact us.

With kind regards,

Idalene F. Kesner
Dean, Kelley School
Frank P. Popoff Chair of Strategic Management

Ash Soni
Executive Associate Dean, Kelley School
The John & Esther Reese Professor

1275 E. Tenth Street Bloomington, IN 47405-1703 (812) 855-8469 fax (812) 855-9883

INDIANA UNIVERSITY

SCHOOL OF PUBLIC AND ENVIRONMENTAL AFFAIRS

March 11, 2015

Dean Robert Schnabel,
School of Informatics and Computing
919 E. 10th Street
Room 210
Bloomington, IN 47405

RE: Letter of support for BS and PhD programs in engineering

Dear Dean Schnabel,

I am pleased to offer the support of the Office of the Dean in the School of Public and Environmental Affairs for the development of BS and PhD degrees in engineering on the Bloomington campus. The stature of IUB as a major international research university will be clearly enhanced by a 'high-tech' engineering program that offers synergies with the existing strengths of Bloomington science programs and also serves local, regional, and national labor markets.

Although SPEA's involvement will likely be greatest in the PhD track in environmental engineering, I expect that there may be opportunities for courses in our existing undergraduate curriculum that will also benefit engineering students in the BS degree program, particularly with respect to sustainability, public policy, and understanding the complex, societal impacts of technological development.

The environmental engineering track of the PhD program has obvious mutual benefits for the research and teaching activities of our environmental science faculty. A number of these faculty members have degrees in engineering or related scientific fields and would like to participate in the engineering program as affiliated faculty. I have learned that they believe offering a PhD in Engineering might allow them to recruit desirable students from a different pool, more easily pursue novel research areas, and ultimately be more competitive for external funding from federal and industrial sources.

In summary, we are highly supportive of the proposed program and I look forward to development of ways that the School of Public and Environmental Affairs might collaborate with the engineering program as these new degrees are developed.

Sincerely,

John D. Graham, Ph.D.
Dean

MAURER SCHOOL OF LAW
INDIANA UNIVERSITY
Bloomington

March 17, 2015

Dean Robert Schnabel
School of Informatics and Computing
Indiana University, Informatics East 210 919
E. 10th Street
Bloomington, IN 47408

Re: Letter of Support for Engineering Degree Proposals

Dear Bobby,

This letter is written on behalf of the law school to enthusiastically support the proposals to establish B.S. and Ph.D. degrees in engineering. Professor Mark Janis, who heads the law school's Center for Intellectual Property Research and served on the engineering task force, joins me in supporting these new degrees and has also signed this letter.

The law school strongly supports the University's efforts to establish a targeted new program in engineering on the Indiana University Bloomington campus that builds on existing IU strengths (in areas such as information technology, for example) and complements engineering programs already established at other institutions in the state. We view the creation of an engineering program as: (1) important in strengthening IU's reputation among our peer institutions, which all have engineering programs; (2) providing a broader array of educational opportunities and assisting in recruiting excellent students to our campus; and (3) as a way for the University to make additional contributions to state and local economic development. An engineering program will help bolster and stimulate various other collaborative research programs and projects, as well as expand the campus's ability to generate grant support for its research activities. As we understand it, Indiana University Bloomington remains the only AAU institution without an engineering program – we view that absence as problematic for a top tiered research university such as ours. Lastly, Indiana and its increasingly technology-driven economy faces a growing need for leaders with engineering backgrounds, and a new engineering program could help address that need. The establishment of a B.S. in Engineering and a Ph.D. in Engineering are therefore welcomed by the law school.

The law school is particularly supportive of the proposed degrees. Increasingly the law school recruits students with engineering backgrounds into its intellectual property law and other technology- based law programs. Students with an engineering background and a law degree are also exceptionally competitive in the job market. As a result, the law school has already partnered with top engineering schools throughout the country, including those at Purdue, Rose-Hulman, Georgia Tech, and Iowa State, and a with a number of foreign technology-focused law schools. We would welcome the opportunity to establish a similar partnership on our own campus.

Moreover, we also see the potential for a number a potential cooperative teaching and research initiatives between the engineering program and the law school's Center for Intellectual Property Research. For example, the Center is developing patent law curriculum suitable for undergraduate engineering students in a range of courses from introductory freshman engineering courses through upper-level engineering design courses. Integrating intellectual property and entrepreneurship studies deeply into an undergraduate engineering curriculum, and offering optional minors or certificates, would

distinguish IU's engineering programs from many others, and would align well with campus strategic objectives. It may also present an opportunity for collaborative interdisciplinary work in engineering education that may be of interest to external funding sources. In addition, the Center's research activities in areas such as the legal protection of big data and design protection for GUI's may have a close nexus with research in the new engineering program, and could serve as focal points for seeking new grant funding.

In sum, the law school supports the degree proposals. We look forward to partnering with the engineering program and hope that the new degrees are established quickly.

Sincerely,

Austen L. Parrish
Dean and James H. Rudy Professor of Law
Indiana University Maurer School of Law

Sincerely,

Mark Janis
Robert A. Lucas Chair of Law
Director, Center for Intellectual Property Research

SCHOOL OF INFORMATICS
AND COMPUTING
INDIANA UNIVERSITY
Bloomington

March 13, 2015

Dear Provost Robel,

Re: Support for engineering at IU Bloomington

The Computer Science division is in strong support of an engineering presence at IU Bloom- ington. In the following, I provide justification along the two dimensions of research and education.

Research: Computers are becoming more and more integrated into the fabric of our so- ciety. The seamless integration of computational algorithms and physical components is transforming computer science research (as well as research in many other disciplines rang- ing from physics, chemistry, biology, healthcare, and others). A significant percentage of the computer science faculty have undergraduate or graduate degrees in engineering. Some of their current research about embedded systems, sensor networks, cyber-physical systems, high-performance computing, hardware design, and robotics, is somewhat handicapped by the absence of a strong engineering program at IUB.

Education: Attracting strong undergraduate and graduate students is essential for the core mission of the university. Our experience at both the undergraduate and graduate level is that we sometimes fail to attract strong students as they perceive IUB to be less rigorous in its computer science education due to the lack of a visible engineering presence. Our undergraduate and graduate program does in fact offer several classes that are engineering- oriented (computer architecture, networks, hardware design, and embedded systems for example) but these efforts can only thrive in the context of a strong engineering program on campus.

Sincerely,

Amr A. Sabry Professor and Chair of
Computer Science Division

150 S. Woodlawn Ave, Lindley Hall 215, Bloomington, Indiana 47405 • phone (812) 855-6486 • fax (812) 855-4829

DEPARTMENT OF
PSYCHOLOGICAL AND
BRAIN SCIENCES
INDIANA UNIVERSITY
Bloomington

March 9, 2015

Dear Provost Lauren Robel:

I am writing to offer my strong and enthusiastic support for the development of an engineering research and training program at IU Bloomington. As I indicated in a meeting of the IUB science chairs with the engineering blue ribbon committee on February 26, 2015, I strongly believe that the science departments need a solid engineering program on campus to fully advance our respective research and training programs. There are at least three important reasons that I hold this view.

First, solving pressing scientific problems increasingly requires engineering knowledge and skills. IU will fall behind in its research and teaching mission if we do not bring engineering onboard. For example, in the psychological and brain sciences, it is increasingly necessary to leverage engineering to study behavior and treat human suffering. The engineering knowledge and skills necessary spans (i) embedded sensors to monitor behavior, (ii) devices to interact with brain function, (iii) the design and optimization of recording and stimulation devices (e.g., MRI, Transcranial magnetic stimulation [TMS], transcranial direct current stimulation [tDCS], EEG, motion-tracking, eye-tracking), and (iv) theoretical and applied knowledge about complex systems and networks. In general, emerging areas within the brain sciences include neuro- technology, neuro-engineering, molecular engineering, wearable sensors, and clinical informatics. The faculty and students in our science departments need access to a local, first-rate engineering program to stay ahead of the curve.

Second, the critical importance of having a local engineering program is increasingly affecting faculty recruitment and retention. In the past 18 months I have dealt with two hiring cases and one retention case wherein the lack of a formal engineering program at IUB presented significant problems. The majority of Carnegie I Research Intensive

Universities have formal engineering programs; the lack of one at IUB is increasingly making hiring and retention more difficult for our department.

Third, most science departments have one or more faculty members with formal engineering training. This is certainly the case in the Department of Psychological and Brain Sciences, where we have at least three faculty members with degrees in engineering. This means that the new engineering program can leverage these faculty members to enhance a quick start-up and then interweave itself into the fabric of the campus.

In conclusion, I strongly support the development of an engineering program here at IU Bloomington. This is a timely and necessary development for the advancement of the sciences at IUB—both in terms of research and student training.

Sincerely,

William P. Hetrick, Ph.D. Professor and
Department Chair
Department of Psychological and Brain Science Programs in
Neuroscience and Clinical Science

1101 E. 10th Street Bloomington, IN
47405

INDIANA UNIVERSITY
OFFICE OF THE EXECUTIVE VICE PRESIDENT
FOR UNIVERSITY ACADEMIC AFFAIRS

RESPONSES TO COMMISSION QUESTIONS CONCERNING THE PROPOSED B.S. AND Ph.D. DEGREES IN ENGINEERING TO BE OFFERED AT INDIANA UNIVERSITY BLOOMINGTON

May 21, 2015; revised June 9, 2015[1]

The following are Indiana University's responses to the questions presented by Commission staff on May 6, 2015.

Background Information about the Program Proposals

In a letter to Commissioner Lubbers, President McRobbie sought to clarify the scope of the proposed degrees. The letter states, in relevant part:

> In my State of the University speech on October 14, 2014 – the first time anyone at Indiana University had said anything about engineering officially - I stated that:
> "… through the School of Informatics and Computing and other academic units, what should be considered is a more general program in modern IT-enabled systems engineering that builds directly on IU Bloomington's existing strengths."

And I noted that:

> "There would certainly be no intention to compete with large engineering programs elsewhere in the nation, such as those in infrastructure intensive areas of engineering like aeronautical, chemical, civil, industrial, and mechanical engineering."

The letter continued, "In summary, IU's goal is, and always has only been, to establish a focused program in intelligent systems engineering within the School of Informatics and Computing." And therefore, "in order to make the scope of our proposal and our intentions completely clear, IU is willing to modify the names of the two proposed degrees to a **Bachelor of Science in *Intelligent Systems* Engineering** and a **PhD in *Intelligent Systems* Engineering."** This name connotes the engineering of intelligent systems – systems that draw significantly on modern information technology approaches in intelligent systems, user interfaces, big data, etc. It also clearly differentiates the focus from traditional engineering in civil, mechanical, chemical, aeronautical and even wide portions of electrical engineering. This name would be consistent with the terms used in the recommendations in the Battelle report and would facilitate advertising programs to potential students. It would also further demonstrate that our programs will not be training Professional Engineers (P.E.).

1 Please furnish the June 2014 study "Strategic Plan for Economic and Community Prosperity in Southwest Central Indiana" prepared by Battelle Technology

The plan – as well as all other documents referenced in these responses – can be found at: https://uaa.iu.edu/engineering/ . (In addition, the Battelle study can be found at:

[1] Revisions are underscored.

Bryan Hall 204 107 S. Indiana Avenue Bloomington, IN 47405-7000 (812)855-9198

http://radiusindiana.com/sites/default/files/strategic_plan_for_economic_and_community_development_in_swc_indiana_11-25-14_1.pdf.)

In addition, the Central Indiana Tech Workforce Study, just released in April by Techpoint and Employ Indy and funded by the Lumina Foundation, the Joyce Foundation and others, confirmed that demand for computer and IT talent continues to grow, particularly in areas related to software development, network and systems, and cybersecurity. In particular, the study noted that employers are especially seeking individuals with skills that can integrate new and emerging technologies, utilize agile and open source platforms, and focus on IT security and risk mitigation.

A number of the proposed new degree offerings address these very issues and will help to ameliorate the current skills deficit confronting Indiana's employers. Indiana's technology sector continues to be a key wealth driver in our state, providing almost double the pay for all jobs in Central Indiana as a whole, as reflected in the study. Not surprisingly, the primary challenge or limiter to this sector's growth, according to the study, is the supply of skilled talent.

2 The Resolution of the Board of Trustees references the documented findings of "a Blue Ribbon Committee comprised of highly respected external academic experts and leaders in engineering." Please furnish the complete report, including findings and back-up documentation, of this Committee.

See https://uaa.iu.edu/engineering/.

3 For how long has the University been contemplating these new program proposals? Please provide a brief, high-level chronology of key decision points that led to this decision.

IU has contemplated programs to enhance our strong programs in computer science, informatics and the related sciences for some time. The Battelle report, whose conclusions we were preliminarily briefed on in summer 2014, pointed out specific needs to which this particular proposal responds. Subsequent conversations with potential employers in the region further demonstrated this need to us, and we were encouraged to pursue the proposed programs by them. Fortuitously, the areas in which Indiana University has particular expertise were areas in domains in which important local employers – notably NSWC Crane and Cook Medical – are especially in need of employees now and in the future. For example, by far the largest category of Crane employees at Crane is "electronics engineer," and Crane officials have told us that the proposed focus fits the needs of this category very well. Of course, the needs of these major regional employers mirror the needs in the state for additional STEM degree holders generally and specifically for individuals with excellent education in the intelligent systems that increasingly dominate all types of manufacturing and indeed the goods that we encounter in our daily lives. We crafted the proposals to best serve the needs of the state and the Southwest Central Indiana region.

See Appendix A for a listing of engineering positions (by type of engineering) at NSWC Crane.

Other Institutions with Engineering Programs

4 The December 2014 Engineering Task Force report identifies five universities that have begun engineering programs in recent years (Appendix C, pp. 30-31). Of these, only two are at public institutions, and these seem to follow different approaches than the IU proposal, e.g. the University of California Santa Cruz program seems highly focused (B.S. in Informatics and an M.S./Ph.D. in Biomolecular Engineering and Bioinformatics) and the University of Georgia "launched a full new

engineering college." Please explain. Are there other public institutions that recently started engineering programs that are closer to the proposed IU model?

Each university and state has a different set of educational and research needs and resource considerations that lead to different decisions. The University of Georgia decided to build a full-scale engineering college even though Georgia Tech is a national leader in engineering education and research (currently tied for #6 national ranking with Purdue). IU proposes a very different, and unique, direction: IU builds on the IU School of Informatics and Computing which also is unique; only five AAU universities including IU have full schools/colleges in the computing and information fields and the other four (Carnegie Mellon, Cornell, Georgia Tech, U.C. Irvine) already have full-scale engineering schools. Since virtually all public AAU universities and virtually all major public research universities already have engineering programs, it is nearly impossible to find places that could be peers to the IU situation. Only two other public AAU universities (out of 36 total) do not have a full engineering school: University of North Carolina and University of Oregon. UNC has developed a Department of Environmental Sciences and Engineering, a Joint Department of Biomedical Engineering with North Carolina State, and also a full scale engineering college on its non-AAU Charlotte campus. Oregon has a 3/2 engineering program joint with Oregon State.

5 For the latest year for which data are available, please supply a spreadsheet for all U.S. AAU institutions; for each institution, please furnish the following data elements from readily available data sources and please indicate the source of each element, e.g. IPEDS, AAU:

Institutional name
State in which the institution is located
Sector (public or private)
Total baccalaureate headcount enrollment
Total graduate headcount enrollment
Total baccalaureate headcount enrollment in engineering programs
Total graduate headcount enrollment in engineering programs Total baccalaureate degrees conferred
Total master's degrees conferred Total doctoral degrees conferred
Total baccalaureate degrees conferred in engineering
Total master's degrees conferred in engineering Total doctoral degrees conferred in engineering Total amount of externally funded R&D
Total amount of externally funded R&D in engineering

(The purpose of the above data request is to fully understand the nature and relative scope of engineering programs at AAU institutions, given that the AAU universe of institutions constitutes an important reference point in the University's rationale. Should staff assumptions about the availability of data prove inaccurate and/or should other or additional data better address the purpose of this request, please contact staff immediately.)

See Appendix B for Engineering Programs and Enrollments at AAU Institutions.

6 The Task Force report references "potential interest from the Purdue School of Engineering and Technology at IUPUI to offer Ph.D. degrees to its Indianapolis-based students through the IU engineering Ph.D. and reports that "the number of highly active and well-funded faculty members in IUPUI engineering faculty is at least equal to the initially expected number of engineering faculty at IU Bloomington" (pp. 17-18). Please elaborate on the potential collaboration between the IUPUI

and IU Bloomington campuses in engineering. In which of the six initial areas of focus might this collaboration occur? How many IUPUI students might participate in the proposed Ph.D.? How much of their program might be completed at IUPUI? Does the University envision offering IU Ph.D. in Engineering programs at IUPUI, which would be listed in the IUPUI Academic Program Inventory and with enrollments and graduations being report by IUPUI?

The PhD tracks in which the Purdue School of Engineering and Technology at IUPUI would participate are cyber-physical systems and molecular and nanoscale engineering. The Purdue School of Engineering and Technology at IUPUI would enhance interdisciplinary collaborations in these areas through the Integrated Nanosystems Development Institute (INDI) at IUPUI in collaboration with School of Science and School of Medicine, the Transportation Active Safety Institute (TASI) in collaboration with several schools on the IUPUI and IUB campuses, and the Lugar Center for Renewable Energy, which also includes participation by faculty from the IUPUI and IUB campuses. Faculty members from biomedical engineering, electrical and computer engineering, mechanical engineering, and computer information and graphics technology at the Purdue School of Engineering and Technology at IUPUI would support these PhD tracks.

In the steady state, the Purdue School of Engineering and Technology at IUPUI anticipates having 16 students in these PhD programs, 10 in cyber-physical systems and 6 in molecular and nanoscale engineering, with 4 students earning their PhD degrees annually. These students would take between 75% and 100% of their coursework at IUPUI, and their PhD degrees would be awarded by IUPUI.

We have not prepared a separate proposal for a PhD that is offered on the IUPUI campus because, like the masters degree, such a development lies in the future. While we can predict areas of focus, collaboration, and likely enrollment, the exact parameters of the degree will need to be developed in light of experience with the IU Bloomington PhD.

7 To what extent have there been discussions between IU Bloomington and Purdue West Lafayette faculty and administrators about the proposed programs and how have these discussions shaped these proposals?

We have engaged in limited conversations with Purdue leadership and remain happy to discuss particular input and concerns which Purdue might have regarding the specifics of our proposals. We have not to date received any such requests or statements.

Further, noted leaders in engineering and higher education have observed that the absence of engineering at Indiana University actually hampers the success of our state and its research institutions. The blue ribbon committee stated that:

> It is our belief that a strong case can be made for the positive impact that such a focused engineering program at IUB will have not only on other programs of Indiana University but also on existing engineering programs in sister institutions such as Purdue University and the IUPUI campus. … The absence of an engineering program at IUB hinders cooperation with leading universities such as Purdue University in areas critical to both institutions and to the state. Launching the proposed engineering program will significantly enhance collaborative activities between Purdue University and Indiana University in an array of areas in the physical, environmental, biological, and information sciences that are critical to the future of both institutions, to the state, and to the nation.

Independently, we have received many supportive remarks from Purdue engineering alumni about IU Bloomington establishing an engineering program, and reports from some of them about similar comments by some Purdue engineering faculty members.

Finally, it is important to note that the differentiated missions of Indiana's two primarily research universities have not, in the past, precluded those institutions from pursuing unique and limited programs that are closely related to areas of expertise within that institution, even if those program areas are nominally similar to areas traditionally taught at the other institution. This distinction, for example, has allowed Purdue University to appropriately pursue educational and research programs in the health sciences and cancer research, even though the general discipline of medical education has traditionally resided with Indiana University. Forty years ago, in 1978, Purdue launched its Center for Cancer Research (see https://www.cancerresearch.purdue.edu/about-us). This has been a very successful center and just recently they have announced a new $8 million grant – see http://indianapublicmedia.org/news/purdue-cancer-center-receives-8-million-grant-80939/. And the more recent establishment of Purdue's College of Health and Human Sciences in 2010 (http://www.purdue.edu/hhs/), which includes many other schools and units that had existed for many years before that, confirmed that the days of narrow or rigid mission differentiation had long passed in fundamental areas like medicine and engineering. In addition a cursory search shows that Purdue has the following units that are in the general area of the life and health sciences:

- The Weldon School of Biomedical Engineering (https://engineering.purdue.edu/BME – grew out of a unit first established in 1974)
- Purdue-UAB Botanical Research Center for Age-Related Diseases (http://www.cfs.purdue.edu/fn/bot/)
- Regenstrief Center for Healthcare Engineering (http://www.purdue.edu/discoverypark/rche/)
- Women's Global Health Institute (http://www.purdue.edu/discoverypark/WGHI/)

In recent years a number of new buildings have been constructed to house some of these programs.

Purdue's general strategy in the life and health sciences is well set out in a recent communication from their Provost Deba Dutta to the Purdue community, at which he noted (in part):

> At a faculty town hall earlier this month, we held a lively discussion about creating "pillars of excellence" in the life sciences. The call for action in life sciences is not new at Purdue, but today it is urgent. Advances in the life sciences are necessary not only for human health but also for other vitally important global problems of energy, food, climate and water. Now more than ever, society relies on the racehorse land-grant institutions to share ideas and find answers. Purdue is well equipped to respond to the exigent challenges facing a world that cries for help more desperately each day. In order to radically raise our profile in the life sciences, we have to exercise vision, take some risks and create pathways to new paradigms.
> Scientific revolutions — old paradigms giving way to new ones — are brought about by scholars who bend traditional rules and are not bound by prior practice.
> Physicist and philosopher Thomas S. Kuhn reminds us of this in his beautiful monograph, "The Structure of Scientific Revolutions."

(https://www.purdue.edu/provostnewsletter/provostMessage/march2015.html).

IU agrees strongly with this assessment, and accordingly, Indiana University has not objected – indeed, has supported – Purdue pursuing such programs and has not and will not assert "mission

differentiation" as a means of limiting our Purdue colleagues in this area. Purdue currently has nearly 40 health and life sciences related degree programs.

Breadth of the Proposed Programs

8 While the December 2014 Engineering Task Force report indicates that the program could be named something generic, such as "Engineering" or "Engineering and Applied Science," it also indicates that "it would be attractive to come up with a name that differentiates the unit, both to create identity and excitement, and to differentiate what IU Bloomington is doing from traditional, large colleges of engineering both within Indiana and beyond;" it then suggested two possibilities: "Intelligent Systems Engineering" and "Convergent Technologies Engineering" (p. 23). What is the rationale for the names selected for the programs, especially given that the IU Board of Trustees Resolution "endorses the creation of a highly-focused program in intelligent systems engineering."

As this question states, the task force spent time discussing a name that made it clear that the proposed engineering program was linked to modern information technology. Many options were considered, and the two mentioned in the question were considered worthy candidates. And indeed, these degrees will focus on the engineering of intelligent systems – systems that draw significantly on modern information technology approaches in intelligent systems, user interfaces, big data, etc. These degrees are also clearly different from most traditional engineering in civil, mechanical, chemical, aeronautical and even wide portions of electrical engineering; and our program will not be training Professional Engineers (P.E.). However, we settled on the more general titles of "engineering," understanding that the newly hired faculty members and their relevant scholarship – as well as communicating the scope of the degrees – might lead us to need to tweak the names in the near future.

9 Does the University anticipate the possibility of adding concentration areas to the B.S. in Engineering, beyond the three identified in the proposal: bioengineering, computer/cyber-physical systems engineering, and nanoscale systems engineering (pp. 1 and 20-23)? If so, what are these additional concentrations and when might they be added?

No, it does not.

10 In both the Task Force report (pp. 3 and 12) and the Ph.D. proposal (pp. 3 and 5), there are reference to "initially" focusing on six overlapping areas ("bioengineering, computer engineering, cyber-physical systems, environmental engineering, molecular and nanoscale engineering, and neuro-engineering"). Please identify other areas of focus that the University is considering beyond those "initial" six and indicate when might they be added?

None has been considered; in fact no others were considered even tentatively during the task force's deliberations.

11 Some of the six areas of focus identified in the Task Force Report (pp. 13-14) and the doctoral program proposal seem more focused and more closely tied to areas of research in which IU Bloomington has clear strengths. For example, biomolecular engineering and nucleic acid and protein engineering clearly related to core areas of historic and present areas of excellence on the campus. However, other areas are broad: computer engineering (the Report actually refers to jumpstarting "the computer engineering program") and molecular and nanoscale engineering (the Report itself states "the scope of molecular and nanoscale engineering is broad"), while others, such

as nanomanufacturing and materials analysis, appear more linked to traditional engineering disciplines. With respect to all six areas, to what extent is this accurate?

Each of the six areas is closely connected to existing educational and research strengths at IU Bloomington and this was a necessary criterion for each area to be considered. The main correlations between the focal areas and existing strengths are:

- Bioengineering (in particular engineering of biological processes): IU Bloomington has a large, internationally prominent group of faculty in bioinformatics that spans Informatics and Computing and Biology, and a number of other faculty in Biology and in Biochemistry. Additional faculty whose research is related to bioengineering are found in biochemistry, chemistry, environmental science, medicine, optometry, public health, speech and hearing sciences, and physics.

- Computer Engineering: SoIC's Center for Research in Extreme Scale Technologies, which has about $3-4M external research funding per year, has strong ties to and needs for computer engineering. Many SoIC faculty in computer systems, networks, robotics and other areas are closely linked to computer engineering. Physics also has several groups of faculty involved in advanced aspects of computing that is related to computer engineering, including in lattice computing and quantum computing.

- Cyber-physical systems: SoIC has a number of successful faculty in both robotics and health informatics whose work already would be considered to be in this area and would benefit greatly from engineering collaborators. Psychological and Brain Science also has multiple faculty in robotics and sensing systems for whom the same is true, as does Physics with faculty in detector design, and sensory and motor processing.

- Environmental engineering: SPEA has 11 active researchers in their environmental science faculty group, including 4 with graduate degrees in engineering. All of these faculty will benefit by being able to recruit graduate students with engineering degrees who would then pursue the PhD in engineering.

- Molecular and nanoscale engineering: IU Bloomington has developed a research focus in material science, with a cluster of faculty between chemistry, biology, and physics with over $3 M research funding per year. Several of these faculty members have training and/or degrees in allied engineering fields. This research is supported by a Nanoscale Characterization Facility and the Center for the Exploration of Energy and Matter, including state of the art facilities for nanomaterials manipulation and testing and materials characterization.

- Neuro-engineering: Psychological and Brain Sciences contains several faculty members whose work with neuroimaging, neural connectomics, and neural signal processing both requires and facilitates partnership with neuro-engineering; some of these faculty themselves are trained as engineers. In addition, Physics has three faculty members, all adjuncts in the Program in Neuroscience, with experimental and theoretical research interests in neural information processing.

Additional Engineering Programs

12 When does the University anticipate requesting authorization to add the M.S. in Engineering?

Tentatively, by January 2016.

13 Does the University anticipate the possibility that the tracks in the B.S. in Engineering might grow to the point of spinning them out as separate degree programs? If so, which ones are likely candidates and what criteria might the University apply to determine when this might occur?

No. This is counter to the basic approach of providing a flexible, multi disciplinary engineering education. It is designed to be distinct from most conventional field-specific engineering degrees, in ways that include the greater modern information technology orientation, a sustained design and build orientation, and the ability to leverage IU strengths in areas including business, law, liberal arts and international studies.

14 Does the University anticipate the possibility that the areas of emphasis in the Ph.D. in Engineering might grow to the point of spinning them out as separate degree programs? If so, which ones are likely candidates and what criteria might the University apply to determine when this might occur?

No. The anticipated faculty size is too small to support separate PhD degree programs, and we do not believe that this is needed.

Enrollment Projections and Staffing Needs

15 Given that Ph.D. programs take some time to reach their anticipated size, please extend the enrollment projections and degrees conferred beyond the five years in the proposal (p. 15) to the point at which the program might stabilize or reach steady state?

Enrollment Projections to Year 7 and Beyond:

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7 and beyond
	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23 and beyond
Enrollment	6	14	24	34	44	48	50
Graduates					6	8	10

Note that the above figures are directly linked to the number of faculty we plan to hired and the assumption that the average faculty members works with 2-3 PhD students at once.

16 Both the Task Force Report (pp. 20-21) and the B.S. and Ph.D. program proposals (p 5 and pp. 6-7, respectively) indicate that "the engineering program (both undergraduate and graduate) initially will require 20-25 new, dedicated engineering faculty members." How long will it take to add this total of 20-25 new dedicated faculty members and in what areas will they be hired?

Our goal is to hire the full complement of faculty –currently estimated as 18 tenure track faculty and 3-4 lecturers – over a three period, with the initial searches conducted during AY 2015-16 for faculty to start in fall 2016. This means that the full faculty would be in place by fall 2018. This schedule is aggressive and an additional year could be required. The faculty will be hired in the six

areas that the engineering program is built around, in each case forming a cluster with current IU Bloomington faculty as well.

17 After the "initial" 20-25 new hires, how many additional faculty members will likely need to be hired? In what areas and over what time period?

None, if the enrollments are at the projected levels. If at some point the enrollment demand is higher (particularly if more qualified Indiana students want to study intelligent systems engineering than we have capacity for) then we may need to raise the enrollment levels and would have to hire additional faculty to serve them.

Facilities and Other Capital Costs

18 What is the relationship between the capital needs identified for these programs (Task Force Report, p. 22, and B.S. and Ph.D. proposals, pp. 5-6 and pp. 7-8, respectively) and the recent request to construct a new School of Informatics and Computing Building? If the programs were not approved, would there still be a need for the new building? Is the 25,000 gsf of needed new space referenced in the program proposals included in the 125,000 gsf to be added when the new School of Informatics and Computing Building is constructed? If not, where is the 25,000 gsf to be located?

There is no relationship between the new SoIC building and the proposal to create an engineering program. Design of the new building began with architect selection in winter 2014; discussion of the need for a new SoIC building goes back well over ten years. There are several options for the 25,000 gsf of space that is identified including: the fourth floor of the new SoIC building (which also could be used to accommodate existing SoIC programs that will not fit in the building otherwise and will continue to be housed in buildings adjacent to campus) and several existing spaces on the IU Bloomington campus.

19 What are the anticipated long-term facility and equipment needs associated with these programs? Does the University anticipate altering its ten-year capital plan in light of these needs, if the programs are approved?

The task force reports attempts to fully identify those needs and they correspond to the 25,000 gsf of space mentioned above. There would be no change to the IU capital plan.

Assurances against Unnecessary Duplication

20 The Task Force Report talks about opportunities that will accrue to the University if IU Bloomington can "design an engineering program that has few boundaries" (p. 11), and indeed, one can read the Report and the program proposals as exhibiting a tendency toward developing engineering programs with "few boundaries." If, instead, the Commission were to approve, in the words of the IU Board of Trustees, a "highly-focused program in intelligent systems engineering," what concrete, quantifiable, objectively verifiable, and enforceable set of principles, metrics, and procedures does the University propose, which can assure the Commission that the IU program will remain highly focused and not expand to the point of unnecessarily duplicating existing engineering resources?

The proposed, highly focused program is not limited by the traditional disciplinary boundaries that can sometimes inhibit innovation and collaboration. It incorporates several related areas in engineering thus encouraging very close coordination among faculty in their research and even in

their institutional appointments (to existing departments in the sciences, computing and informatics). Thus the task force report and the Trustee's recommendation are entirely consistent.

The metric that the Commission could expect and apply simply would be that IU continues to offer a program specifically focused on the areas that are proposed, which are all linked by a common core (sensors, instrumentation, modern information technology), and that the degrees continue to be unified, general engineering degrees with these foci. Though we cannot imagine the creation of additional tracks at this time, the changing nature of technology may lead to new areas of interest some years down the road. If this were to happen, these new tracks or concentrations, we would commit to reporting them to the Commission, and of course, like all such programmatic additions, would be reported to our Board of Trustees and would therefore be matters of public record. Most importantly, the revised name of the degrees offers strong assurance that it will be pursued by students and taught by faculty members who are interested in intelligent systems engineering and not in broader areas.

In the final analysis, the Commission itself can, and we presume will, assert its proper coordination and approval authority over any proposed new programs – whether they be engineering-related at IU or health sciences-related at Purdue – to ensure that unnecessary duplication in these or any other discipline, does not occur.

Attachments:

Appendix A: Listing of engineering positions (by type of engineering) at NSWC Crane Appendix B:

Engineering Programs and Enrollments at AAU Institutions

For Further information:

Documents Accessible from https://uaa.iu.edu/engineering/:

Message from President McRobbie & Provost Robel
Press Release: IU trustees support new engineering program Blue
Ribbon Committee Report
Strategic Plan for Economic and Community Prosperity in Southwest Central Indiana Engineering
Task Force report
Resolution of the Board of Trustees of Indiana University On Establishing an Engineering Program and
Engineering Degrees At Indiana University Bloomington
Central Indiana Tech Workforce Study

INDIANA UNIVERSITY

OFFICE OF THE EXECUTIVE VICE PRESIDENT
FOR UNIVERSITY ACADEMIC AFFAIRS

RESPONSES TO SECOND SET OF COMMISSION QUESTIONS CONCERNING THE PROPOSED B.S. AND Ph.D. DEGREES IN ENGINEERING TO BE OFFERED AT INDIANA UNIVERSITY BLOOMINGTON

July 20, 2015

The following are Indiana University's responses to the questions presented by Commission staff on July 6, 2015.

1 Dean Leah Jamieson of Purdue University has remarked that a focus on "intelligent systems engineering" does not limit the scope of the JU program and could have very broad reach into many engineering disciplines, including the "big infrastructure" engineering disciplines. Furthermore, Dean Jamieson has indicated that a systems approach is utilized in many engineering disciplines. What is the University's response to this?

First, it is important to clarify that IU is proposing *"intelligent* systems engineering" as the title, and not "systems engineering." Systems engineering is indeed a broader designation, whereas *"intelligent* systems engineering" expressly links the proposed degrees to the School of Informatics and Computing and the programs from which they are a logical outgrowth, and to which they will remain closely tied, as described in the proposal documents.

IU's original proposal was to name the degrees the unmodified term "engineering," for reasons that are described in the proposal. However, in response to concerns raised about scope, and in a good faith effort to address those concerns, JU revised its proposal to use the name "intelligent systems engineering." President Daniels told President McRobbie that the addition of "intelligent systems" was helpful.

Despite this apparent progress, at the Commission meeting in Columbus on June 11th, Dean Jamieson raised the above concern about scope regarding the revised name. No preferable alternatives were suggested, however. In an effort to address this and other questions raised at the Columbus meeting, IU representatives met with Dean Jamieson and Dr. Balakrishnan on July 13th. The meeting was productive in some respects, but it also did not provide any firm proposals for a preferable title. Having already modified our preferred name to address Purdue's concerns, we do not feel that it would be productive for us to offer further alternatives without a firm understanding of what would be deemed acceptable.

IU has stated clearly in every set of remarks, official speech, and document about the proposed engineering program, including President McRobbie's extensive remarks on June 11th, that we have no intention of moving beyond the stated scope

of the proposed programs. We also have made it clear to the Commission that we are happy to have the ongoing scope of the proposed program reviewed by the Commission in the future. We believe that the name "intelligent systems engineering" accurately reflects and limits the scope to the proposal.

2 Dean Jamieson has indicated that "duplication is at the heart of Purdue's concerns." She further indicated that there is "significant overlap" with Purdue programs, including: Multidisciplinary Engineering (which offers a concentration in Nano-Engineering), Computer Engineering (which also matches many aspects of Cyber-Physical Systems Engineering), Industrial Engineering, Agricultural and Biological Engineering, Biomedical Engineering (which also has a focus on Neuro-Engineering), and Environmental and Ecological Engineering. What is the University's response to this characterization?

This point was raised and extensively discussed at the Columbus meeting, and we have been provided with no additional detail on which to base more specific responses. The fact is that Purdue has a very comprehensive engineering program, and so there is probably no area of engineering that we or anyone else could propose, which would not overlap to some degree with something that Purdue offers.

The primary evidence offered for duplication is that there are overlapping courses offered by the proposed program and in various Purdue programs. In the first place, the programs and courses of IU and Purdue already overlap enormously – from the core liberal arts subjects, to professional schools in business and nursing and education, to both universities' extensive and long-standing investment in the health sciences. Overlap, in other words, is the norm and not the exception, as one should expect of two major research universities.

The more important consideration, as we discussed in Columbus, is in area of emphasis at a programmatic level. The IU proposal grows out of strengths in informatics and computing that are unique to JU Bloomington, even if they not entirely distinct from Purdue's course offerings in computer engineering and science.

Most importantly, we firmly believe – and we are joined in this belief by leading Indiana business leaders, some of whom addressed the Commission in Columbus – that the current and future economic prosperity of the State of Indiana is best *served* by encouraging our major public research universities to teach and conduct research in areas that are demanded by our business community. As these business leaders emphatically said, Indiana needs to *expand* these offerings, rather than narrow and allocate them. We are responding to a very clear request from the Battelle study and from industry to develop an IT-enabled, intelligent systems engineering program at IU Bloomington.

Finally, as the Blue Ribbon Commission emphatically stated, some overlap of areas with a difference in approach is a highly desirable asset to the State of Indiana, as it will form a basis for more research collaboration between these two great universities.

3 The *Venn* diagram in the Engineering Task Force Report (p. 16) lists the following nine "underlying topics," which appear to overlap with or underlie all six areas of emphasis in the Ph.D. program:

- Sensors, Detectors, and Instrumentation
- Mobile Computing Devices and Computing Hardware
- Intelligent Systems
- Big Data
- User Interface Design
- Computational Modeling
- Signal Processing
- Control Theory
- Information Theory

a. Do these nine underlying topics constitute the curricular core of the Ph.D. program?
b. If not, what is the curricular core of the doctoral program?
c. If so, do all doctoral students take a core set of courses that cover these nine topical areas? What are these core courses and are these courses offered through the School of Informatics and Computing or through other academic units?
d. Do all nine of these underlying topics equally undergird all six areas of emphasis? For example, would the topics "mobile computing devices and computing hardware" and "user interface design" undergird the "molecular and nanoscale engineering" area of emphasis as much as they would other areas of emphasis?

These topics constitute the research core of the proposed engineering program, that is, the
topics that would underlie the research approaches in the proposed areas of engineering. The weighting of how each topic applies to the different proposed areas of engineering will naturally vary.

The course core will be different from this list of topics, although they will of course be related. The course core also will include basic material in the particular areas of engineering and related sciences. These core courses - which will constitute the heart of the tracks of any future master's degrees - are not yet fully specified, as we need to start forming an engineering faculty before we reach that stage. Forming that faculty, in turn, awaits approval of the initial two degree proposals by the Commission.

4 Please provide more specific curricular detail on the six areas of focus identified in the Ph.D. proposal. Taken together, Appendices 6 ("Example Eligible Course Lists," pages 21-22) and 7 ("Sample Track Curricula," pages 22-23) attempt to do this, but are illustrative and do not precisely cross-reference one another. For example:

a. Appendix 6 lists eligible courses in four areas (Computer Science, Mathematics, Physics, and Environmental Engineering), but leaves out eligible courses in other areas presumably of central importance to the program (e.g. Biology and Chemistry);
b. Appendix 7 identifies curricular tracks for only two of the six areas of focus (Computer Engineering and Cyber-Physical Systems) and does not precisely reference the courses in these tracks with alphanumeric course numbers and titles;
c. It is unclear if the curricular tracks in Appendix 7 are totally individualized

to each student or indicate a curricular structure for each area of focus have some structure.

While it is not necessary to identify every eligible or potentially eligible course, please do so for all key areas; please also indicate how these courses apply to all six areas of focus. Are these tracks totally individualized to each area of focus or do they have curricular structure; if the latter, please describe.

These are details of the Ph.D. program that cannot meaningfully be specified before faculty are hired, and indeed for this very reason the Commission does not ordinarily seek this level of detail in PhD proposals. In this case, where we are proposing to start an intelligent systems engineering program, we first need approval of the degree proposals in order to begin recruiting faculty members. Thus it makes the most sense to specify the degree at the level we have done so far, and then after we receive the Commission's approval, to hire an initial set of faculty and then develop the degree requirements more fully. There definitely will be a structure for each track as opposed to fully individualizing for each student. Note that at the outset, students can enter the PhD program with external MS degrees, and in this case would mainly take qualifying exams and conduct research.

5 What is the rationale for housing the proposed programs in the School of Informatics and Computing as opposed to some other academic unit?

As stated in previous documents and remarks, there are two main reasons for placing the proposed engineering program in the School of Informatics and Computing (SoJC). First, while the proposed engineering content builds on a number of academic areas of IU Bloomington including in several of the sciences, the largest overlap is with SoIC. This includes the areas of computer engineering and cyber-physical systems, which we expect to form the heart and largest component of the proposed BS degree, as well as bioengineering due to the large and excellent bioinformatics program in SoIC. Secondly, SoIC as a thriving professional school provides key infrastructure that will be crucial to the success of the engineering program and can be effectively leveraged by it. This includes a robust and thriving career services organization with extensive programming, excellent faculty research support, and a mature development organization including corporate relations.

Finally, this placement should be welcomed by those who are concerned about the scope and duplication of the degrees, as it provides an ongoing organizational focus and foundation within the SoIC's existing, distinctive concentration and approach.

6 Does the University feel that all six areas of focus in the Ph.D. program have to be implemented initially and simultaneously in order for the program to be viable? Could the program still be viable if only a subset of the six areas of focus were implemented, at least initially? For example, page five of the Ph.D. proposal states "of the initial six interdisciplinary areas of emphasis of the proposed program, half will produce graduates with direct applicability to medical research (bioengineering, neuro-engineering, molecular and nano-scale engineering)." Could the program be viable if only these three areas, all of which have strong ties to a core IU mission (medical research), were implemented? If so, could a title for such a program be developed that reflected the bioinformatics and biomedical engineering aspects of the program?

Our hiring may cause us to take a phased approach where 3-4 of the six areas are initiated

first. If so, the most likely areas for initial emphasis are computer engineering, cyber-physical systems, environmental engineering and possibly neuro-engineering. Computer engineering and cyber-physical systems are the heart of what the Battelle study calls for in IT-enabled systems engineering, and what key engineering industry in southern Indiana most needs to hire, starting with Crane's huge demand for electronics engineers. It also builds upon and provides a much needed complement to existing strengths in the School of Informatics and Computing. Environmental engineering, along with neuro-engineering, are the other areas where IU Bloomington has a large cohort of engineering-trained scientists who are clamoring for an engineering counterpart. These faculty reside primarily in the environmental sciences department of the School of Public and Environmental Affairs and in the Geology Department of the College of Arts and Sciences in the case of environmental engineering, and in the Department of Psychological and Brain Sciences of the College of Arts and Sciences in the case of neuro-engineering.

7 Indiana and Purdue Universities have many examples of programmatic collaboration, including the placing of programs from one university on a campus of another. In addition to IUPUI and IPFW, we have Statewide Technology, in which Purdue degree programs offered through the College of Technology (now the Polytechnic Institute) are co-located at IU regional campuses, in separate facilities, with Purdue University branding. We also have all four years of the M.D. degree available at partner campuses around the state, including Purdue University West Lafayette, with IU School of Medicine facilities and branding. Could such a model work for one or both of the proposed programs? If so, under what circumstances would it be feasible for Purdue West Lafayette engineering programs be offered on the Bloomington campus? What is the feasibility of a jointly offered program, in which both institutions have degree-granting authority?

This question combines very different kinds of arrangements. The Purdue Polytechnic Institute and IU School of Medicine facilities are essentially stand-alone operations conveniently housed on the other university's campus. In some cases, this provides the basis for extensive faculty-to-faculty collaboration of the kind that occurs between geographically separate campuses, and in other cases it is simply a geographical convenience for students taking courses at the other university. In both situations, the students are enrolled and credentialed entirely in their home campuses, and collaborative research is managed as with separately located campuses.

The other arrangement – shared campuses – involves a closer relationship, but in fact the two campuses in question (IUPUI and IPFW) are managed by *one* university *or* the other. Likewise, every degree program enrolls and credentials students at *one* university *or* the other. This arrangement has significant challenges, of course, and it functions best where responsibilities for instruction and administration are clearly allocated to one university or the other.

The actual sharing of a degree would represent an entirely new level of complexity with instruction, curriculum, administration, and accreditation – with no obvious benefit to students or the research enterprise, beyond what exists already. Students already move between IU and Purdue programs and courses constantly at shared campuses, and IU and Purdue researchers have collaborated on *literally hundreds*

of grant applications in the last few years. IU is firmly committed to working closely with Purdue's leadership to identify strategic areas of future collaboration, and have begun meetings for that purpose. It does not appear to us that joint degrees are necessary to valuable and productive research collaboration.

July 20, 2015

1 In her remarks to the Commission at its June Working Session, Dean Leah Jamieson of Purdue University stated, in reference to the IU engineering proposal, "Purdue is not blindly opposed to the idea and we are willing to look for a way to agree." Please expand on this. What specific suggestions would Purdue be willing to make in this regard? Are there any specific ways in which the IU proposal might be modified that would result in Purdue support for the program?

Rather than proposing specific modifications to the IU proposal, we believe it is more promising for IU, Purdue, and the State to consider collaborative approaches to bringing engineering to southern Indiana. Two such approaches that reflect a spirit of collaboration between the two institutions have been identified in Commissioner Sauer's question #5:

a. IU hosts a Purdue Engineering presence on the Bloomington campus, reciprocating the IUSM activity on our campus. This supports research collaborations and gives students access to engineering classes.

b. Purdue and IU create a joint PhD program in select areas of engineering, focusing on areas where the two institutions' complementary strengths create new opportunities for both institutions and for the State.

The two approaches could be combined to powerful effect.

2 Pages 7-8 of the IU B.S. in Engineering proposal makes specific reference to ways in which the University believes the proposed program does not duplicate programs at Purdue University. Likewise, page 8 of the IU Ph.D. proposal indicates that Purdue University confers Ph.D. degrees "in traditional engineering areas of practice, e.g. civil or mechanical engineering … [whereas] the proposed program is unique in that it is a 'Ph.D. in Engineering,' with an emphasis on a novel, multidisciplinary overlap with Computer Science and Informatics." Please respond to these statements. Please summarize the extent to which there may or may not be overlap or duplication between Purdue programs and the proposed IU baccalaureate areas of concentration and doctoral areas of focus.

Following is a summary of the relationship between Purdue Engineering degrees and the undergraduate concentration areas and the PhD areas of focus proposed for the IU engineering degrees. Without detailed syllabi, there is inherently a limitation on the depth of the analysis that is possible. However, based on the listings of courses and topics, we see no area in which Purdue is not already offering degrees very similar to those proposed by IU.

BS program – Areas of Concentration

- Molecular and Nanoscale Engineering: There is significant duplication between the proposed concentration and the existing Nano-engineering Concentration offered by Purdue under the ABET-accredited BS degree in Multidisciplinary Engineering (MDE). In particular, there appears to be significant overlap with Purdue courses in Chemical Engineering and Electrical and Computer Engineering, as well as with introductory and capstone design classes.

- Cyber-Physical Systems: There is significant duplication between the proposed concentration and the plans of study offered under Purdue's existing accredited BS degree in Electrical Engineering. In particular, the foundational areas that include sensors, mobile computing devices, signal processing, control theory, and information theory are all strengths of Purdue Electrical Engineering. Intelligent systems and interface design represent specific strengths of Purdue Industrial Engineering.

- Bioengineering: There is duplication between the proposed concentration and Purdue's offerings in Agricultural and Biological Engineering, Biomedical Engineering, and Environmental and Ecological Engineering. All topics listed in the high-level descriptions of the IU Bioengineering concentration are offered at Purdue. Purdue graduates over 200 BS students per year across these areas.

Although the "packaging" is in some cases different at Purdue, the topics covered are all well-represented in undergraduate degree programs. The Multidisciplinary Engineering BS degree program allows the flexible construction of plans of study that gracefully cross school/discipline boundaries.

PhD Program – Areas

We note that the proposal for the PhD at IU characterizes the Purdue PhD degrees in engineering as "… confer[ring] the Ph.D. degree in traditional engineering areas of practice, e.g., civil or mechanical engineering. Students apply to an engineering department, which largely defines their specialty." While PhD students at Purdue do apply and enroll in a specific school and schools/disciplines gain approval to offer the PhD, the degree granted is a PhD, without qualifiers or discipline descriptions. Because the PhD degree is largely defined by the research conducted, it is very common for a student's PhD committee to include faculty from different disciplines/schools, including co-supervisors as the "major professor(s)" of record. There are effectively no discipline boundaries constraining PhD-level research.

The following summarizes attributes of the PhD programs at Purdue in the six areas identified in the IU proposal.

- Computer Engineering: Purdue's School of Electrical and Computer Engineering has 20 faculty in computer engineering and a robust PhD program in computer engineering.
- Bioengineering: Purdue has approximately 100 faculty across six engineering academic units (Agricultural and Biological Engineering, Biomedical Engineering, Chemical Engineering, Electrical and Computer Engineering, Environmental and Ecological Engineering, and Mechanical Engineering) who supervise students explicitly in the areas listed as a part of the IU Bioengineering proposal.
- Neuro-engineering: 15 faculty in Purdue's School of Biomedical Engineering identify neuro-engineering as their primary area of research, and are currently supervising over 75 PhD students.

- Molecular and Nanoscale Engineering: Purdue is a world leader in this area, with facilities of the 186,000 square-foot interdisciplinary Birck Nanotechnology Center in Discovery Park; the widely acclaimed nanoHUB, whose education material and simulation tools are used by over 300,000 people annually; and especially strong interdisciplinary research involving over 50 faculty from across Engineering, as well as Chemistry and Physics.
- Environmental Engineering: Purdue's interdisciplinary division of Environmental and Ecological Engineering was created in in 2006. Its BS degree in Environmental and Ecological Engineering was approved by the Commission for Higher Education in 2012 and the BSEEE earned ABET accreditation in 2014 (retroactive to 2012). EEE's proposal to offer the MS and PhD degrees has been approved by Purdue's Graduate School (February 2015) and Board of Trustees (April 2015) and was submitted for consideration by the Commission on Higher Education in April 2015. The proposal will be reviewed by the Commission's Academic Affairs and Quality Committee on July 22, 2015. Purdue has a uniquely interdisciplinary environmental engineering program that is ranked #13 (undergrad) and #15 (grad program) by US News and World Report, which is quite remarkable for a program that is less than ten years old.
- Cyber-Physical Systems: Purdue's strength in embedded systems, sensors, robotics, and information networks spans the schools of Electrical and Computer Engineering, Industrial Engineering, Mechanical Engineering, and Computer Science (the latter in the College of Science). These are active areas of research involving over 40 engineering faculty supervising PhD dissertations.

3 Indiana University has indicated that it might be willing to change the name of the proposed program (to, for example, "Intelligent Systems Engineering") in order to differentiate its unique focus ("the engineering of intelligent systems – systems that draw significantly on modern information technology approaches in intelligent systems, user interfaces, big data, etc.") from that of more traditional engineering programs. Please respond to this. Would re-naming the proposed program "Intelligent Systems Engineering" be a way to appropriately signify the unique nature of the proposed programs? If not, why not? Would some other name help to do this better?

The name "Intelligent Systems Engineering" does not sharpen the focus or narrow the scope, in that "systems engineering" captures a significant fraction of leading-edge research in engineering, including but not limited to energy systems, environmental engineering, defense systems, aerospace systems, climate systems, healthcare systems, transportation systems, communication systems, power systems and smart grid, manufacturing systems, integrated electronics systems, agriculture, and cyber-human systems. The broadening from the notion of "closed-form" systems that could be characterized by mathematical input-output equations to the design, modeling, analysis, and characterization of complex systems – that is, "intelligent systems engineering" – spans almost all of engineering. A name such as "Informatics Engineering" would more appropriately reflect the strong emphasis on connecting engineering to informatics and information technology.

4 In authorizing Indiana University to seek approval from the Commission for Higher Education for

the proposed engineering programs, the IU Board of Trustees believed it was authorizing a "highly- focused program in intelligent systems engineering." If the Commission were to approve such a program, what concrete, quantifiable, objectively verifiable, and enforceable set of principles, metrics, and procedures might be employed by the Commission to assure that the IU program will remain highly focused and not expand to the point of unnecessarily duplicating existing engineering resources?

In the spirit of collaboration, we suggest that IU confer with Purdue on any "transcriptive change" – i.e., a change such as a new concentration or a formal minor that would appear on a student's transcript.

5 Indiana and Purdue Universities have many examples of programmatic collaboration, including the placing of programs from one university on a campus of another. In addition to IUPUI and IPFW, we have Statewide Technology, in which Purdue degree programs offered through the College of Technology (now the Polytechnic Institute) are co-located at IU regional campuses, in separate facilities, with Purdue University branding. We also have all four years of the M.D. degree available at partner campuses around the state, including Purdue University West Lafayette, with IU School of Medicine facilities and branding. Could such a model work for one or both of the proposed IU programs? If so, under what circumstances would it be feasible for Purdue West Lafayette engineering programs be offered on the Bloomington campus? What is the feasibility of a jointly offered program, in which both institutions have degree-granting authority? Are there examples of collaborative engineering programs in other states that have been successful?

As noted in our response to question #1, a model that is the reciprocal of the IUSM program on the West Lafayette campus is a promising alternative, as is a PhD developed and offered jointly by IU and Purdue. The single most important factor in the feasibility and success of such programs would be that they are developed jointly from the outset: designed to take full opportunity of the strengths of the two universities and offering new opportunities for both. Most examples of collaborative engineering programs are in the area of biomedical engineering, reflecting the "division of labor" between engineering and medicine in many institutions. Examples are the Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech and Emory (BS and graduate degrees), the UNC-NCSU Joint Department of Biomedical Engineering at the University of North Carolina and North Carolina State University (BS and graduate degrees), and joint programs offered through the Harvard-MIT Program in Health Sciences and Technology (MD, PhD, and combined MD/PhD programs).

COMMISSION FOR HIGHER EDUCATION
Thursday, August 13, 2015

BUSINESS ITEM C: **Academic Degree Programs for Expedited Action**

Staff Recommendation

That the Commission for Higher Education approve by consent the following degree programs, in accordance with the background information provided in this agenda item:

- Master of Science and Ph.D. in Environmental and Ecological Engineering to be offered by Purdue University West Lafayette
- Bachelor of Art and Bachelor of Science in Business Analytics to be offered by Ball State University
- Master of Science in Quantitative Psychology to be offered by Ball State University
- Bachelor of Science in Respiratory Therapy to be offered by the University of Southern Indiana
- Master of Science in Sport Management to be offered by the University of Southern Indiana
- Master of Arts in Second Language Acquisition, Policy, and Culture to be offered by the University of Southern Indiana

Background

The Academic Affairs and Quality (AA&Q) Committee reviewed this program at its July 22, 2015 meeting and concluded that the proposed MS and Ph.D. in Environmental and Ecological Engineering to be offered by Purdue University West Lafayette, BA and BS in Business Analytics to be offered by Ball State University, MS in Quantitative Psychology to be offered by Ball State University, BS in Respiratory Therapy, MS in Sport Management, and the MS in Second Language Acquisition, Policy and Culture to be offered by the University of Southern Indiana could be placed on the August 13, 2015 agenda for action by the Commission as expedited action items.

Supporting Document

Academic Degree Programs on Which Staff Propose Expedited Action, August 13, 2015.

Academic Degree Programs on Which Staff Propose Expedited Action

August 13, 2015

CHE 15-11 Master of Science and Ph.D. in Environmental and Ecological Engineering to be offered by Purdue University West Lafayette

Proposal received on April 13, 2015
CIP Code: 14.1401
Fifth Year Projected Enrollment: Headcount (all programs) – 48/40, FTEs – 48/40
Fifth Year Projected Degrees Conferred (all programs): 24/10

Purdue offers a B.S. in Environmental and Ecological Engineering, which the Commission approved in 2012; this program enrolled 84 headcount students in FY2014, which is slightly ahead of projected enrollments. The B.S. received ABET accreditation in Fall 2014. The proposed program differs from other environmental engineering programs in other states (there are no similar graduate level programs presently in Indiana), which usually address remediating environmental problems and pollution, in that the proposed programs also have a significant focus on reducing energy and water use.

The proposed IU Ph.D. in Intelligent Systems Engineering includes Environmental Engineering as one of its six areas of focus. However, both Indiana University and Purdue University agree that the two programs differ in significant ways and do not unnecessarily duplicate state resources.

CHE 15-15 Bachelor of Art and Bachelor of Science in Business Analytics to be offered by Ball State University

Proposal received on May 18, 2015
CIP Code: 52.1301
Fifth Year Projected Enrollment: Headcount – 55, FTEs – 55
Fifth Year Projected Degrees Conferred: 36

Business analytics converts large amounts of data and information into useable knowledge and insights through mathematical and statistical techniques, which is then combined with domain specific judgment and knowledge, leading to better decision-making in business and government. Ball State offers an array of undergraduate business programs, including Business Administration, Management, Logistics and Supply Chain Management, Finance, Human Resources Management, Information Systems, Marketing, and Finance. The proposed program requires 120 semester hours of credit, thus meeting the standard credit hour expectation for baccalaureate degree programs. The University has also indicated that the proposed program will fit into the Transfer Single Articulation Pathway for Business Administration, thereby providing an articulation with related associate degree programs at Ivy Tech Community College and Vincennes University.

CHE 15-16 Master of Science in Quantitative Psychology to be offered by Ball State University

Proposal received on May 15, 2015
CIP Code: 42.2708
Fifth Year Projected Enrollment: Headcount – 24, FTEs – 14
Fifth Year Projected Degrees Conferred: 12

This program will provide students with basic and advanced statistical knowledge and skills and the proficiency to analyze and apply data in a wide variety of social science related data situations. It will emphasize the use of computer statistical software, as well as the interpretation and reporting of results. The degree will serve students who need greater training in quantitative methods, particularly as they are applied to the social sciences. The proposed program builds on the University's M.A./M.S./M.A.Ed. in Educational Psychology, which is accredited by the American Psychological Association and which enrolled 51 headcount students in FY2014 and awarded 32 degrees that same year.

CHE 15-19 Bachelor of Science in Respiratory Therapy to be offered by the University of Southern Indiana

Proposal received on June 5, 2015
CIP Code: 51.0908
Fifth Year Projected Enrollment: Headcount – 90, FTEs – 90
Fifth Year Projected Degrees Conferred: 77

The University of Southern Indiana currently offers an A.S. in Respiratory Therapy, which enrolled 44 headcount or 38 FTE students in FY2014 and graduated 16 students that same year. If the Commission approves this program, the University will eliminate the associate degree program, with its last cohort of students entering in Fall 2015. The proposed B.S. will start in Fall 2016 and students who enter the A.S. this Fall will be able to transition seamlessly into the baccalaureate program.

Both the American Association for Respiratory Care (AARC) and the National Board for Respiratory Care (NBRC) have recommended the transition of associate degrees in Respiratory Care to the baccalaureate level, which is in response to increasing skill needs and demands of healthcare providers of respiratory therapy nationally. Graduates of the program would be prepared to earn recognition as a Registered Respiratory Therapist (RRT) through the NBRC. Ball State and IUPUI also offer baccalaureate degrees in Respiratory Therapy. The proposed B.S. requires 120 semester hours of credit, thus meeting the standard credit hour expectation for baccalaureate degrees. The program is designed to articulate with the Ivy Tech A.S. in Respiratory Care.

CHE 15-14 Master of Science in Sport Management to be offered by the University of Southern Indiana

Proposal received on April 20, 2015
CIP Code: 31.0504
Fifth Year Projected Enrollment: Headcount 75 –, FTEs – 75
Fifth Year Projected Degrees Conferred: 60

The University of Southern Indiana currently offers a B.S. in Sport Management, which enrolled 144 headcount or 132 FTE students in FY2014 and had 17 graduates that same year. The proposed program will be offered totally online in two formats: an accelerated one-year program for graduates of USI's B.S. in Sport Management and a two-year standalone option for all other students. It is expected that over 50 percent of the students who enroll in the proposed M.S. will be graduates of the University's baccalaureate program. The University will seek accreditation of the program from the Commission on Sport Management Accreditation (COSMA). USI estimates that approximately 60-70 percent of the graduates will find employment with major or minor professional league sports teams, intercollegiate athletics, or recreational sports programs.

CHE 15-20 Master of Arts in Second Language Acquisition, Policy, and Culture to be offered by the University of Southern Indiana

Proposal received on June 5, 2015
CIP Code: 13.0201
Fifth Year Projected Enrollment: Headcount –30, FTEs – 25
Fifth Year Projected Degrees Conferred: 12

Second language acquisition examines the process by which people learn a second language and the teaching methodologies that can best facilitate that acquisition. The proposed program will prepare individuals who wish to teach in this field and includes preparation in cultural awareness and the policies associated with speakers of other languages. Two six-semester hour certificates are imbedded within the curriculum and will be offered as standalone certificates: (1) Certificate in Cultural Awareness Training and (2) Certificate in Teaching English to Speakers of Other Languages (TESOL). The latter is aligned with the American Council on the Teaching of Foreign Languages (ACTFL) and the Cambridge English Language and Assessment (CELTA) standards. IU Bloomington's M.A. in TESOL and Applied Linguistics is the only other master's program offered by a public institution in this field.

COMMISSION FOR HIGHER EDUCATION
Thursday, August 13, 2015

BUSINESS ITEM D:	**Multi-Institutional Academic Health Science and Research Center – Evansville**
Staff Recommendation	That the Commission for Higher Education recommends approval to the State Budget Agency and the State Budget Committee of the following project: Multi-Institutional Academic Health Science and Research Center – Evansville
Background	By statute, the Commission for Higher Education must review all projects to construct buildings or facilities costing more than two million dollars ($2,000,000), regardless of the source of funding. Each repair and rehabilitation project must be reviewed by the Commission for Higher Education and approved by the Governor, on recommendation of the Budget Agency, if the cost of the project exceeds two million dollars ($2,000,000) and if any part of the cost of the project is paid by state appropriated funds or by mandatory student fees assessed all students. Such review is required if no part of the project is paid by state appropriated funds or by mandatory student fees and the project cost exceeds two million dollars ($2,000,000). A project that has been approved or authorized by the General Assembly is subject to review by the Commission for Higher Education. The Commission for Higher Education shall review a project approved or authorized by the General Assembly for which a state appropriation will be used. All other non-state funded projects must be reviewed within ninety (90) days after the project is submitted to the Commission.
Supporting Document	Multi-Institutional Academic Health Science and Research Center – Evansville, Project Summary and Description

Multi-Institutional Academic Health Science and Research Center – Evansville

STAFF ANALYSIS

This project will construct a multi-institutional health facility in downtown Evansville. This facility will be shared by the Indiana University School of Medicine (Medical Education and Research), University of Southern Indiana (Occupational Therapy and Health Informatics), and University of Evansville (Physical Therapy and Physicians' Assistant Program). Total new space required for instructional and research activities will be approximately 145,000 gross square feet.

This learning environment will attract the most talented students and train them in sophisticated simulation and clinical skills labs with the latest technologies. It also will provide a dedicated facility focusing on a common inter-professional education mission while allowing each institution to advance its students and faculty. It will develop a diverse and flexible learning environment that will encompass the next generation of learning spaces that support team-based, problem-based, and experiential learning.

This project aims to re-position the region to better compete in the recruitment and development of science-oriented and knowledge-based industries. Coupled with a related expansion of the number of medical resident training positions in the region, the project will foster the retention of trained medical professions in the underserved Evansville area and the city's development as a nexus for health care services.

Inter-professional training in health care is the new pedagogical paradigm to prepare health care professionals for new protocols of practice that are far more interdisciplinary and team oriented than in the past. This team oriented, tightly coordinated approach to health care also holds the promise of better health care cost control in the future.

Comparable Projects: The Indiana University-South Bend Raclin-Carmichael Center at approximately $328/gsf (in 2008 dollars) and the IPFW Medical Education Center at approximately $290/gsf (in 2004 dollars).

Funding: The total cost for the project is estimated at $52 million. The funding will consist of appropriations from the General Assembly totaling $25.2 million ($19.2 million IU/$6 million USI). The $25.2 million will be funded by the Tobacco Master Settlement Agreement Fund. The University of Evansville has committed $6 million through lease payments with the project developer, Evansville Health Realty. The City of Evansville, by means of tax incremental financing (TIF district) has committed to fund the remainder of the project and to contribute the land necessary for the development. TIF uses future gains in taxes to subsidize current improvements, which are projected to create the conditions for gains above the routine yearly increases which often occur without the improvements.

Additional Staff Notes: The facility will be constructed by the developer on the site recommended by the Indiana University Board of Trustees following an extensive Request for Proposal Process. Following construction, both Indiana University and the University of Southern Indiana will take ownership of their portions of the new facility in a "condominium" arrangement to be purchased from the developer. An operating agreement will be developed between the partner institutions and the developer to account

for such items as occupancy costs (utilities, custodial, staffing, ordinary maintenance, etc.), shared space use, and renovation and rehabilitation (R&R).

To provide additional context, capital projects are submitted to the Commission for review under many different circumstances. Capital projects are sometimes included in the Commission's biennial budget recommendation to the Governor and General Assembly. Other projects, such as this, are funded based on intent of the General Assembly. After the General Assembly has funded a project, it is then submitted to the Commission for review. Because the Commission's review is the first step in the process after a project is funded by the General Assembly, many times operating agreements, lease agreements, and specific details have yet to be determined.

The Commission recognizes the trustees of public institutions are responsible to negotiate contracts and enter agreements that ensure the interests of the institutions are protected. The Commission staff, while cautious with regard to future purchase, ownership and operating agreements relating to this project, is confident trustees and staff of the institutions will only enter agreements that are advantageous to the short-term and long-term fiscal health of the two public institutions involved in this review.

The Commission staff recommends approval to the State Budget Agency and State Budget Committee, while noting the aforementioned questions and cautions raised by members and staff.

INDIANA UNIVERSITY

OFFICE OF THE PRESIDENT

June 26, 2015

The Honorable Michael R. Pence
Governor, State of Indiana
206 State House
Indianapolis, Indiana 46204

RE: IU School of Medicine Multi-Institutional Academic Health Science and Research Center – Evansville
Indiana University Purdue University – Indianapolis
A-2-14-1-15

Dear Governor Pence:

The Trustees of Indiana University and I respectfully request authorization to proceed with the construction of the IU School of Medicine Multi-Institutional Academic Health Science and Research Center at the downtown site proposed by Skanska/U.S. HealthRealty and the City of Evansville. IU's portion of the project is estimated at $19,200,000, to be funded by cash from State Appropriations. An additional $12,800,000 will be provided by Local Funding/City of Evansville.

This project will construct a multi-institutional health facility in downtown Evansville. This facility will be shared by the Indiana University School of Medicine, University of Southern Indiana, and University of Evansville. Total new space required for instructional and research activities will be approximately 145,000 gross square feet. IU's portion of the facility will be approximately 87,000 gsf, with the remainder divided between the University of Southern Indiana and University of Evansville. The five-story tower will house office/support space, research labs, wet/dry teaching labs, seminar/classrooms, and a simulation center/clinic.

Your early approval of this request will allow us to proceed on schedule with the project.

Yours sincerely,

Michael A. McRobbie
President

Submitted though the Indiana Commission for Higher Education and the State Budget Agency.

cc: Indiana Commission for Higher Education
State Budget Agency

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20131788

RE: IU School of Medicine Multi-Institutional Academic Health Science and Research Center – Evansville
Indiana University Purdue University – Indianapolis
A-2-14-1-15

cc: Senator Luke Kenley
Representative Tim Brown
Senator Karen Tallian
Representative Terry Goodin
Mr. Brian Bailey
Senator Ryan Mishler
Representative Sheila Klinker
Senator John Broden
Representative Robert Cherry
Ms. Teresa Lubbers
Ms. Alecia Nafziger
Mr. Matt Hawkins

PROJECT SUMMARY AND DESCRIPTION

IU SCHOOL OF MEDICINE MULTI-INSTITUTIONAL ACADEMIC HEALTH SCIENCE AND RESEARCH CENTER - EVANSVILLE

Institution:	Indiana University	**Budget Agency Project No.:**	A-2-14-1-15
Campus:	Indianapolis	**Institutional Priority:**	6
Previously approved by General Assembly:	Yes	**Previously recommended by CHE:**	Yes
Part of the Institution's Long-term Capital Plan:	Yes		

20131788

Project Summary Description:

This project will construct a multi-institutional health facility in downtown Evansville. This facility will be shared by the Indiana University School of Medicine (Medical Education and Research), University of Southern Indiana (Occupational Therapy and Health Informatics), and University of Evansville (Physical Therapy and Physicians' Assistant Program). Total new space required for instructional and research activities will be approximately 145,000 gross square feet. IU's portion of the facility will be approximately 87,000 gsf, with the remainder divided between the University of Southern Indiana and University of Evansville.

Summary of the impact on the educational attainment of students at the institution:

Each University is committed to creating learning environments which promote academic excellence, foster personal development, and enhance the University experience for diverse student populations. This learning environment will attract the most talented students and train them in sophisticated simulation and clinical skills labs with the latest technologies. It also will provide a dedicated facility focusing on a common inter-professional education mission while allowing each institution to advance its students and faculty. It will develop a diverse and flexible learning environment that will encompass the next generation of learning spaces that support team-based, problem-based, and experiential learning.

Project Size:	87000	GSF	57925	ASF	0.6658046 ASF/GSF
Net change in overall campus space:	87000	GSF	57925	ASF	

Total cost of the project (1):	$ 32,000,000 (IU portion only)	**Cost per ASF/GSF:**	$ 367.82 GSF $ 552.44 ASF
Funding Source(s) for project (2):	$ 19,200,000 Cash from State Appropriation $ 12,800,000 Local Funding/City of Evansville		
Estimated annual debt payment (4):	0		
Are all funds for the project secured:	Yes		
Estimated annual change in cost of building operations based on the project:	$ 696,000		
Estimated annual repair and rehabilitation investment (3):	$ 480,000		

(1) Projects should include all costs associated with the project (structure, A&E, infrastructure, consulting, FF&E, etc.)

(2) Be consistent in the naming of funds to be used for projects. If bonding, note Bonding Authority Year (1965, 1929, 1927, etc.)

(3) Estimate the amount of funding the institution would need to set aside annually to address R&R needs for the project. CHE suggests 1.5% of total construction cost

(4) If issuing debt, determine annual payment based on 20 years at 5.75% interest rate

- If project is a lease-purchase or lease, adjust accordingly. Note the total cost of the lease in the project cost, and annual payments in project description

PROJECT DETAILED DESCRIPTION - ADDITIONAL INFORMATION

IU SCHOOL OF MEDICINE MULTI-INSTITUTIONAL ACADEMIC HEALTH SCIENCE AND RESEARCH CENTER - EVANSVILLE

Institution:	Indiana University	**Budget Agency Project No.:**	A-2-14-1-15
Campus:	Indianapolis	**Institutional Priority:**	6

20131788

Description of Project

This project will construct a multi-institutional health facility in downtown Evansville. This facility will be shared by the Indiana University School of Medicine (Medical Education and Research), University of Southern Indiana (Occupational Therapy and Health Informatics), and University of Evansville (Physical Therapy and Physicians' Assistant Program). Total new space required for instructional and research activities will be approximately 145,000 gross square feet. IU's portion of the facility will be approximately 87,000 gsf, with the remainder divided between the University of Southern Indiana and University of Evansville. An advisory board will be established to assist the ongoing collaboration between the institutions and local Evansville partners.

Relationship to Other Capital Improvement Projects: This project does not affect any other capital improvement projects.

Historical Significance: Indiana University does not consider any of the buildings or structures affected by this project to be historically significant.

Alternatives Considered: Other options were considered; however, having the facility built at the downtown site proved to be best suited for students and faculty/staff and allows for maximum accessibility. This location is ideally situated among all the major hospital facilities in the greater Evansville area, as well as having easy interstate access to other healthcare facilities in the region by way of I-164.

Relationship to Long-Term Capital Plan for Indiana University: This project is consistent with the mission of extending the IU School of Medicine in the southwest region of Indiana.

Need and Purpose of the Program

This project is essential to fulfilling the need for health science education in the Evansville region. A multi-institutional academic health science and research center located in the southwestern region of Indiana will enable the University to reach beyond its own campus borders and academic programs to focus on a learning environment that attracts the most talented students and trains them in sophisticated simulation and clinical skills labs with the latest technologies. It also will provide a dedicated facility focusing on a common inter-professional education mission while allowing each institution to advance its students and faculty. It will develop a diverse and flexible learning environment that will encompass the next generation of learning spaces that support team-based, problem-based, and experiential learning, and will allow the University to provide the state with experienced graduates ready to make an immediate impact in health-related professions.

Relationship to Strategic Plan for Indiana University: This project is consistent with the mission of extending the IU School of Medicine in the southwest region of Indiana.

PROJECT DETAILED DESCRIPTION - ADDITIONAL INFORMATION

IU SCHOOL OF MEDICINE MULTI-INSTITUTIONAL ACADEMIC HEALTH SCIENCE AND RESEARCH CENTER - EVANSVILLE

Institution:	Indiana University	**Budget Agency Project No.:**	A-2-14-1-15
Campus:	Indianapolis	**Institutional Priority:**	6

20131788

Space Utilization

This facility will provide space for three (3) local institutional partners: IU School of Medicine, University of Evansville, and University of Southern Indiana. The Multi-Institutional Academic Health Science and Research Center will consist of a five-story tower. This configuration will be utilized by all partner institutions with each having dedicated space. This facility will house office/support space, research labs, wet/dry teaching labs, seminar/classrooms, and a simulation center/clinic.

Comparable Projects

The IUSB Raclin-Carmichael Center at approximately $328/gsf (in 2008 dollars) and the IPFW Medical Education Center at approximately $290/gsf (in 2004 dollars).

Background Materials

This project will be funded through cash from state appropriations. Local funding also will be utilized to supplement project cost per the proposal approved by the IU Board of Trustees in April, 2015, from Skanska, US Health Realty. This project was approved during the 2015 Indiana Legislative Session (HEA 1001) as part of Indiana University's 2015-17 Capital Appropriation Request. The IU Board of Trustees approved the Capital Appropriation Request at its August 2014 meeting. This project also was approved at the IU Board of Trustees June 2015 meeting.

CAPITAL PROJECT REQUEST FORM
INDIANA PUBLIC POSTSECONDARY EDUCATION
INSTITUTION CAMPUS SPACE DETAILS FOR IU SCHOOL OF MEDICINE MULTI-INSTITUTIONAL ACADEMIC HEALTH SCIENCE AND RESEARCH CENTER - EVANSVILLE

IU SCHOOL OF MEDICINE MULTI-INSTITUTIONAL ACADEMIC HEALTH SCIENCE AND RESEARCH CENTER - EVANSVILLE A-2-14-1-15	Current Space in Use (1)	Space Under Construction (2)	Space Planned and Funded	Subtotal Current and Future Space	Space to be Terminated	New Space in Capital Request (3*)	Net Future Space
A. OVERALL SPACE IN ASF							
Classroom (110 & 115)	277,618	5,400		283,018		2,500	283,018
Class Lab (210,215,220,225,230,235)	250,250			250,250		28,530	252,750
Non-class Lab (250 & 255)	674,962			674,962		14,835	689,797
Office Facilities (300)	2,014,799			2,014,799		4,520	2,019,319
Study Facilities (400)	315,818			315,818		1,000	316,818
Special Use Facilities (500)	521,263			521,263			521,263
General Use Facilities (600)	418,581			418,581		1,540	420,121
Support Facilities (700)	2,402,028			2,402,028			2,402,028
Health Care Facilities (800)	990,331			990,331		5,000	995,331
Resident Facilities (900)	460,639	99,600		560,239			560,239
Unclassified (000)*	184,274			184,274		-	184,274
B. OTHER FACILITIES (Please list major categories)	n/a			-			-
TOTAL SPACE	8,510,563	105,000	-	8,615,563	-	57,925	8,644,958

Notes:
(1) Figures include assignable square feet (asf) for IUPUI campus
(2) Includes Campus Housing Expansion (North Hall)
(3*) Includes Multi-Institutional Academic Health Science Research Center, IU portion only

- Space/Room codes based on Postsecondary Ed Facilities Inventory and Classification Manual (2006)

CAPITAL PROJECT COST DETAILS

IU SCHOOL OF MEDICINE MULTI-INSTITUTIONAL ACADEMIC HEALTH SCIENCE AND RESEARCH CENTER - EVANSVILLE

20131788

Institution:	Indiana University	**Budget Agency Project No.:**	A-2-14-1-15
Campus:	Indianapolis	**Institutional Priority:**	6

ANTICIPATED CONSTRUCTION SCHEDULE

	Month	Year
Bid Date	November	2015
Start Construction	December	2015
Occupancy (End Date)	December	2017

ESTIMATED CONSTRUCTION COST FOR PROJECT

	Cost Basis (1)	Estimated Escalation Factors (2)	Project Cost
Planning Costs			
a. Engineering			$ -
b. Architectural	$ 2,560,000		$ 2,560,000
c. Consulting			$ -
Construction			
a. Structure	$ 10,240,000		$ 10,240,000
b. Mechanical (HVAC, plumbing, etc.)	$ 7,680,000		$ 7,680,000
c. Electrical	$ 5,120,000		$ 5,120,000
Movable Equipment			$ -
Fixed Equipment			$ -
Site Development/Land Acquisition	$ 2,560,000		$ 2,560,000
Other (Contingency, Admin & Legal Fees)	$ 3,840,000		$ 3,840,000
TOTAL ESTIMATED PROJECT COST	**$ 32,000,000**	**$ -**	**$ 32,000,000**

(1) Cost Basis is based on current cost prevailing as of: (June 2015)

(2) Explain in the Description of Project Section of the "Cap Proj Details" schedule the reasoning for estimated escalation factors

CAPITAL PROJECT OPERATING COST DETAILS

IU SCHOOL OF MEDICINE MULTI-INSTITUTIONAL ACADEMIC HEALTH SCIENCE AND RESEARCH CENTER - EVANSVILLE

20131788

Institution:	Indiana University	**Budget Agency Project No.:**	A-2-14-1-15
Campus:	Indianapolis	**Institutional Priority:**	6

GSF OF AREA AFFECTED BY PROJECT 87000

ANNUAL OPERATING COST/SAVINGS (1)

	Cost per GSF	Total Operating Cost	Personal Services	Supplies and Expenses
1. Operations	$ 2.08	**$ 180,960**	$ 144,768	$ 36,192
2. Maintenance	$ 0.56	**$ 48,720**		$ 48,720
3. Fuel	$ 0.64	**$ 55,680**		$ 55,680
4. Utilities	$ 4.00	**$ 348,000**		$ 348,000
5. Other	$ 0.72	**$ 62,640**		$ 62,640
TOTAL ESTIMATED OPERATIONAL COST/S	**$ 8.00**	**$ 696,000**	**$ 144,768**	**$ 551,232**

Description of any unusual factors affecting operating and maintenance costs/savings.

(1) Based on figures from "Individual Cap Proj Desc" schedule

UNIVERSITY OF SOUTHERN INDIANA

July 10, 2015

The Honorable Mike Pence
Governor of the State of Indiana
State Capitol – Room 206
Indianapolis, IN 46204

RE: Project No. – G-0-15-1-01
Multi-Institutional Academic Health Science/Research Center

Dear Governor Pence:

The Board of Trustees of the University of Southern Indiana on July 9, 2015, approved a request to you, the State Budget Committee, and the Indiana Commission for Higher Education to approve the release of funds for the construction of a Multi-Institutional Academic Health Science/Research Center. The 2015 Indiana General Assembly appropriated $6,000,000 for the University of Southern Indiana to proceed with this project. We are asking for the release of $6,000,000 for the construction of the Multi-Institutional Academic Health Science/Research Center.

The University of Southern Indiana (USI), Indiana University School of Medicine-Evansville, and the University of Evansville will jointly plan, occupy, and co-fund, with the City of Evansville, an academic medical complex in downtown Evansville. The goal of the project is to facilitate inter-professional health sciences education and the joint training of related health professions. The total size of the Center with three partners will be approximately 140,000 gross square feet. Based on initial space programming, USI's share of the facility will be approximately 26,300 gross square feet which includes institutional programming and shared space.

Attached is a copy of the authorizing resolution for the Multi-Institutional Academic Health Science/Research Center approved by the University's Board of Trustees on July 9, 2015. Also attached is a copy of the revised project summary submitted with the University's 2015-2017 Capital Improvement Budget Request.

We are happy to answer any questions you or your staff may have about this project. I want to thank you and members of the Indiana General Assembly for supporting this project. We respectfully request your favorable consideration of this request.

Sincerely,

Linda L.M. Bennett, Ph.D.
President

Enclosure

c: Brian E. Bailey, State Budget Director
Teresa Lubbers, Commissioner for Commission for Higher Education

President's Office
8600 University Boulevard • Evansville, Indiana 47712 • 812-464-1756 • Fax 812-464-1956 • USI.edu

SECTION II – FINANCIAL MATTERS

A. APPROVAL OF ANNUAL OPERATING BUDGETS

The recommended Current Operating Budget for fiscal year 2015-2016 will be presented. The recommendation is for a balanced budget based upon estimates of fee revenue, State appropriations, and other available sources (summarized in Exhibit II-A).

Approval of the Annual Operating Budgets is recommended.

NOTE: At the time this agenda was prepared, the Current Operating Budget was being finalized. Details will be shared at the meeting on July 9, 2015.

B. APPROVAL OF PROPOSED SCHEDULE OF STUDENT FEES AND OTHER MANDATORY FEES FOR 2015-2016 AND 2016-2017

It is recommended that the 2015-2016 per-semester credit-hour fee be increased to $227.92 for Indiana resident undergraduate students; $337.92 for Indiana resident graduate students; $553.96 for non-resident undergraduate students; and $666.19 for non-resident graduate students.

It is recommended that the 2016-2017 per-semester credit-hour fee be increased to $234.82 for Indiana resident undergraduate students; $351.53 for Indiana resident graduate students; $576.22 for non-resident undergraduate students; and $692.95 for non-resident graduate students.

Approval of the Student Fees and Other Mandatory Fees for 2015-2016 and 2016-2017 in Exhibit II-B is recommended.

NOTE: IC-21-14-2-7 requires state universities in Indiana to approve Mandatory Fees ("Tuition"), such as the Contingent, Academic Facilities, Student Services, and Technology Fees, for a two year period. Institutions must set those rates on or before June 30 of any odd numbered year or 60 days after the State budget bill is enacted into law, whichever is later.

C. APPROVAL OF MISCELLANEOUS FEES FOR 2015-2016

Miscellaneous Fees are those fees (other than Contingent, Academic Facilities, Student Services, and Technology Fees) charged to some, but not necessarily all, students in the course of their attendance. Examples include, but are not limited to, Laboratory Fees, Parking Fees, and Late Registration Fees. A schedule of proposed Miscellaneous Fees for 2015-2016 is in Exhibit II-C.

Approval of the proposed Miscellaneous Fees for 2015-2016 (Exhibit II-C) is recommended.

D. APPROVAL OF RESOLUTION REGARDING BANK DEPOSITORIES AND WIRE TRANSFER AUTHORIZATIONS

At its meeting on July 10, 2014, the Board of Trustees approved a resolution regarding bank depositories and wire transfer authorizations.

Approval of the following resolution to update the procedures is recommended:

WHEREAS, the University wishes to update the list of banks designated as depositories in which funds may be deposited and to update the authorizations required for transactions with the depositories;

THEREFORE BE IT RESOLVED the Banterra Bank, Boonville Federal Savings Bank, Evansville Commerce Bank, Fifth Third Bank, First Federal Savings Bank, First Financial Bank, First Security Bank, German American Bancorp, JP Morgan Chase Bank, Legence Bank, Lynnville National Bank, Old National Bank of Evansville, PNC Bank, Regions Bank, United Fidelity Bank, and U.S. Bank be and hereby are designated as depositories in which funds of this Corporation may be deposited by its officers, agents, and employees; and

FURTHER RESOLVED that the Treasurer is authorized to sign (including using electronic and facsimile signatures) any and all checks, drafts, and orders, including orders or directions in informal or letter form, against any funds at any time standing to the credit of this Corporation with said Bank, and that the said Bank hereby is authorized to honor any and all checks, drafts and orders so signed, including those drawn to the individual order of such officer without further inquiry or regard to the authority of said officer or the use of said checks, drafts, and orders, or proceeds thereof; and

FURTHER RESOLVED that the Treasurer or Assistant Treasurer of the University of Southern Indiana are authorized to enter into a Funds Transfer Agreement with the aforementioned Banks; and

FURTHER RESOLVED that the Treasurer, the Assistant Treasurer, the Controller, the Assistant Controller, and the Payroll Manager be designated as the officers of the University authorized to make wire transfers; and

FURTHER RESOLVED that each of the foregoing resolutions shall continue in force until express written notice of its rescission or modification has been received by the said Bank, but if the authority contained in them should be revoked or terminated by operation of law without such notice, it is resolved and hereby agreed for the purpose of inducing the said Bank to act thereunder, that the said Bank shall be saved harmless from any loss suffered or liability incurred without such notice.

E. APPROVAL OF AUTHORIZING RESOLUTION FOR CONSTRUCTION OF A WELCOME CENTER

The Welcome Center will serve as a resource to all guests visiting campus. Visitors will be able to obtain information about campus events, directions to buildings, and other general information at the Welcome Center. The facility will include a reception area, a lounge, and meeting room space to create an inviting atmosphere that will positively enhance a visitor's time on campus at the University of Southern Indiana. The University proposes to begin construction of a 6,000 square foot Welcome Center in the spring of 2016. The Welcome Center will be located between the Orr Center and University Center East.

The estimated cost is $2.5 million, which will be funded through private gifts and Special Projects Reserves. Completion of the Welcome Center is expected in spring of 2017.

Approval of the following resolution is recommended:

WHEREAS, the University has a long-standing and well-documented need for a Welcome Center; and

WHEREAS, the University of Southern Indiana Foundation has secured a commitment in the amount of $2 million for construction of the facility; and,

WHEREAS, the University is expending $500,000 from its Special Projects Reserves; and,

WHEREAS, the University proposes a project budget of $2.5 million; and

WHEREAS, approvals necessary to advance the project in a timely manner may be required between regularly scheduled meetings of the Board of Trustees;

NOW, THEREFORE, BE IT RESOLVED that the Board of Trustees authorizes the Finance/Audit Committee to approve design plans, cost estimates, and construction schedules; to review construction bids; to award contracts or to reject any or all construction bids for the project; and to report the progress of the project to the Board of Trustees; and

FURTHER RESOLVED, that the University of Southern Indiana Foundation will provide $2 million to the University of Southern Indiana as university support for this project with the particular timing to be agreed upon by both parties; and

FURTHER RESOLVED, that the president of the University is authorized to request approval of the project from the Indiana Commission for Higher Education, the Indiana State Budget Committee, and the governor of the State of Indiana, as needed to advance the project to completion.

F. APPROVAL OF AUTHORIZING RESOLUTION FOR MULTI-INSTITUTIONAL ACADEMIC HEALTH SCIENCE AND RESEARCH CENTER

The 2015 Indiana General Assembly appropriated $6 million in cash through State appropriation to the University of Southern Indiana for its portion of the Multi-Institutional Academic Health Science and Research Center in downtown Evansville. This facility will be shared by the Indiana University School of Medicine, University of Southern Indiana, and University of Evansville. Each University is committed to creating learning environments which promote academic excellence, foster personal development, and enhance the University experience for diverse student populations. An advisory board will be established to assist the ongoing collaboration between the institutions. Total new space required for these instructional and research activities will be approximately 91,000 assignable square feet to be located in a facility in downtown Evansville. USI's portion of the facility will be approximately 18,000 assignable square feet, with the remainder divided between Indiana University and the University of Evansville. Project completion and opening is scheduled during the 2017-18 academic year.

Approval of the following resolution is recommended:

WHEREAS, the 2015 Indiana General Assembly appropriated $6 million in cash to the University of Southern Indiana for its portion of the Multi-Institutional Academic Health Science and Research Center to be built in downtown Evansville, Indiana; and

WHEREAS, the University wishes to proceed with a construction project budget for its portion of the Multi-Institutional Academic Health Science and Research Center; and

WHEREAS, the University proposes a project budget of $6 million; and

WHEREAS, approvals necessary to advance the project in a timely manner may be required between regularly scheduled meetings of the Board of Trustees;

NOW, THEREFORE, BE IT RESOLVED that the Board of Trustees authorizes the Finance/Audit Committee to approve design plans, cost estimates, and construction schedules; to review construction bids; to award contracts or to reject any or all construction bids for the project; and to report the progress of the project to the Board of Trustees; and

FURTHER RESOLVED, that the president of the University is authorized to request approval of the project from the Indiana Commission for Higher Education, the Indiana State Budget Committee, and the governor of the State of Indiana, as needed to advance the project to completion.

G. APPROVAL OF AUTHORIZATION OF FINANCIAL AID AWARDS

Approval of the following Authorization for Financial Aid Awards is recommended.

Pursuant to Indiana Code 21-15-2-1 which provides for awarding financial aid to students from existing resources, the University of Southern Indiana Board of Trustees delegates to the President of the University of Southern Indiana the responsibility to approve financial aid recommendations for students within the 2015-2016 budgetary capabilities.

H. UPDATE ON CURRENT CONSTRUCTION PROJECTS

A report will be presented on current construction projects. Exhibit II-D includes a summary of the cost and funding sources for each project.

Institution:	University of Southern Indiana	**Project:**	Multi-Institutional Academic Health Science/Research Ctr. – USI – Revised
Biennium:	2015-2017	**Project No:**	G-0-15-1-01
Submitted:	Yes	**Last Updated:**	07/06/15

General Project Information

Project Name/Title:	Multi-Institutional Academic Health Science/Research Ctr. - USI	Institutional Priority:	2
Budget Agency Project	G-0-15-1-01	Project Type:	New Construction
Previously Approved by General Assembly:	No	Previously Recommended by CHE:	Yes

Project Summary

The University of Southern Indiana, Indiana University School of Medicine-Evansville and the University of Evansville will jointly plan, occupy, and co-fund, with the City of Evansville, an academic medical complex in downtown Evansville. The facility will co-locate various health sciences programs operated by the participating schools with the medical school currently located on the campus of the University of Southern Indiana. The goal of the project is to facilitate inter-professional health sciences education and the joint training of related health professions. This project also is intended to re-position the region to better compete in the recruitment and development of science-oriented and knowledge-based industries. Coupled with a related expansion of the number of medical resident training positions in the region, the project will foster the retention of trained medical professions in the underserved Evansville area and the development of the city as a nexus for health care services. USI requests funding to construct approximately 26,300 gross square feet in the facility that will be dedicated to several health-related degree programs.

Summary of the Impact on the Educational Attainment of Students

Inter-professional training in health care is a new pedagogical paradigm that will prepare health care professionals for new protocols of practice that are far more interdisciplinary and team oriented than in the past. This team oriented, tightly coordinated approach to health care also holds the promise of better health care cost control in the future.

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Biennium:	2015-2017	**Project No:**	G-0-15-1-01
Submitted:	Yes	**Last Updated:**	07/06/15

Project Size

	GSF	ASF	ASF/GSF
Project Size:	26,300	17,100	65%
Net Change in Overall Campus Space:	26,300	17,100	

Project Cost Summary

Total Project Cost: (USI Project Cost)	$6,000,000	Cost Per GSF/ASF:	$228 **GSF** $351 **ASF**

Project Funding

	Funding Amount	Funding Type	Funding Source Description
Funding Sources:	$6,000,000	State	2015 Indiana General Assembly authorized cash funding of the project
Total Funding	**$6,000,000**		

Annual Cost

Estimated annual change in cost of building operations based on the project:	$209,085
Estimated annual repair and rehabilitation investment:	$120,000

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Submitted:	Yes	**Last Updated:**	07/06/15

Detail Description of Project

The University of Southern Indiana supports the efforts to enhance inter-professional teaching, learning, and research in the health sciences professions in the southwestern Indiana region. The improvement of regional health outcomes and the efficient and effective delivery of health care require more cooperation, communication, and coordination among health care professionals than ever before. It is incumbent on the educational programs that train aspiring doctors, nurses, and other health care professionals to evolve their educational programs and training protocols in ways that reflect this emerging professional practice standard. In the 2013 legislative session, the Indiana General Assembly approved $2M in architectural and engineering funds for Indiana University to begin planning the development of the Multi-Institutional Academic Health Science/Research Center. USI has been a participant in the planning process. The University of Southern Indiana will be one of three partners in the project. The 26,300 gross square feet requested in the project by the University of Southern Indiana will be occupied by the Doctor of Nursing Practice Program (DNP), Master of Nursing Program (MSN), Accelerated Bachelor of Nursing Program (BSN), Occupational Therapy Program, and Dental Assisting Program. These programs will be relocated from the USI main campus to the new Multi-Institutional Academic Health Science/Research Center in downtown Evansville. The gross square feet requested in the project includes USI's share of common space.

The space will be composed of faculty offices, classrooms with onsite instruction and for distance learning, and teaching laboratories.

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Submitted:	Yes	**Last Updated:**	07/06/15

Need & Purpose

Indiana University School of Medicine - Evansville recently added a fourth year to the three years of medical school already offered in the region. Co-locating various health-related degree programs offered by the three institutions of higher education will foster the kind of interdisciplinary communication, cooperation and coordination that is needed to train the health care professionals of the future.

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Submitted:	Yes	**Last Updated:**	07/06/15

Space Utilization

The space requested by the University of Southern Indiana will be used to expand existing health care programs at the graduate level. The Accelerated Bachelor of Nursing Program (BSN) will offer new opportunities to individuals who have completed a degree to transition to nursing. The Dental Assisting Program will support the Indiana University Dental Clinic. The space requested would include faculty offices, classrooms for onsite instruction and distance education programming and specialized laboratories. Common space in the facility would be shared by the three partners in the project.

Comparable Projects

There are no comparable projects in the Evansville area. The Indiana University School of Medicine - Evansville has been located on the campus of the University of Southern Indiana for over 40 years.

Background Materials

Indiana University has coordinated the project and would be able to provide additional background materials.

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Submitted:	Yes	**Last Updated:**	07/06/15

Overall Space in ASF

Space Type Name	Current Space in Use	Space Under Construction	Space Planned And Funded	Subtotal Current And Future Space	Space to be Terminated	New Space in Capital Request	Net Future Space
Classroom (110 & 115)	153,174	0	0	153,174	0	8,980	162,154
Class Lab (210, 215, 220, 225, 230, 235)	145,511	0	0	145,511	0	2,950	148,461
Non-class Lab (250 & 255)	19,943	0	0	19,943	0	0	19,943
Office Facilities (300)	222,628	7,323	0	229,951	0	4,670	234,621
Study Facilities (400)	107,896	0	0	107,896	0	0	107,896
Special Use Facilities (500)	116,561	0	0	116,561	0	0	116,561
General Use Facilities (600)	189,950	4,632	0	194,582	0	0	194,582
Support Facilities (700)	86,516	745	0	87,261	0	500	87,761
Health Care Facilities (800)	3,019	0	0	3,019	0	0	3,019
Resident Facilities (900)	561,367	0	0	561,367	0	0	561,367
Unclassified (000)	1,845	0	0	1,845	0	0	1,845
TOTAL SPACE	1,608,410	12,700	0	1,621,110	0	17,100	1,638,210

Space Detail Notes

New Space: Proposed IU Medical Center
Space To Be Demolished: none
Space Under Construction: Griffin Center
Space Planned and Funded: none

Institution:	University of Southern Indiana	**Project:**	Multi-Institutional Academic Health Science/Research Ctr. – USI – Revised
Biennium:	2015-2017	**Project No:**	G-0-15-1-01
Submitted:	Yes	**Last Updated:**	07/06/15

Anticipated Construction Schedule

Bid Date:	September	2015
Start Construction:	October	2015
Occupancy (End Date):	January	2018

Estimated Cost for Project

		Cost Basis	Escalation Factors	Project Cost
Planning Costs	Engineering	$0	$0	$0
	Architectural	$399,000	$21,000	$420,000
	Consulting	$0	$0	$0
Construction	Structure	$3,420,000	$180,000	$4,380,000
	Mechanical (HVAC, plumbing, etc.)	$855,000	$45,000	$,900,000
	Electrical	$570,000	$30000	$600,000
Other	Movable Equipment	$456,000	$24,000	$480,000
	Fixed Equipment	$0	$0	$0
	Site Development/Land Acquisition	$0	$0	$0
	Other - Please List	$0	$0	$0
	Total Estimated Cost	**$5,700,000**	**$300,000**	**$6,000,000**

Cost Detail Notes

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Annual Operating Cost/Savings

	Personnel Services	Supplies and Expenses	Total Operating Cost	Cost per GSF
Operations	$65,329	$43,553	$108,882	$4.14
Maintenance	$22,723	$15,149	$37,872	$1.44
Fuel	$10,100	$6,732	$16,832	$0.64
Utilities	$18,936	$12,624	$31,560	$1.20
Other	$8,363	$5,576	$13,939	$0.53
Total Estimated Cost	**$125,451**	**$83,634**	**$209,085**	**$7.95**

Cost Detail Notes

MULTI-INSTITUTIONAL ACADEMIC HEALTH SCIENCE & RESEARCH CENTER

Edited: 06/03/2015
Originally Prepared: 12/05/2013
Prepared by: JAB
IU PROJECT No.: 20131788

Conceptual Space Program: Indiana University • University of Evansville • University of Southern Indiana

DRAFT: IN PROGRESS

UNITS:	IU	UE	USI
PROGRAMMING ASF LIVE TOTALS:	57,925	16,110	17,100

	ASF	GSF
PROGRAMMING GOAL:	91,000	140,000
TOTAL BUILDING ASF | GSF LIVE TOTAL:	91,135	141,259
Δ	-135	-1,259

ID	PROGRAMMED SPACE	PROJECTED SPACES: COUNT Required	COUNT Growth	@	PROJECTED ALLOCATION (T) Trad	(F) Flex	(O) Open	=	PROJECTED ASF Required	PROJECTED ASF Growth	COMMENTS	ADJACENCIES
	ALL SPACES/SIZES ARE APPROXIMATE AND SUBJECT TO MODIFICATION (+/-)											
INDIANA UNIVERSITY												
1.0	ADMINISTRATIVE OFFICES										DETAILS TO BE DEVELOPED	TO BE DEVELOPED
1.1	Assoc. Dean / Director	1	-	@	200	-	-	=	200	0	tbd	
1.2	Assistant Director	1	-	@	120	-	-	=	120	0	tbd	
1.3	Support Staff (Clerical)	4	-	@	-	-	80	=	320	0	tbd	
1.4		1	-	@	-	-	180	=	180	0	Workstation w/ waiting area.	
1.5	Faculty	16	-	@	120	-	-	=	1920	0	Tenured faculty; private offices	
1.6	Shared	3	-	@	240	-	-	=	720	0	Private space for shared office for volunteer faculty, etc. 3 workstations @ ~ 80 asf ea.	
1.7	**Foundation:**											
1.8	Office	3	-	@	120	-	-	=	360	0	tbd	
1.9	Storage	1	-	@	80	-	-	=	80	0	tbd	
1.10	**Operations:**											
1.11	Office	1	-	@	120	-	-	=	120	0	tbd	
1.12	Storage	1	-	@	80	-	-	=	80	0	tbd	
1.13	**Support:**											
1.14	Resource Room	1	-	@	120	-	-	=	120	0	General storage / workroom, mail/copy, etc.	
1.15	Conference (Medium)	1	-	@	300	-	-	=	300	0	Faculty / Meeting room	
1.16	**SUBTOTAL ADMINISTRATIVE OFFICES:**							ASF:	4520	0		
1.17								TOTAL:	4520			
1.18	General Notes: •											
2.0	RESEARCH LABS										DETAILS TO BE DEVELOPED	TO BE DEVELOPED
2.1	Multipurpose Labs (Includes):	3	-	@	1150	-	-	=	3450	0	Computers/printers; chemical hoods; low speed centrifuges/rotors; microfuges; water baths; refrigerators/beverage coolers; -20°C freezers; PCR; power supplies - agarose gel boxes; power supplies - SDS PAGE gel boxes, western blot; small equipment: pipettors, pipet aids, stir/heat plates, rocker platform, vortex genies, pH meter, balances	
2.2	Shared Equipment Room - 1	1	-	@	1200	-	-	=	1200	0	-20°C freezers; -80°C freezers; liquid nitrogen storage and tanks; ice machines; glass distilled water system; autoclaves (large and small); drying ovens; work bench; large sink with distilled water tap	
2.3	Shared Equipment Room - 2	1	-	@	800	-	-	=	800	0	Refrigerators / beverage coolers; spectrophotometer; imaging station / computer; real time PCR; purified water supply; work benches; secure storage for controlled substances	
2.4	Shared Equipment Room - 3	1	-	@	800	-	-	=	800	0	Work benches; sink with distilled water; chemical hood; balances; high speed centrifuges; ultra centrifuge; lyophilizer	
2.5	Radioactive Use Room	1	-	@	400	-	-	=	400	0	Gamma counter; scintillation counter; sink with distilled tap water; chemical hood; work benches; radiation shields; radioactive waste storage	
2.6	Storage Areas	2	-	@	600	-	-	=	1200	0	Shelves for general supplies; flammable storage	
2.7	Bacteria / Virus Culture Room	1	-	@	400	-	-	=	400	0	Culture hoods with incinerators - gas, air, vacuum; shaker / incubator platforms; incubators; low speed centrifuge / rotors; microfuge; biohazard waste storage	
2.8	Human Subjects Area	1	-	@	600	-	-	=	600	0	Subject consultation areas with computers / printers; sample collection areas; recovery / subject snack areas; refrigerators; -20°C freezers	
2.9	Tissue Culture Facilities	2	-	@	600	-	-	=	1200	0	4 double wide laminar flow hoods / lab stools; water jacketed incubators; CO2 supply / tanks; storage areas for sterile plastics; gas/air/vacuum; emergency outlets; microscopes (inverted)	
2.10	Microscopy / Histology Room	1	-	@	500	-	-	=	500	0	Fluorescent microscopes; dissecting microscopes; compound microscopes; flow cytometer; work benches; chemical hood; microtome	
2.11	Emergency Shower	1	-	@	40	-	-	=	40	0		
2.12	**Animal Care:**										All animal care rooms should have wider than 36" doors (42" or 48") except for the staff office (ID 2.22)	
2.13	• Short-Term Housing for Rodents - Mice	1	-	@	225			=	225	0	tbd	
2.14	• Short Term Housing for Rodents - Rats	1	-	@	225			=	225	0	tbd	
2.15	• Work Room	1	-	@	400			=	400	0	tbd	
2.16	• Refrigerator / Freezer	1	-	@	120			=	120	0	tbd	
2.17	• Washing / Cleaning Room	1	-	@	400			=	400	0	tbd	
2.18	• Rack Storage	1	-	@	225			=	225	0	tbd	

MULTI-INSTITUTIONAL ACADEMIC HEALTH SCIENCE & RESEARCH CENTER

Edited: 06/08/2015
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ID	PROGRAMMED SPACE	PROJECTED SPACES: COUNT Required	COUNT Growth	@	(T) Trad	(F) Flex	(O) Open	=	PROJECTED ASF Required	PROJECTED ASF Growth	COMMENTS	ADJACENCIES
	ALL SPACES/SIZES ARE APPROXIMATE AND SUBJECT TO MODIFICATION (+/-)											
2.19	• Cages / Bedding / Storage	1	-	@	600			=	600	0	tbd	
2.20	• Food Storage	1	-	@	40			=	40	0	tbd	
2.21	• General Storage	1	-	@	150			=	150	0	tbd	
2.22	• Staff Office / Lockers	1	-	@	160			=	160	0	tbd	
2.23	**SUBTOTAL RESEARCH LABS:**						ASF:		13135	0		
2.24							TOTAL:		13135			
2.25	General Notes: •											
3.0	CLASSROOMS / TEACHING LABS										DETAILS TO BE DEVELOPED	TO BE DEVELOPED
3.1	**Histology / Microbiology / Pathology:**											
3.2	Wet Lab	1	-	@	-	-	1000	=	1000	0	tbd	
3.3	Dry Lab	1	-	@	-	-	1000	=	1000	0	tbd	
3.4	**Gross Anatomy: Shared w/ UE**											
3.5	Lab	1	-	@	-	-	3600	=	3600	0	Able to handle 20 cadavers	
3.6	Lab Prep	1	-	@	400	-	-	=	400	0	tbd	
3.7	Lab Storage	1	-	@	200	-	-	=	200	0	tbd	
3.8	Lockers (Dedicated to Gross Anatomy)	1	-	@	-	-	400	=	400	0	tbd	
3.9	**Other:**											
3.10	Group Study / Focus / Teaching Rooms (Small)	9	-	@	150	-	-	=	1350	0	tbd	
3.11	Group Study / Focus / Teaching Rooms (Large)	4	-	@	500	-	-	=	2000	0	tbd	
3.12	Video Control Room	1	-	@	180	-	-	=	180	0	Supports Standardized Patient Rooms	
3.13	Workshop	1	-	@	200	-	-	=	200	0	tbd	
3.14	Classroom	2		@	-	-	1250	=	2500	0	IUB needs a classroom (seating for 50) to support first and second year students; prefer if rooms can be designed to have sound attenuating divider to allow space to open to one large room when needed	
3.15	Storage	1		@	200	-	-	=	200	0	General purpose	
3.16	**SUBTOTAL CLASSROOMS/TEACHING LABS:**						ASF:		13030	0		
3.17							TOTAL:		13030			
3.18	General Notes: •											
4.0	DENTAL CLINIC										DETAILS TO BE DEVELOPED	TO BE DEVELOPED
4.1	Temporary placeholder for asf	1	-	@	5000	-	-	=	5000	0	tbd	
4.2	**SUBTOTAL DENTAL CLINIC:**						ASF:		5000	0		
4.3							TOTAL:		5000			
4.4	General Notes: •											
5.0	GRADUATE MEDICAL EDUCATION (GME CONSORTIUM)											TO BE DEVELOPED
5.1	Faculty Offices	8	-	@	-	120	-	=	960	0	tbd	
5.2	Board Room	1	-	@	500	-	-	=	500	0		
5.3	Reception	1	-	@	-	-	120	=	120	0	Space for one workstation (@ 80 asf max); waiting	
5.4	Break / Lunch Room	1	-	@	-	-	120	=	120	0	Space for counter/shelving, sink, frig, microwave/coffee and small seating area.	
5.5	**SUBTOTAL GRADUATE MEDICAL EDUCATION:**						ASF:		1700	0		
5.6							TOTAL:		1700			
5.7	General Notes: • Suite will need close access to two other public restroom spaces.											
6.0	GRADUATE SHARED AREAS										TO BE DEVELOPED	TO BE DEVELOPED
6.1	Health Sciences Library	1	-	@	-	-	1000	=	1000	0	tbd	
6.2	Kitchenette / Lunchroom	1	-	@	80	-	-	=	80	0	tbd	

MULTI-INSTITUTIONAL ACADEMIC HEALTH SCIENCE & RESEARCH CENTER

Edited: 06/08/2015
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Prepared by: JAB
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Conceptual Space Program: Indiana University • University of Evansville • University of Southern Indiana

DRAFT: IN PROGRESS

UNITS:	IU	UE	USI
PROGRAMMING ASF LIVE TOTALS:	57,925	16,110	17,100

	ASF	GSF
PROGRAMMING GOAL:	91,000	140,000
TOTAL BUILDING ASF | GSF LIVE TOTAL:	91,135	141,259
Δ	-135	-1,259

ID	PROGRAMMED SPACE	PROJECTED SPACES: COUNT Required	COUNT Growth	@	PROJECTED ALLOCATION (T) Trad	(F) Flex	(O) Open	=	PROJECTED ASF Required	PROJECTED ASF Growth	COMMENTS	ADJACENCIES
	ALL SPACES/SIZES ARE APPROXIMATE AND SUBJECT TO MODIFICATION (+/-)											
6.3	Graduate Faculty Lounge	1	-	@	300	-	-	=	300	0	tbd	
6.4	Classroom Equipment Storage	1	-	@	200	-	-	=	200	0	tbd	
6.5	**Student Lockers / Showers:**											
6.6	Lockers	1	-	@	-	-	600	=	600	0	tbd	
6.7	Women's Showers	1	-	@	-	-	180	=	180	0	tbd	
6.8	Men's Showers	1	-	@	-	-	180	=	180	0	tbd	
6.9	**SUBTOTAL GRADUATE SHARED AREAS:**							ASF:	2540	0		
6.10								TOTAL:	2540			
6.11	General Notes: •											
7.0	SIM CENTER	THIS SECTION TO BE DEVELOPED										TO BE DEVELOPED
7.1	Temporary placeholder for balance of asf (to sum to 20K)	1		@	18000	-	-	=	18000	0		
7.2	**Offices:**											
7.3	Faculty			@				=	0	0		
7.4	**High Fidelity Rooms:**											
7.5	Large ER Adult Room			@				=	0	0		
7.6	Standard Adult Room			@				=	0	0		
7.7	OB/GYN			@				=	0	0		
7.8	Pediatric			@				=	0	0		
7.9	Debriefing			@				=	0	0		
7.10	High Fidelity Control Room			@				=	0	0		
7.11	**Ambulance Simulator Lab**											
7.12	Ambulance Simulator Lab			@				=	0	0		
7.13	**Classroom:**											
7.14	Lecture (Large)			@				=	0	0		
7.15	Lecture (Small)			@				=	0	0		
7.16	**Additional Teaching & Learning Spaces:**											
7.17	Low to Mid Fidelity Labs			@				=	0	0		
7.18	10 Bed Hospital Ward			@				=	0	0		
7.19	10 Room Standardized Patient Halls			@				=	0	0		
7.20	Surgical Suite			@				=	0	0		
7.21	ER Suite			@				=	0	0		
7.22	ICU Suite			@				=	0	0		
7.23	Flex Suite			@				=	0	0		
7.24	Surgical Skills Training Lab			@				=	0	0		
7.25	PHLB Lab			@				=	0	0		
7.26	**Support:**											
7.27	Storage			@				=	0	0		
7.28	Informal Study			@				=	0	0		
7.29	Lounge / Break			@				=	0	0		
7.30	Lockers (See Comments)			@				=	0	0		
7.31	Conference room			@				=	0	0		
7.32	**SUBTOTAL SIM CENTER:**							ASF:	18000	0		
7.33								TOTAL:	18000			
7.34	General Notes: • Space types are proposed and subject to modification or removal from program.											

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	ASF	GSF
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TOTAL BUILDING ASF | GSF LIVE TOTAL:	91,135	141,259
Δ	-135	-1,259

ID	PROGRAMMED SPACE	PROJECTED SPACES: COUNT Required	COUNT Growth	@	(T) Trad	(F) Flex	(O) Open	=	PROJECTED ASF Required	PROJECTED ASF Growth	COMMENTS	ADJACENCIES
	ALL SPACES/SIZES ARE APPROXIMATE AND SUBJECT TO MODIFICATION (+/-)											
8.0	TOTAL SQUARE FEET PROJECTION - IU											
8.1	TOTAL NET ASSIGNABLE SQUARE FEET (ASF) - IU ONLY								57,925			
UNIVERSITY OF EVANSVILLE												
9.0	ADMINISTRATIVE OFFICES											
9.1	UE Faculty Offices	17		@	120			=	2040	0	tbd	No required adjacencies
9.2	**Department of Physical Therapy:**											
9.3	Chair	1		@	200			=	200	0	tbd	No required adjacencies
9.4	Administrative Assistant	1		@			80	=	80	0	tbd	No required adjacencies
9.5	**Physician's Assistant Program:**											
9.6	Chair	1		@	200			=	200	0	tbd	No required adjacencies
9.7	Clinical Coordinator	1		@		120		=	120	0	tbd	No required adjacencies
9.8	Administrative Assistant	1		@			80	=	80	0	tbd	No required adjacencies
9.9	**Support:**											
9.10	Resource Room	1		@	120			=	120	0	General storage / workroom, mail/copy, etc.	No required adjacencies
9.11	Conference Room	1		@	120			=	120	0	General administrative use; seating for 6 ppl max.	No required adjacencies
9.12	Amphitheatre	1	-	@	-	-	3250	=	3250	0	Seating for 150 max.	
9.13	**SUBTOTAL ADMINISTRATIVE OFFICES:**							ASF:	6210	0		
9.14								TOTAL:	6210			
9.15	General Notes: •											
10.0	CLASSROOMS AND TEACHING LABS											
10.1	Movement Analysis Lab	1		@			1500	=	1500	0	Research space; space needed to conduct clinical research related to functional movement, injury and fall prevention.	No required adjacencies
10.2	Classroom	1		@			1250	=	1250	0	Space needed for approximately 50 students; prefer if rooms can be designed to have sound attenuating divider to allow space to open to one large room when needed. These rooms can be shared w/other graduate programs.	No required adjacencies
10.3	Classroom	1		@			1250	=	1250	0	Space needed for approximately 50 students; prefer if rooms can be designed to have sound attenuating divider to allow space to open to one large room when needed. These rooms can be shared w/other graduate programs.	No required adjacencies
10.4	Class Lab	2		@			2500	=	5000	0	Class and lab space: space needed to accommodate 50 students for didactic (desks or work tables) and psychomotor skill instruction (26 treatment tables)	Near storage
10.5	Storage	1		@	900			=	900	0	General storage for PT equipment	Near class lab
10.6	**SUBTOTAL CLASSROOMS AND TEACHING LABS:**							ASF:	9900	0		
10.7								TOTAL:	9900			
10.8	General Notes: •											
11.0	TOTAL SQUARE FEET PROJECTION - UE											
11.1	TOTAL NET ASSIGNABLE SQUARE FEET (ASF) - UE ONLY								16,110			
UNIVERSITY OF SOUTHERN INDIANA												
12.0	ADMINISTRATIVE OFFICES											TO BE DEVELOPED
12.1	**Occupational Therapy:**										PhD program	
12.2	Chair	1	-	@	200	-	-	=	200	0	tbd	
12.3	Faculty	2	-	@	-	120	-	=	240	0	tbd	
12.4	**SUBTOTAL ADMINISTRATIVE OFFICES:**							ASF:	440	0		
12.5								TOTAL:	440			
12.6	General Notes: • Cluster OT, MSN/DNP, and accelerated BSN spaces to allow for adjustments according to enrollments, etc.											

MULTI-INSTITUTIONAL ACADEMIC HEALTH SCIENCE & RESEARCH CENTER

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	ASF	GSF
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TOTAL BUILDING ASF | GSF LIVE TOTAL:	91,135	141,259
Δ	-135	-1,259

ID	PROGRAMMED SPACE	PROJECTED SPACES: COUNT Required	COUNT Growth	@	PROJECTED ALLOCATION (T) Trad	(F) Flex	(O) Open	=	PROJECTED ASF Required	PROJECTED ASF Growth	COMMENTS	ADJACENCIES
	ALL SPACES/SIZES ARE APPROXIMATE AND SUBJECT TO MODIFICATION (+/-)											
13.0	CLASSROOMS AND TEACHING LABS											TO BE DEVELOPED
13.1	**Occupational Therapy:**											
13.2	Dry lab	1	-	@	-	-	1500	=	1500	0	tbd	
13.3	**Classroom:**											
13.4	Classroom	1	-	@	-	-	750	=	750	0	Space need for approximately 30 ppl to support first, second and third year students in Occ. Th. and Hlth & Info. (by year three there will be 90 students in each program). This space can be shared with other units.	
13.5	SUBTOTAL CLASSROOMS AND TEACHING LABS:							ASF:	2250	0		
13.6								TOTAL:	2250			
13.7	General Notes: • Cluster OT, MSN/DNP, and accelerated BSN spaces to allow for adjustments according to enrollments, etc.											
14.0	MSN/DSP											TO BE DEVELOPED
14.1	Faculty Office	6		@	120			=	720	0	tbd	
14.2	**Classroom:**											
14.3	General Lecture	2		@	1055			=	2110	0	General classrooms with 50 stations each	
14.4	Seminar	2		@	600			=	1200	0	Distance Education / Telehealth suites; full IT/AV; projection; etc.	
14.5	SUBTOTAL MSN/DSP:							ASF:	4030	0		
14.6								TOTAL:	4030			
14.7	General Notes: • Cluster OT, MSN/DNP, and accelerated BSN spaces to allow for adjustments according to enrollments, etc.											
15.0	ACCELERATED BSN											TO BE DEVELOPED
15.1	Faculty Office	5		@	120			=	600	0	tbd	
15.2	**Classroom:**											
15.3	General Lecture	2		@	1250			=	2500	0	General classrooms with 50 stations each	
15.4	SUBTOTAL ACCELERATED BSN:							ASF:	3100	0		
15.5								TOTAL:	3100			
15.6	General Notes: • Cluster OT, MSN/DNP, and accelerated BSN spaces to allow for adjustments according to enrollments, etc.											
16.0	DENTAL ASSISTING											TO BE DEVELOPED
16.1	Faculty Office	3		@	120			=	360	0	tbd	
16.2	**Classroom:**											
16.3	General Classroom	2		@	750			=	1500	0	Details to be provided	
16.4	**Lab:**											
16.5	Dental Assisting Lab	1		@	1250			=	1250	0	Design similar to existing lab. This is based on the assumption that USI will share the sterilization room and radiology room with IUSD	
16.6	Lab Support - Equipment / Supply Storage	1		@	200			=	200	0	tbd	
16.7	SUBTOTAL DENTAL ASSISTING:							ASF:	3310	0		
16.8								TOTAL:	3310			
16.9	General Notes: •											
17.0	COMMON AREAS										DETAILS TO BE DEVELOPED	TO BE DEVELOPED
17.1	**Conference / Meeting:**											
17.2	Conference Room - Assembly	1	-	@	1000	-	-	=	1000	0	Seating for 40+	
17.3	Conference Room - Large	1	-	@	500	-	-	=	500	0	Seating for 20 max	
17.4	Conference Room - Medium	1	-	@	300	-	-	=	300	0	Seating for 12-15	
17.5	**General Shared Areas:**											
17.6	Lobby / Event Center	1	-	@	-	-	500	=	500	0	Could serve as area for One Stop / Concierge area as well as event center	
17.7	Kitchen / Catering	1	-	@	250	-	-	=	250	0	tbd	

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	ASF	GSF
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Δ	-135	-1,259

ID	PROGRAMMED SPACE	PROJECTED SPACES: COUNT Required	COUNT Growth	@	PROJECTED ALLOCATION (T) Trad	(F) Flex	(O) Open	=	PROJECTED ASF Required	PROJECTED ASF Growth	COMMENTS	ADJACENCIES
	ALL SPACES/SIZES ARE APPROXIMATE AND SUBJECT TO MODIFICATION (+/-)											
17.8	Lunchroom	0	-	@	1000	-	-	=	0	0	tbd	
17.9	Laundry Service	1	-	@	-	-	500	=	500	0	Sizing based on similar programs/buildings	Close to labs
17.10	**General Building Support:**										Building mgr., mail, storage, dock, resource rooms & stations, break, privacy room	
17.11	Building Manager	1	-	@	-	120	-	=	120	0	tbd	
17.12	Wellness Room	1	-	@	80	-	-	=	80	0	tbd	
17.13	General Storage	1	-	@	200	-	-	=	200	0	Tables and chairs for event center, other building needs	
17.14	Mail Room	1	-	@	120	-	-	=	120	0	tbd	
17.15	Receiving / Loading Dock	1	-	@	-	-	400	=	400	0	tbd	
17.16	SUBTOTAL COMMON AREAS:							ASF:	3970	0		
17.17								TOTAL:	3970			
17.18	General Notes: *											
18.0	TOTAL SQUARE FEET PROJECTION - USI											
18.1	TOTAL NET ASSIGNABLE SQUARE FEET (ASF) - USI ONLY								17,100			
19.0	TOTAL BUILDING SF PROJECTIONS											
19.1	TOTAL NET ASSIGNABLE SQUARE FEET (NASF) - ALL SPACES COMBINED								91,135			
19.2	BURDEN (GROSSING) FACTOR								1.55			
19.3	BUILDING EFFICIENCY RATIO (NASF / GSF)								65%			
19.4	TOTAL PROJECTED GROSS SQUARE FEET - ALL SPACES COMBINED								141,259			
20.0	NOTES											
20.1	All projected spaces sizes and types are approximate and subject to change.											
20.2	SPACE TYPES:											
20.3	T - "Traditional" built-construction, fully-enclosed, full-height/walled space w/ door, sound isolation, individual lighting control, individual atmosphere/HVAC control.											
20.4	F - "Flexible" systems installed wall (80"-96" h) panel-based, defined area of space w/ door, individual lighting control w/ shared atmosphere											
20.5	O - "Open" systems installed (36" up to 72" h) panel-based defined area or space, no door, w/ shared lighting and atmosphere											
20.6	KEY POINTS:											
20.7	• Programmed spaces account for current and future needs											
20.8	• All Non- Assignable Areas (listed below in Section: OTHER POTENTIAL BUILDING COMPONENTS MATRIX) will be evaluated by UAO professionals on staff at IUB and/or IUPUI to determine need and sizing components.											
21.0	OTHER POTENTIAL BUILDING COMPONENTS MATRIX → WORKING MATRIX ONLY; ASF's BELOW ARE INCLUDED IN THE NET ASSIGNABLE TO GROSS PERCENTAGE ABOVE (ID 23.2)											
21.1	SPACE	COUNT			SIZE				APPROXIMATE SF NEEDED			
21.2	Restroom (W)			@								
21.3	Restroom (M)			@								
21.4	Restroom w/ Shower (W)			@								
21.5	Restroom w/ Shower (M)			@								
21.6	Vending			@								
21.7	Recycling Stations			@								
21.8	Building Service Area (Loading dock, etc.)			@								
21.9	Custodial			@								
21.10	Electric Equipment Room			@								
21.11	Electric Panel Closet			@								
21.12	Telecom			@								
21.13	IDF	1		@	100			=	100			
21.14	MDF	3		@	40			=	120			
21.15	Mechanical Equipment Rooms			@								

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	ALL SPACES/SIZES ARE APPROXIMATE AND SUBJECT TO MODIFICATION (+/-)											
21.16	Elevator Equipment Rooms			@								
21.17	HVAC Equipment Room			@								
21.18	HVAC Chases			@								
21.19	Elevator Shafts			@								
21.20	Stairwell			@								
21.21	Corridors, Phantom Corridors, Circ.			@								
21.22	General Notes: *											
	* ----------END OF PROGRAM---------- *											

COMMISSION FOR HIGHER EDUCATION
Thursday, August 13, 2015

BUSINESS ITEM E: **Capital Projects for Expedited Action**

Staff Recommendation

That the Commission for Higher Education recommends approval to the State Budget Agency and the State Budget Committee of the following projects:

- Vermont Street Parking Garage Facade Repair and Replacement – Indiana University Purdue University - Indianapolis
- Indiana University School of Medicine – Center for Drug Discovery – Wishard/Dunlap Building Lab Renovation – Indiana University Purdue University - Indianapolis
- Regional Campuses – Multi-Campus Special Repair and Rehabilitation for Deferred Maintenance – Indiana University East, Kokomo, Northwest, South Bend, and Southeast
- Old Crescent Renovation – Phase II – Indiana University Bloomington

Background

Staff recommends approval to the State Budget Agency and the State Budget Committee of the following capital projects in accordance with the expedited action category originated by the Commission for Higher Education in May 2006. Institutional staff will be available to answer questions about these projects, but the staff does not envision formal presentations.

Supporting Document

Capital Projects on Which Staff Proposes Expedited Action, August 13, 2015

Capital Projects on Which Staff Proposes Expedited Action

August 13, 2015

A-2-15-2-23 Vermont Street Parking Garage Facade Repair and Replacement – Indiana University Purdue University – Indianapolis - $3,400,000

The Trustees of Indiana University request authorization to proceed with repair and replacement work to the facade of the Vermont Street Parking Garage on the IUPUI campus. The cost of this project is estimated to be $3,400,000 and will be funded through Parking Funds designated for renewal and replacement projects at IUPUI parking facilities.

This project will repair screening forming the facade of the Vermont Street Parking Garage on the IUPUI campus. The Vermont Street Parking Garage was constructed in 1979 and expanded in 1985. A system of 2-foot x 6-foot vertical redwood slats provide screening for the exterior elevations. Over the last thirty-five years the redwood screens have failed and fallen off the garages, creating a safety hazard. This project will replace the existing vertical redwood slats with aluminum extrusions.

A-2-12-1-15 IU School of Medicine – Center for Drug Discovery – Wishard/Dunlap Building Lab Renovation – Indiana University Purdue University – Indianapolis - $25,000,000

The Trustees of Indiana University request authorization to revise the project scope of the IU School of Medicine – Center for Drug Discovery – Wishard/Dunlap Building Lab Renovation project. This project was approved by the IU Board of Trustees on February 14, 2014, and by the State Budget Committee on June 20, 2014. The project cost will be $25,000,000, to be funded through State Appropriations.

Following two studies that examined both the condition of the Dunlap Building and other older research laboratories, it is now recommended that the research and financial objectives of this project would be better served by renovating other older laboratories. Portions of the VanNuys Medical Science Building and the Medical Research and Library Building for the IU School of Medicine in Indianapolis will be renovated to current research standards. Renovations to VanNuys include converting approximately 6,200 ASF of Drug Discovery old "C" type anatomy lab space on the 5th Floor north wing, and approximately 16,000 asf of PharmTox lab spaces on the eastern half of the 4th Floor and the 5th Floor south wing, into labs and research support spaces. Additionally, approximately 12,700 asf of the VanNuys south wing basement currently used as medical

storage will be renovated. In the Medical Research and Library Building, renovations will convert 54,000 asf of old "B" and "C" space labs on Floors 1-5 of the west wing into labs and research support spaces. The future use or disposition of the Dunlap Building will be determined following further study.

A-0-15-2-03 Regional Campuses – Multi-Campus Special Repair and Rehabilitation for Deferred Maintenance – Indiana University East, Kokomo, Northwest, South Bend, and Southeast - $12,500,000

The Trustees of Indiana University request authorization to address major renovation and rehabilitation issues currently affecting five regional campuses: IU East, IU Kokomo, IU Northwest, IU South Bend, and IU Southeast. This project is estimated to cost $12,500,000 and will be funded by State Appropriations.

These projects are replacements/repairs of building exteriors, replacements/repairs of building exteriors, replacements/repairs of campus and building systems, road improvements, and code updates for accessibility and campus safety.

A-1-15-2-02 Old Crescent Renovation – Phase II – Indiana University Bloomington - $48,500,000

The Trustees of Indiana University request authorization to proceed with the renovation of Kirkwood Hall, Swain West, and Ernie Pyle Hall as the second phase of the Old Crescent Renovation on the Bloomington campus.

This project will renovate Kirkwood Hall, Ernie Pyle Hall, and Swain Hall on the IUB campus. Kirkwood Hall is one the oldest buildings on campus at 121 years (constructed in 1894), Ernie Pyle Hall was completed 1937, Swain East in 1910, and Swain West in 1940. Due to their age, all of these buildings are in need of renovations, including new building systems (heating/air conditioning, electrical, plumbing, computer data, and fire suppression). Also included will be improvements to building envelopes (roof, windows, etc.), as well as accessibility upgrades. Swain West in particular contains lab space for the Department of Physics that is in need of renovation to create the best and safe learning environment for students and faculty. Classrooms will be refurbished with the latest technologies and seating arrangements to be effective as possible.

This project was submitted as IU's priority one capital project in the 2015-17 biennium. The project was included in the Commission's 2015-17 budget recommendation, the Governor's budget recommendation and funded by the General Assembly.

COMMISSION FOR HIGHER EDUCATION
Thursday, August 13, 2015

INFORMATION ITEM A: **Academic Degree Programs Awaiting Action**

	Institution/Campus/Site	Title of Program	Date Received	Status
01	Purdue University West Lafayette	Master of Science in Environmental and Ecological Engineering Ph.D. in Environmental and Ecological Engineering	4/13/2015	On the CHE agenda for action
02	Indiana University Bloomington	Bachelor of Science in Intelligent Systems Engineering Ph.D. in Intelligent Systems Engineering	4/17/2015	On the CHE agenda for action
03	University of Southern Indiana	Master of Science in Sport Management	4/20/2015	On the CHE agenda for action
04	Ball State University	Bachelor of Art and Bachelor of Science in Business Analytics	5/6/2015	On the CHE agenda for action
05	Ball State University	Master of Science in Quantitative Psychology	5/6/2015	On the CHE agenda for action
06	Indiana University Purdue University (PWL)	PhD in Chemistry and Chemical Biology	5/18/2015	Under CHE review
07	Indiana University Purdue University (PWL)	PhD in Biology	5/18/2015	Under CHE review
08	University of Southern Indiana	Master of Arts in Second Language Acquisition, Policy, and Culture	6/5/2015	On the CHE agenda for action
09	University of Southern Indiana	Bachelor of Science in Respiratory Therapy	6/5/2015	On the CHE agenda for action

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INFORMATION ITEM B: **Academic Degree Program Actions Taken by Staff**

	Institution/Campus/Site	Title of Program	Date Approved	Change
01	Indiana University South Bend	Bachelor of Art in Mass Communication		Merging two existing programs
02	Ball State University	Bachelor of Art/Bachelor of Science in Criminal Justice and Criminology		Adding distance education to an existing program
03	Ivy Tech Community College – Evansville	CNC Production Machinist Certificate		Adding a location to an existing program
04	Ivy Tech Community College – Evansville	CNC Production Machinist Technical Certificate		Adding a location to an existing program
05	Ivy Tech Community College – Evansville	Certificate in Machine Tool Technology		Adding a location to an existing program
06	Purdue University West Lafayette	Bachelor of Science in Nutrition Science		Changing the CIP code of an existing program
07	Purdue University North Central	Certificate in Process Improvement		Changing the name of an existing program
08	Indiana University Bloomington	Bachelor of Art in Slavic and East European Languages and Cultures		Changing the name of an existing program
09	Indiana University of South Bend	Bachelor of Science in Mathematics		Changing the name of an existing program

	Institution/Campus/Site	Title of Program	Date Approved	Change
10	Indiana University Northwest	Bachelor of Art in African American and African Diaspora Studies		Changing the name of an existing program
11	Purdue University West Lafayette	Master of Science in Nutrition		Changing the name of an existing program and the CIP code
12	Purdue University West Lafayette	Ph.D. in Nutrition		Changing the name of an existing program and the CIP code
13	Purdue University West Lafayette	Bachelor of Science in Nutrition, Fitness and Health		Changing the name and CIP code of an existing program
14	Purdue University North Central	Certificate in Organizational Leadership and Supervision		Changing the name of an existing program and adding distance education
15	Vincennes University Aviation Technology Center Indianapolis	Certificate of Graduation in Aviation Maintenance, Airframe		Adding a certificate to an existing program
16	Vincennes University Aviation Technology Center Indianapolis	Certificate of Graduation in Aviation Maintenance, Powerplant		Adding a certificate to an existing program
17	Indiana University East	Graduate Certificate in Online Instruction and Assessment		Adding a new certificate
18	Purdue University North Central	Certificate in Office Productivity		Adding a new certificate
19	Purdue University North Central	Certificate in Quality Control		Adding a new certificate
20	Purdue University North Central	Certificate in Organizational Administration		Adding a certificate to an existing program and distance education
21	Purdue University North Central	Certificate in Human Resources		Adding a certificate to an existing program and distance education

	Institution/Campus/Site	Title of Program	Date Approved	Change
22	Indiana University Kokomo	Post-Baccalaureate Certificate in New Media		Adding a certificate to an existing program
23	Indiana University Purdue University Indianapolis (IU)	Dietetic Internship Professional Certificate		Adding a new certificate
24	Indiana University Purdue University Indianapolis (IU)	Graduate Certificate in Translation Studies		Adding a new certificate
25	Indiana University Southeast	Undergraduate Certificate in Core Competencies		Adding a new certificate
26	Indiana University Southeast	Post-Baccalaureate Certificate in Entrepreneurship		Adding a new certificate
27	Indiana University Southeast	Post-Baccalaureate Certificate in Professional Selling		Adding a new certificate
28	Purdue University North Central	Certificate in Computer and Information Technology		Changing the degree level of an existing program and the CIP code

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INFORMATION ITEM C: **Capital Projects Awaiting Action**

I. NEW CONSTRUCTION

A-9-09-1-12 Indiana University Southeast
New Construction of Education and Technology Building
Project Cost: $22,000,000
Submitted to the Commission on January 19, 2010

The Trustees of Indiana University request authorization to proceed with the new construction of the Education and Technology Building on the Indiana University Southeast campus. The new building would be a 90,500 GSF facility and provide expanded space for the IU School of Education and Purdue University College of Technology. The expected cost of the project is $22,000,000 and would be funded from 2009 General Assembly bonding authority. This project was not recommended by the Commission as part of the biennial budget recommendation.

STATUS: The project is being held by the Commission until funds are identified to support the project.

B-1-08-1-02 Purdue University West Lafayette
Animal Disease Diagnostic Laboratory BSL-3 Facility
Project Cost: $30,000,000
Submitted to the Commission on July 9, 2007

Purdue University seeks authorization to proceed with the construction of the Animal Disease Diagnostic Laboratory BSL-3 Facility on the West Lafayette campus. The expected cost of the project is $30,000,000 and would be funded from 2007 General Assembly bonding authority. This project was not recommended by the Commission as part of the biennial budget recommendation.

STATUS: The project is being held by the Commission until funds are identified to support the project.

B-2-09-1-10 Purdue University Calumet
Gyte Annex Demolition and Science Addition (Emerging Technology Bldg)
Project Cost: $2,400,000
Submitted to the Commission on August 21, 2008

The Trustees of Purdue University seek authorization to proceed with planning of the project Gyte Annex Demolition and Science Addition (Emerging Technology Bldg) on the Calumet campus. The expected cost of the planning the project is $2,400,000 and would be funded from 2007 General Assembly bonding authority. This project was not recommended by the Commission as part of the biennial budget recommendation.

STATUS: The project is being held by the Commission until funds are identified to support the project.

II. REPAIR AND REHABILITATION

None.

III. LEASES

None.

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INFORMATION ITEM D: **Capital Projects on Which Staff Have Acted**

In accordance with existing legislation, the Commission is expected to review and make a recommendation to the State Budget Committee and State Budget Agency for:

(1) each project to construct buildings or facilities that has a cost greater than $2,000,000;
(2) each project to purchase or lease-purchase land, buildings, or facilities for which the principal value of which exceeds $2,000,000;
(3) each project to lease, other than lease-purchase, a building or facility, if the annual cost exceeds $500,000; and
(4) each repair and rehabilitation project if the cost of the project exceeds (a) $2,000,000, if any part of the cost of the project is paid by state appropriated funds or by mandatory student fees assessed all students, and (b) $2,000,000 if no part of the cost of the project is paid by state appropriated funds or by mandatory student fees assessed all students.

Projects of several types generally are acted upon by the staff and forwarded to the Director of the State Budget Agency with a recommendation of approval; these projects include most allotments of appropriated General Repair and Rehabilitation funds, most projects conducted with non-State funding, most leases, and requests for project cost increase. The Commission is informed of such actions at its next regular meeting. During the previous month, the following projects were recommended by the Commission staff for approval by the State Budget Committee.

I. NEW CONTRUCTION

E-1-14-1-03
Mock Mine Training Facility
Project Cost: $2,000,000

The new Mock Mine Training Facility will feature 24,696 gross square feet of simulated mine that will provide vital mine rescue and emergency preparation training. As Indiana's designated Mine Safety and Health Administration training provider, VU has trained over 30,000 miners in the past five years. This state-of-the-art facility will be located at VU's Gibson County campus and will prepare Indiana's miners in the event of a mine emergency. This project was funded by the General Assembly utilizing the Mine Subsidence Insurance Fund (IC 27-7-9-7).

II. REPAIR AND REHABILITATION

A-1-15-2-22
Indiana University Bloomington, Harper Hall Foster Quadrangle
Project Cost: $3,500,000

This project will repair limestone panels forming the facade of Harper Hall in Foster Quad. Harper Hall was constructed in 1962 and repairs were made to the facade in the late 1970's. The facade was examined in 2013 and again in 2015 after two stone panels fell from the building in January 2015. The resulting report recommended that approximately 75% of the limestone panels be removed and rest. A safety issue will occur if steps are not taken to prevent future failure of the exterior. Additionally, all joints between the limestone panels will be replaced as well l as the soffit overhangs. This project will be funded using Foster Quadrangle Renewal & Replacement Funds.

III. LEASES

IV. LAND ACQUISITION

V. OTHER

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INFORMATION ITEM E: **Media Coverage**

Staff has selected a compilation of recent media coverage related to the Commission for Higher Education. Please see the following pages for details.

Indianapolis Star
Letter: Universities should participate in key survey
State Sen. Luke Kenley
August 4, 2015

Indiana has a strong network of colleges and universities across the state. In order to constantly improve, many of these schools use data to track the success of their graduates.

While quantitative data like how many students graduate and subsequently obtain jobs is relatively simple to track, it can be difficult for colleges and universities to measure the more qualitative benefits of higher education like job satisfaction and quality-of-life.

Indiana is currently poised to become a national leader in higher education by scientifically tracking qualitative data. The Indiana Commission for Higher Education's (CHE) recently announced Gallup-Indiana survey will measure not only economic benefits, but qualitative benefits of higher education, which, in the past, have gone unmeasured and unrepresented in our state reporting on Indiana colleges.

I am strongly encouraging public colleges and universities across the state to take part in this survey. In order to produce a comprehensive report concerning the success of higher education in Indiana that is truly accurate, the CHE needs full participation from all public schools.

Participating institutions will receive feedback that identifies which campus-level efforts are leading to the greatest long-term outcomes for their alumni. In addition, the data will provide colleges and universities new tools to demonstrate to prospective students and families what distinguishes them from other schools by indicating which specific programs lead to a successful graduate experience.

Survey results will also help Hoosier students and families make the best decisions about which college to attend, what to study and how to pay for degrees or credentials, which will ensure a greater return on their investments in education.

The Gallup-Indiana survey findings will also be instructive to lawmakers as we work to identify policies that will help Indiana meet current and future workforce needs and strengthen our economy.

Indiana colleges and universities should capitalize on this opportunity to improve their product and help ensure our state has a well-educated and successful workforce.

I sincerely hope all Indiana colleges and universities participate in the Gallup-Indiana survey so that, as a state, we can help our higher education community identify best practices and where there is room for improvement as we make Indiana a national leader in higher education.

Colleges and universities wanting to participate should contact the Commission for Higher Education at 317-464-4400.

State Sen. Luke Kenley R-Noblesville

Fort Wayne Journal Gazette
IPFW extends in-state rate
Jamie Duffy
July 29, 2015

Some Buckeyes close to the Indiana border are in for a nice surprise if they are considering attending IPFW this fall.

Eight more counties in Ohio – ones considered the closest to Fort Wayne – have been included in a list of 14 counties whose residents are eligible for in-state tuition. They are Allen, Auglaize, Defiance, Fulton, Henry, Paulding, Putnam and Williams.

The difference could mean up to $45,000 for a four-year degree, IPFW spokesman John Kaufeld said. The change takes effect immediately.

With school starting Aug. 24, the new eligibility could also mean a boost to IPFW's enrollment, which suffered a 1.8 percent drop last fall from the previous year but showed a 6.5 percent increase in new student enrollment.

"It could absolutely be a boost to enrollment, and we certainly have individuals who've applied from those counties already," said Tonishea Jackson, IPFW's director of admissions.

Since 2013, 70 students have attended IPFW from the counties covered under the agreement, while nearly 90 attended from the counties that were just added to the agreement, Jackson said. "We hope to gain some ground there significantly because those are the ones that are closest to us," she added.

She was not able to estimate how many more students would be enrolled for the fall semester.

IPFW has vacancies in its on-campus housing, Jackson said, and would be able to accommodate students who may wish to stay on campus. Even though the Ohio line is about 20 minutes away from Fort Wayne, commuting every day could mean considerable mileage. Van Wert is about 34 miles from Fort Wayne.

Kaufeld said the original in-state tuition agreement for IPFW was forged about three years ago. Van Wert was the county closest in the original six counties that also included Mercer, Darke, Preble, Butler and Shelby.

New cities and towns include Paulding, about 31 miles away; Hicksville and Defiance in Defiance County, about 27 and 47 miles away, respectively; and Lima in Allen County, Ohio, about 65 miles away.

Kaufeld said the decision was made by the Indiana Commission for Higher Education and the Ohio Board of Regents. "It was a surprise, and we were just ecstatic," Kaufeld said.

Out-of-state tuition for 2015-16 costs $19,407 for a full-time student taking 15 credit hours of classes, Kaufeld said. In-state tuition for the same schedule costs $8,079.

Stephanie Wilson, a spokeswoman for the Indiana Commission for Higher Education, said the agreement approved June 11 worked to the advantage of both states.

"We do look for parity," she said. The two-year reciprocity agreement between Indiana and Ohio institutions that runs through 2017 includes Central State University, Cincinnati State Technical and

Community College, Clark State Community College, Edison Community College, Miami University Hamilton, Miami University Middletown, Owens Community College, Rhodes State College, Sinclair Community College, Sinclair Community College Warren County campus, University of Cincinnati, University of Cincinnati Clermont College, University of Cincinnati Blue Ash College, Wright State University main campus, Wright State University Lake Campus, all in Ohio, as well as Ball State University, Indiana University East in Richmond, IPFW and Purdue University College of Technology at Richmond in Indiana.

The decision was made to expand access to higher education with "the understanding that students have post-secondary needs and it really doesn't pay attention to where the state boundaries are," Wilson said. "A lot of these students who live on the border, they're closer to IPFW than to a school in Ohio." The agreement does not put limits on the number of credit hours, Wilson added.

At Ivy Tech Community College Northeast, Ohio students pay out-of-state tuition, but out-of-state students who work in Indiana are eligible for in-state tuition, said Jaclyn Garver, spokeswoman. "They need to provide an up-to-date paystub each semester to show they work in Indiana. We typically see this for some Ohio or Michigan students," Garver wrote in an email.

IPFW began a media campaign to recruit students, Kaufeld said, including television and newspaper. For more information, interested students should visit ipfw.edu/ohio or call 1-800-324-IPFW for application information.

The Purdue Exponent
Indiana University seeks own engineering program
Logan Cordes
July 27, 2015

As industries diversify, so must academic institutions, and that is exactly what Indiana University intends to do by adding an engineering program.
In its proposal to the Indiana Commission for Higher Education, the University states its aims to begin offering a bachelor's of science in engineering, as well as a Ph.D. in engineering, in the fall semester of the 2016-17 academic year.

The idea for the program has been in the works for months – if not in writing, then at least in the mind of Indiana University president Michael McRobbie. In his state of the university speech in January, McRobbie said the word "engineering" 16 times while discussing STEM programs at Indiana.

McRobbie's intentions seemed clear when he said, "In an era in which there is a national shortage of STEM graduates, in which design has emerged as a critical component of product competitiveness, and in which there is an expectation that research universities should contribute to state and local economic development, the lack of programs in design and engineering at IU Bloomington must be addressed."

On April 17, the Indiana Board of Trustees approved the proposal to the Commission for the University to establish an engineering program. The Commission's academic affairs and quality committee first discussed the proposal on May 26. It has since been discussed in committee and Commission meetings, once in June and then again just last Wednesday.

According to Indiana's official proposal to the Commission, these are the two major points of rationale for Indiana establishing an engineering program: "1. Having engineering at IU Bloomington is vital for

economic development in Indiana. 2. Having engineering is crucial to realizing the full potential of a broad spectrum of ongoing research and education at IU Bloomington."

There are many factors to process in evaluating whether Indiana should or could sustain an engineering program.

"As we do with all degrees and programs, the cost of the program, the return on investment, missions of institutions, all of those things will be considered," said Teresa Lubbers, Commissioner of the Indiana Commission for Higher Education. "We have not compiled our recommendation ... but we have a very comprehensive template that we use for every degree approval. You can't just look at curriculum."

Part of Indiana's motivation is the fact that engineering is an integral facet of many industries and their day-to-day developments, which Indiana believes should not be an area completely monopolized by Purdue. In fact, Indiana explicitly stated such in an 11-page response to questions presented by the Commission.

According to the document, "Finally, it is important to note that the differentiated missions of Indiana's two primarily [sic] research universities have not, in the past, precluded those institutions from pursuing unique and limited programs that are closely related to areas of expertise within that institution, even if those program areas are nominally similar to areas traditionally taught at the other institution."

Indiana went on to highlight Purdue's Center for Cancer Research and its College of Health and Human Sciences as confirmation that, "the days of narrow or rigid mission differentiation had long passed in fundamental areas like medicine and engineering."

Though she wouldn't comment on the status of Indiana's proposal, Lubbers said, "The reality is, the interdisciplinary nature of engineering is true."

WFYI, The Statehouse File, NUVO
State wants colleges to take part in satisfaction survey
Maxwell Bomber
July 20, 2015

The Indiana Commission for Higher Education has invited every public and private college in the state to take part in the nation's first statewide Gallup-Indiana survey of undergraduate satisfaction.

"The benefits of a college degree extend beyond economic factors, but those benefits can be more difficult to measure: job satisfaction and engagement, civic involvement and better physical health," said CHE Commissioner Teresa Lubbers in a statement.

The commission negotiated a discounted price – with significant funding support from USA Funds and Gallup, a national polling and survey firm – for public colleges that agree to participate by Aug. 1. The base price of the three-year program would typically be $70,600, but with the discounts, the price for an Indiana school will be $24,730.

“Through the Indiana College Value Index, Indiana is leading the nation in helping students and parents make better choices in the selection of a postsecondary program of study,” said Carol D’Amico, a USA Funds executive vice president.

The Indiana College Value Index will combine data from multiple sources to provide a clear image of college completion, learning outcomes, return on investment, career success and long-term college graduate satisfaction. Once the index has been completed, the Indiana College Value Index will be combined with existing economic data on colleges and shared publicly within the next Return on Investment report.

The Gallup-Indiana Survey was inspired by Gallup-Purdue Index – a partnership between Gallup and Purdue University that surveyed more than 30,000 college graduates to measure the relationship between a college degree and graduate well-being.

The Brazil Times
Lubbers calls on Indiana colleges to participate in new Gallup-Indiana survey
July 20, 2015

Indiana Commissioner for Higher Education Teresa Lubbers has invited every public, private and for-profit college in the state to take part in the nation's first statewide survey of undergraduate satisfaction through a Gallup-Indiana survey.

The survey results will provide colleges valuable feedback on the campus-level practices making the biggest difference in students' lives long-term as well as provide the state important data to incorporate into its next Return on Investment report in 2016.

"The benefits of a college degree extend beyond economic factors, but those benefits can be more difficult to measure: job satisfaction and engagement, civic involvement and better physical health," Lubbers said. "The Gallup-Indiana Survey will provide data about those benefits. Once combined with the data we already have about tuition costs, debt and expected salary--students, families and policymakers will have a more complete view of college value and return on investment."

With significant funding support from USA Funds and the Gallup organization, the Commission was able to offer a discounted price for public Indiana colleges that agree to participate by August 1, 2015.

Gallup will discount its price 10 percent for all participating colleges, the Commission will subsidize another 10 percent for participating public colleges, and a USA Funds grant will provide a 50 percent subsidy of the discounted price for all participating public institutions.

"Through the Indiana College Value Index, Indiana is leading the nation in helping students and parents make better choices in the selection of a postsecondary program of study," said Carol D'Amico, USA Funds executive vice president, National Engagement and Philanthropy. "Participation in this initiative

offers Indiana colleges and universities a unique opportunity to demonstrate their value to prospective students and their families."

View the letter Commissioner Lubbers sent to Indiana's college presidents here as well as a pricing sheet detailing associated costs and a draft of the proposed Indiana College Value Index.

The Indiana College Value Index will combine data from multiple sources to provide a clear picture of college completion, learning outcomes, return on investment, career success and long-term college graduate satisfaction. Once fully developed, the Indiana College Value Index will be combined with existing economic data on colleges and shared publicly within the next Return on Investment report.

Widespread college participation in the Gallup-Indiana Survey is critical to bring to scale the Indiana College Value Index.

The Gallup-Indiana Survey was inspired by Gallup-Purdue Index. This partnership between Gallup and Purdue University surveyed more than 30,000 college graduates to measure the relationship between a college degree and long-term graduate well-being. Learn more about the Gallup-Purdue Index and its results online atwww.purdue.edu/newsroom/gallup.

Read all of the Commission's reports as well as its Reaching Higher, Achieving More strategic plan at www.che.in.gov.

Lafayette Journal & Courier
Purdue will forgo Gallup-Indiana poll of grads
Joseph Paul
July 21, 2015

The Indiana Commission for Higher Education has invited every public and private college in the state to take part in the nation’s first statewide Gallup-Indiana survey of undergraduate satisfaction.

“The benefits of a college degree extend beyond economic factors, but those benefits can be more difficult to measure: job satisfaction and engagement, civic involvement and better physical health,” said higher ed Commissioner Teresa Lubbers in a statement.

The Gallup-Indiana Survey was inspired by Gallup-Purdue Index — a partnership between Gallup and Purdue University that surveyed more than 30,000 college graduates to measure the relationship between a college degree and graduate well-being.

The commission negotiated a discounted price — with significant funding support from USA Funds and Gallup, a national polling and survey firm — for public colleges that agree to participate by Aug. 1. The base price of the three-year program would typically be $70,600, but with the discounts, the price for an Indiana school will be $24,730.

Amy Patterson Neubert, a Purdue spokesperson, said the university will not pay the cost to participate. Results from the Gallup-Purdue Index, however, will be incorporated into the Indiana survey, said Stephanie Wilson, an ICHE spokesperson.

The Indiana College Value Index will combine data from multiple sources to provide a clear image of college completion, learning outcomes, return on investment, career success and long-term college graduate satisfaction. Once the index has been completed, it will be combined with existing economic data on colleges and shared publicly within the next Return on Investment report.

"Through the Indiana College Value Index, Indiana is leading the nation in helping students and parents make better choices in the selection of a postsecondary program of study," said Carol D'Amico, a USA Funds executive vice president.

StateImpact Indiana
Higher Ed Commission joins efforts to reduce student debt
Rachel Morello
July 23, 2015

As student debt continues to climb across the country, state officials and institutions in Indiana are taking steps to help student figure out how to best manage their loans.

As we've reported, the General Assembly passed a law during the 2015 "education session" to better inform college students about their debt load. House Enrolled Act 1042, authored by Rep. Casey Cox, R-Fort Wayne, requires public and private colleges and universities across the state to provide annual information to all students receiving loans, specifically those participating in the 21st Century Scholars program or receiving Frank O'Bannon scholarships – both state funded programs.

Beginning in June 2016, schools will be required to send estimates of the following data on a yearly basis:

- Total amount of student loans
- Total amount the student will have to pay (principal + interest)
- Monthly payment amount
- Percentage of the cumulative federal borrowing limit a student has reached

Indiana University has already been sending student borrowers this type of letter since 2012, and the school has seen much success. IU officials estimate undergraduate debt system-wide has decreased by over 12 percent – close to $31 million.

To help institutions fulfill this new "truth in borrowing" requirement, the Indiana Commission for Higher Education has released new guidance, as well as templates for those student letters.

Higher Education Commissioner Teresa Lubbers says she hopes the materials will provide further clarity for schools, to allow them to help Hoosier students be more responsible with paying for school.

"As we call upon Indiana's colleges to keep tuition increases to an absolute minimum, we must also make sure students make informed decisions when they borrow to pay for college," Lubbers said in a statement. "Providing students…an easy-to-understand breakdown of their debt responsibility is a small step that will help thousands of Hoosiers graduate with less debt."

The Commission estimates Hoosier graduates leaving school with a four-year degree shoulder an average debt load of $27,000. That amount sits closer to $17,000 for students graduating with two-year degrees.

Indiana ranks near the top of the list when it comes to student debt across the country. Nationwide, the average student owes $28,400 after college, according to data from the Institute for College Access and Success.

KPC News
Our View: Information on loan debt aids students
July 23, 2015

We applaud efforts to inform students and their parents about the best ways to fund a college education, especially the increased focus on information about college loans.

To help Indiana colleges provide clear and useful information about a student's loan debt, the Indiana Commission for Higher Education has provided guidance and templates to colleges. This will assist colleges in meeting the requirements of new "truth in borrowing" legislation signed into law in April.

House Enrolled Act 1042, authored by state Rep. Casey Cox, R-Fort Wayne, requires Indiana's public and private colleges to provide yearly information to all students with college loans — including total estimated debt and estimated monthly payments after graduation.

The Commission estimates that the average debt for a Hoosier graduate with a four-year degree is $27,000 and $17,000 for graduates with two-year degrees.

"As we call upon Indiana's colleges to keep tuition increases to an absolute minimum, we must also make sure students make informed decisions when they borrow to pay for college," Indiana Commissioner for Higher Education Teresa Lubbers said. "Providing students at every Indiana college an easy-to-understand breakdown of their debt responsibility is a small step that will help thousands of Hoosiers graduate with less debt."

The law was inspired by the success of a similar effort at Indiana University. After just two years of sending annual letters to all student borrowers, undergraduate student borrowing decreased by about 16 percent, amounting to approximately $44 million in student savings.

The law requires public and private colleges to send to students with debt on an annual basis beginning in June 2016:

- Estimated total amount of student loans (principal);
- Estimated total amount the student will have to pay (principal plus interest);
- Estimated monthly repayment amount;
- The percentage of the cumulative federal borrowing limit a student has reached.

“Providing students and their families greater access to loan information will allow them to better plan their financial future and avoid excessive borrowing,” Cox said. “It will also reduce the potential burden for taxpayers who may otherwise bear responsibility for defaulted student loans.”

In addition to basic debt information, the Commission recommends that colleges provide information about the importance of on-time graduation in its annual communication to students. An additional year of college can cost students $50,000 in extra tuition, lost wages and related costs.

Along with their estimated monthly payment based on current borrowing levels, the Commission also recommends that colleges show students their estimated monthly payment if they reach the maximum borrowing limit.

The Commission’s reports as well as its “Reaching Higher, Achieving More” strategic plan can be read at che.in.gov.

We remind students that the best investment of all is to get every possible benefit out of their “pre-college” years. Students need to work hard in the most challenging classes possible; do as much extracurricular reading as possible and take advantage of opportunities to earn college credits while in high school.

Only through hard work in high school can students take full advantage of scholarship opportunities.

In addition, hard work in high school will help ensure students don’t spend extra dollars on remedial classes in college, especially if they have clear career goals.

Tribune Star
ISU hopes to adjust to decline in 4-year grad rate
July 16, 2015

Floyd Johnson and Colton Rusk are two aspiring Indiana State University students participating in the three-week summer LEAP program, aimed at giving students the basic skills needed to succeed in college.

Johnson, who wants to study psychology, said in the first few days he's already improved his writing skills. "I've never written with such detail in my entire life," he said.

Rusk, who is from Indianapolis and hopes to study criminology, said he's learning about the importance of time management in college. He's also finding that the faculty "want you to succeed, and they let you know that."

LEAP is just one of the programs the university has to help students succeed and graduate. Officials hope that eventually translates into better, on-time graduation rates — which affects ISU's state funding.

According to a new state report, ISU's four-year graduation rate dropped slightly over a five-year period, when comparing freshmen who started in 2005 with those who started in 2010. For the class starting in 2005, 20.5 percent graduated in four years, while the on-time graduation rate for those starting in 2010 was 19.4 percent, a drop of 1.1 percentage points.

Statewide, the on-time graduation rate for public college students pursuing a bachelor's degree improved nearly 7 percentage points over that same time span, from 29.5 percent for the 2005 freshman cohort to 36.1 percent for the 2010 freshman class.

Those data come from the Indiana Commission for Higher Education's 2015 College Completion Report, which was released Wednesday. It includes statewide data and information for each public college. ISU officials say they've put in place several measures to improve those graduation rates, and they expect to see some tangible results at the end of summer. Also, they made some adjustments in recruiting after the freshman class starting in 2010 did not fare so well.

John Beacon, vice president for enrollment management, marketing and communications, said ISU recruited heavily in the Chicago area in 2010, which helped the university significantly boost freshman enrollment that fall by 765 students or about 42 percent. Freshman enrollment went from 1,801 students in 2009 to 2,566 students in 2010.

Several of those Chicago-area students who achieved a certain grade-point could take advantage of a Midwest consortium scholarship that meant significantly reduced tuition costs at ISU. But they had to maintain a 2.5 grade-point average to keep the scholarship, and ISU lost several of those students when their grade-point averages fell below that threshold and they couldn't afford to stay.

ISU had recruited from the Chicago metropolitan area, including Cook County and inner city Chicago. The university learned an "interesting lesson," Beacon said. "No one could have anticipated we weren't ready to deal with the academic issues that surge in population brought with it."

After that, ISU “restrategized” its marketing in the Chicago area. “We went to the suburbs where students are better able to academically compete,” he said. “I think it has helped. We’ve had better classes every year.”

Now, the number of students conditionally admitted at ISU is down, while the average GPA of entering freshmen has improved, he said.

The state report also shows that for full-time students who started at ISU in 2006, 24.7 percent graduated in four years; 51.8 percent completed within six years; and 58.4 percent graduated within eight years. In some cases, those students graduated at different colleges.

When looking at ISU full-time students who both started in 2006 and graduated at ISU, 21.3 percent finished in four years; 41.9 percent finished in six years; and 44.4 percent graduated in eight years. LEAP is a mandatory program for at-risk ISU students to ensure they’re ready for the rigors of college; if they don’t successfully complete it, they won’t be enrolled. LEAP is an intensive three-week residential program that helps students improve study skills and successfully transition to college.

On Thursday, some ISU students who attended LEAP in past years talked about what it takes to succeed. ISU student Ryan Drzewiecki, who participated in LEAP in 2013, is one of the counselors for this year’s program. LEAP “taught me that motivation isn’t going to get me where I need to go, necessarily.” He had to apply self-discipline. He tells LEAP participants there will be times they won’t be motivated to do an assignment or they would rather party or hang out with friends than study.

“You have to discipline yourself and know that it’s for a good cause. That’s one of the hardest things to learn,” said Drzewiecki, a marketing major from Dyer, Ind.

Aliyah Washington, who participated in LEAP in 2011 and is now a senior, also is a counselor for this year’s program. LEAP “is a great second chance to get into college,” she said. She learned from it that “you don’t have to be the way you were. Your past doesn’t define who you are. You can change.” LEAP gave her the discipline she needed to succeed and showed her she was capable of doing college level work, she said.

Jermanie Branch, who went through LEAP in 2013 and is now a junior, said the program “helped me get prepared for college-level classes” and meet new people. She also learned how to manage her time and set priorities.

This is the second year the higher education commission has released a report focused on providing a comprehensive picture of college completion in Indiana.

Stephanie Wilson, CHE spokeswoman, said every campus has a different student population. Also, the report, which looks at data from past years, may not reflect the positive effects of more recent efforts implemented at the state and campus levels. “We are hopeful as we move into the future, we’ll see some of those positive effects,” she said.

Chicago Tribune
Report shows effort to complete college in four years often a losing battle
Nancy Coltun Webster
July 23, 2015

Stephanie Peters is skating toward the end of her college career at Purdue University Calumet just one semester past the typical four-year goal.

The computer graphics technology major, like thousands of students enrolled at Northwest Indiana universities, juggles school, a job and other pursuits. If everything goes as planned, the 22-year-old Highland resident will be done in December.

She will also become another statistic for the Indiana Commission on Higher Education's goal to get students out of college sooner rather than later.

Peters, a competitive figure skater, goes to school full-time and is the skating director and coach at the Midwest Training and Ice Center in St. John.

"I knew when I started college (in 2011) I wanted to continue figure skating, but I still wanted to get done in as close to four years as possible," she said. "I did anticipate it could be four or five years. I know they say on the plan of study it averages a good 15 hours of credit, but I opted to do 12 with my load of work and skating."

The Indiana Commission on Higher Education continues to study rates of college completion at two- and four-year campuses across the state as it seeks to meet a goal of 60 percent of Hoosier adults with degrees beyond high school by 2025.

Statistics for on-time graduation — degrees earned in four years — for most Northwest Indiana campuses are nearly flat or show a decrease in the 2015 College Completion report. Officials cite obstacles such as financial concerns and remediation opportunities and say policies are being developed to keep students on track.

A Purdue North Central representative said a variety of initiatives are in place to increase student retention and on-time completion including a 10 percent discount for each academic hour taken beyond 12 credit hours. The Westville campus improved on-time completion rates between 2014 and 2015, going from 14.9 percent to 17.4 percent, the report said.

The school offers Freshman Year Experience courses to help new students acclimate to campus. It also uses Degree Works, a computer-based program that helps students and advisers with academic planning.

"Purdue University Calumet's numbers are almost flat," Indiana Commissioner for Higher Education Teresa Lubbers said.

Purdue Calumet's on-time graduation dropped from 12.8 percent in 2014 to 11.8 percent in 2015.

"A little more concerning would be the numbers at IU Northwest," she said. "You did see a decline there. The important thing: The report is a more comprehensive look at completion. We have been very focused in on-time completion at the commission. This is only the second year we've done the report. Having an honest assessment gives us a roadmap."

The report showed 17.6 percent completed their studies in four years at IUN in the 2014 report compared with 12.2 percent in the 2015 report.

In a written statement, IU Northwest Chancellor William Lowe addressed the report's findings.

"While we take seriously the ICHE initiatives to help students graduate within four years, it is clear that IU Northwest's students often have completion timelines based on their personal and family obligations that stretch that timeline beyond the traditional four years," he wrote. "We understand our students' needs and support them throughout their academic journeys.

"Forty-seven percent of IU Northwest students attend part-time," he said, "while those who attend full-time take an average of 13 credit hours per semester, fewer than the 15 recommended in the state's '15 to Finish' program that promotes four-year completion. These numbers reflect the fact that many of our students need to work in order to pay for college, even though more than 70 percent of our students receive some form of financial aid."

Lubbers acknowledged that the 2015 data deals with lagging numbers. She pointed out the report shows IUN's on-time graduation rate for its 21st Century Scholars recipients is up 3.6 percent. The needs-based scholarship program provides income-eligible students with up to four years of paid in-state tuition.

The state has pumped an additional $93 million into the 21st Century Scholars program, Lubbers said, bringing it to somewhere between $125 million and $150 million — about half of the $300 million in state financial aid.

Lowe said a survey of graduating IUN seniors from the 2014-15 academic year shows that 82 percent were employed while enrolled in their coursework and 56 percent of all seniors worked at least 20 hours per week.

"Compared to other IU regional campuses and peer institutions, our students, on average traditionally work more hours and have more dependents relying on them than at any other campus, according to the National Survey of Student Engagement," Lowe said.

At Purdue Calumet, the student profile is changing, said Kris Falzone, associate vice chancellor of marketing and communications. The school has increased its retention rate of freshmen returning as sophomores from 68.8 percent in the fall of 2013 to 73.5 percent in the fall of 2014, Falzone said.

"We no longer offer associate degrees," Falzone said. "Six years ago, 38 percent of entering freshman would have had a 3.0 or higher grade-point average and 14 percent would have had a 3.5 percent or higher grade-point average — looking at the six-year graduation rate. By comparison, among our students who entered in 2014, 56 percent had a high school GPA of 3.0 or higher and 24 percent had a 3.5 GPA or higher. The students who need remediation in math and reading are going to Ivy Tech. We

are looking for a student profile of degree-seeking persistence — a different profile of student than you may have seen before.

"Many of our students work part-time and full-time," Falzone said. "Enrollment in 2014-15 was just under 9,500 and 96 percent of our freshman students attended full-time. Sometimes that surprises people — we have students who work full-time and go to school full-time."

The report also looked at each Ivy Tech campus.

"Ivy Tech Northwest did show an improvement for on-time graduation that was a significant," Lubbers said and noted that on-time graduation for the two-year programs at Ivy Tech Northwest showed an increase from 4 percent in 2011 to 10 percent in 2012. However, "all of our Ivy Tech numbers are unacceptably low," she said.

"I think in general, there's a push to get students through to completion," said Chancellor Thomas Coley of Ivy Tech Northwest. In order for students to complete a two-year Ivy Tech program on time, they would need to take 15 credits per semester.

"We have 5 percent who do that," he said. "When they take the courses at that rate, they do well (in terms of completion). When they take part-time, they are not going to complete in two years, because they are wrapping school around family, getting a job, keeping a job, advancing in a job."

Lubbers said the state needs to consider the population of students who combine work, studying and family and address the "achievement gap issues."

Some of those issues include remediation education classes that do not sap financial aid dollars and better scheduling predictability for working students, she said.

"We need to change the way we deliver higher education," she said. She pointed to Ivy Tech's Math Pathways that offers three curriculum choices to help students who struggle with math as one of those new measures.

Statewide, 36.1 percent of four-year students who enrolled in 2006 graduated on time. The report showed improvements for low-income and minority students and, in particular, 21st Century Scholar students. The report notes a statewide disparity for black students, who are twice as likely as their peers to finish late.

"What that means is, we are doing a good job of getting more minorities entering college, but we now need to acknowledge the challenges," Lubbers said. "Many of these students are working and balancing family life.

"If you take an honest assessment, we hope that people will see it as a cause for action," she said. "At a community level, they will come together and say, 'What do we do to close the achievement gap?' Data can be a tool to drive these conversations. The reason we drive this is the 21st century employment base. The imperative is so much stronger than it was in the second half of the 20th century."

About the study:

The 2015 College Completion report study by the Indiana Commission on Higher Education looked at the four-, six- and eight-year statistics for students who enrolled in college at in-state campuses in 2006. Data was collected for students who started and stayed on the same campus without switching their degree as well as those who switched campuses or degrees. Data was also collected to distinguish part-time students from full-time students and looks at characteristics including income, scholarship recipients and race/ethnicity.

South Bend Tribune
Indiana still facing challenges in college completion
Margaret Fosmoe
July 16, 2015

The number of Indiana residents earning bachelor's degrees in four years is increasing, but it's still a minority of those who enroll.

About 36.2 percent of Hoosiers who enter college earn bachelor's degrees within four years, an increase of nearly 7 percent from five years ago, according to the 2015 Indiana College Completion Report, released Wednesday by the Indiana Commission for Higher Education.

But just three of 10 students who enroll at an Indiana four-year campus graduate on time (in four years) and fewer than 65 percent finish within six years, according to the report. At Indiana's two-year colleges, fewer than one in 10 students earn degrees in two years, and fewer than two in 10 graduate within three years.

The highest on-time completion rates are at state residential campuses: Indiana University Bloomington, 59.8 percent; Purdue University in West Lafayette, 49.1 percent; and Ball State University, 44.7 percent. At Indiana University South Bend, 7.3 percent of students who enrolled in 2010 earned bachelor's degrees in four years, an increase of 2.7 percent from five years earlier, according to the report.

At Purdue North Central in Westville, 7.2 percent of students who enrolled in 2010 earned bachelor's degrees in four years, up 0.9 percent from five years earlier.

In the statewide Ivy Tech Community College system, 4 percent of students who entered in 2012 earned degrees in two years, an increase of 0.3 percent from five years earlier. In Ivy Tech's north central region (which includes campuses in South Bend, Elkhart County and Warsaw), 1.6 percent of students who enrolled in 2012 earned degrees in two years, a 1.9 percent drop from five years earlier.

The commission estimates that each additional year of college can cost an individual $50,000 in extra tuition, lost wages and related costs.

The Star Press
BSU big gainer, Ivy Tech big loser
Seth Slabaugh
July 16, 2015

Ball State University is the state’s biggest gainer, and the East Central Region of Ivy Tech Community College is the state’s biggest loser, in a new report of on-time college completion rates.

Only a third of students who entered Ball State in 2005 graduated within four years, while nearly 45 percent of those who enrolled there in 2010 graduated within four years, according to an Indiana Commission for Higher Education (ICHE) report released on Wednesday.

BSU's 12 percentage-point increase over five years was the highest among Indiana's four-year public schools, followed by Purdue University-West Lafayette (11.5), Indiana University-Bloomington (10.1) and IUPUI (8.4). Indiana State University's on-time graduation rate actually declined by 1.1 percentage point during the five-year period.

While Ball State showed the most improvement, its 44.7 percent on-time completion rate remains in third place behind IU-Bloomington at 59.8 percent and Purdue-West Lafayette at 49.1 percent. Only19.4 percent of ISU students and 18.9 percent of IUPUI students graduate on time.

Meanwhile, only 1.2 percent of the students who enrolled in 2012 at Ivy Tech East Central (Muncie, Marion, Anderson and New Castle) graduated on time (within two years). That's down 3.3 percentage points — the biggest decline among all Ivy Tech campuses — from the 4.5 percent on-time graduation rate among East Central students who enrolled in 2007.

Republican state lawmakers cited poor graduation rates and declining enrollment this year when they eliminated a $25 million appropriation to modernize Ivy Tech Muncie's outdated Cowan Road campus, which was to have included a new manufacturing technology center.

Sen. Luke Kenley, chairman of the Appropriations Committee, told The Star Press in May that it was "time to call timeout" to "see if we can't find our path here" before moving forward in the next budget cycle with a plan that is "successful," because "right now it's not happening."

Ivy Tech's statewide graduation rates are the lowest in the nation.

East Central Ivy Tech Chancellor Andy Bowne has said students in Marion, Muncie, Anderson and New Castle are among the poorest in the nation, ranking in the second to fifth percentile in median household income among community college students nationally.

About 95 percent of the East Central region's students are part-time. Many work full time and attend school part time and have families.

"Ivy Tech is incredibly important to the state," ICHE Commissioner Teresa Lubbers told The Star Press. "We need to look at what we can do to make sure Ivy Tech is successful. I think Sen. Kenley is looking for trends in the right direction."

Meanwhile, Lubbers said, "I think Ball State should be encouraged, as we are, by the progress they are making across all demographic groups."

For example, she noted an 8.5 percentage point increase in graduation rates among taxpayer-funded 21st Century Scholars enrolled at BSU, as well as a 4.8 percentage point increase in graduation rates among black students.

The 21st Century Scholars program is a "promise" scholarship. Low-income students enroll in the program during seventh or eighth grades and must maintain a 2.5 grade-point average, stay drug- and alcohol-free and complete college-preparation activities.

Indiana's performance-based funding formula rewards schools of higher education for on-time graduation.

"Consistent with our Centennial Commitment strategic plan, we have developed a concerted effort to increase our four-year graduation rate to at least 50 percent by Ball State's 100th anniversary in 2018," BSU President Paul Ferguson said in a news release.

"We have created opportunities for students — as soon as they arrive on campus for summer orientation — to foster successful college careers by connecting with their peers, engaging with campus activities and being challenged in a supportive academic environment," Kay Bales, BSU's vice president for student affairs, was quoted as saying.

Strategies include:

- "Commuter Ambassadors," a program that pairs first-year commuter students with upper-level students.
- "Transfer Ambassadors," a program linking first-semester transfer students with upperclassmen
- Upper Division Advising Center to coordinate how students manage their last two years of classes.
- Creation in 2013 of the Retention and Graduation Office to help academically at-risk students.

On-time graduation rates

(Percent of students graduating in 4 years)

COLLEGE	ENTERED IN 2005	ENTERED IN 2010	5-YEAR CHANGE*
BALL STATE	32.6%	44.7%	+12.1
Purdue-W. Laf.	37.6%	49.1%	+11.5
IU-Bloomington	49.7%	59.8%	+10.1
IUPUI	10.5%	18.9%	+8.4
Southern Indiana	15.3%	18.7%	+3.4
Indiana State	20.5%	19.4%	-1.1

* Percentage-point change

On-time graduation rates

(Percent of Ivy Tech students graduating in 2 years)

COLLEGE	ENTERED IN 2007	ENTERED IN 2012	5-YEAR CHANGE*
IVY NORTHWEST	3.2%	10.0%	+6.8
Ivy Lafayette	4.5%	7.2%	+2.7
Ivy Northeast	1.9%	3.9%	+2.0

COLLEGE	ENTERED IN 2007	ENTERED IN 2012	5-YEAR CHANGE*
Ivy Central	2.2%	3.6%	+1.5
Ivy Southwest	5.0%	6.2%	+1.2
Ivy Kokomo	1.9%	1.3%	-0.6
Ivy Wabash Valley	3.2%	2.0%	-1.2
Ivy S. Central	5.0%	3.7%	-1.3
Ivy Columbus	4.8%	3.4%	-1.4
Ivy North Central	3.5%	1.6%	-1.9
Ivy Richmond	3.8%	1.5%	-2.3
Ivy Southeast	4.0%	1.6%	-2.4
Ivy Bloomington	5.6%	2.5%	-3.1
Ivy East Central	4.5%	1.2%	-3.3

* Percentage-point change

Kokomo Tribune
Editorial: Time – enemy of completion
Editorial Board
July 17, 2015

College preparedness is a national problem. More than 1.7 million college freshmen across the U.S. take remedial courses each year. The annual cost of remediation to states, schools and students is close to $7 billion, according to a 2012 report by the National Bureau of Economic Research.
Much of that money seems wasted: Fewer than 50 percent of students enrolled in remedial courses complete them. Those who do find their path to graduation delayed or derailed. Two-thirds of students in four-year colleges needing remediation fail to earn their degrees within six years. Fewer than 8 percent of students in two-year colleges earn their degrees within four years.

As Indiana Commissioner for Higher Education Teresa Lubbers describes it: Time is the enemy of completion.

“If it takes too long, it’s much less likely students will graduate, and much more likely that they’ll leave without a degree but owing thousands of dollars in student loan debt hanging over their head,” she told us in 2012.

Wednesday, Lubbers released the commission’s second Indiana College Completion Report. It showed progress in on-time graduation rates in 2014, yet fewer than 2 in 5 students attending state-funded four-year colleges finished in four years. Half of those students earned degrees in six years.

At Indiana University Kokomo, 17.3 percent of students graduated in four years, according to the report. IU Kokomo's on-time graduation rate spiked 4.6 percent in 2014, the best year-over-year improvement of any publicly funded campus in the state.

Indiana spends about $7 billion a year on K-12 schools and claims to be a pioneer in education reform. Yet thousands of its high school students are graduating without the basic math, reading and writing skills needed to succeed in college.

That’s what another series of reports from the Commission for Higher Education has shown since the state started tracking data on the college-readiness of its students seven years ago.

In 2013 — the most recent year available — 1 in 3 Indiana high school seniors who graduated from public schools with the state’s required “college preparatory” diploma, known as Core 40, had to take at least one remedial course after enrolling at a state-supported college.

Gov. Mike Pence made college readiness one of his top priorities when taking office in 2013. With his leadership, the state must raise high school graduation standards.

The Journal Gazette
Hoosier kid's access to dual credits in peril
State Rep. Martin Carbaugh (R-Fort Wayne)
July 9, 2015

As a state representative, one of my goals is to ensure that our students receive the best education possible. This year, House Republicans made it a priority to increase education funding and empower teachers and school districts to find innovative ways to meet the educational needs of their students.

This is why I am concerned about a proposal that could limit a school's ability to help students become college-ready.

Federal regulations require universities to be accredited through the Higher Learning Commission, which allows them to provide their students federal student aid assistance. This federal funding for college students makes the commission accreditation important for universities to obtain but could soon negatively affect high school students attempting to earn dual credit.

There is a proposal in front of the commission that would limit the number of teachers who are eligible to teach dual-credit courses. The proposal would require these educators to hold at least a master's degree in the discipline of the course they teach. If an educator holds at least a master's degree or higher in a discipline other than that in which they are teaching, then they must have completed at least 18 graduate credit hours within that field.

For example, if you are an English teacher with a master's degree in education, you would no longer be eligible to teach dual-credit English or speech courses. If you are this same teacher but have fewer than 18 hours of graduate credits earned in English, then you are still considered ineligible to teach English dual-credit courses – regardless of the undergraduate credits you may have earned.

If this proposal is adopted by the commission, schools would have significantly fewer qualified dual-credit teachers.

According to Fort Wayne Community Schools, this proposal would reduce their dual-credit offerings, and it could even hurt their accountability, or A-F, grade.

Academic growth, graduation rates, and college and career readiness are a few of the measures used to calculate the accountability of Hoosier schools. One of the indicators for the college and career-readiness metric is dual credit. With limits on the number of eligible teachers, Indiana schools could see a negative effect on their A-F grade.

Additionally, a measure of accountability is necessary to receive a waiver from the federal education standard known as No Child Left Behind. Therefore, it is impossible to postpone our current accountability system and allow our local schools to adjust to these changes without hurting another area of our education structure.

NCLB is another example of federal regulations that burden our local schools. These regulations require Hoosier schools to waste resources in order to comply with federal statute and do not always make sense at the local level.

Studies show the more dual credits students take with them to college, the more likely they are to stay enrolled and potentially finish their degree. Supporting Hoosier students' academic success means providing them adequate access to dual-credit courses, which will better prepare them for college.

South Bend Tribune
Our Opinion: Unpaid college loans a drag on economy
July 15, 2015

A recent study by the Center for American Progress shows that Indiana students have the sixth highest debt per graduate in the country.

Of the people who started college in 2003-04, borrowed at some point then later defaulted on their loans, more than 60 percent had dropped out of college and often very early in their college career.

Ben Miller, who authored the report, said the issue is important because student loan nonrepayment has negative effects that hurt not just people but communities as well. "If lots of people in an area have student loans but no degree, then those payments are sucking dollars out of the community without giving it the positive benefits of increased attainment. That can reduce the wealth in the community,'' Miller said by email in response to several questions.

There are two ways to ease the problem of student debt, Miller explained. One is to make payments lower and the other is to reduce the amount people borrow in the first place. "This is where you see pushes for greater state funding to freeze or reduce tuition,'' Miller said. Indiana University is one of those institutions making a significant effort toward reducing the amount borrowed and educating students about the loan process.

Three years ago IU established MoneySmarts, a website that offers financial literacy training. Each spring, every IU student receives a letter clearly stating the estimate of total education loans. Students also can take a five-week class that educates them about a variety of financial topics, including loan repayments.

Over the past two decades, tuition and fees at most of Indiana's public colleges have increased about 200 percent, Teresa Lubbers, Indiana's commissioner for higher education, wrote in a recent Tribune Viewpoint. Two-thirds of Hoosiers who graduate from four-year colleges hold an average debt of almost $27,000. For two-year college graduates, the average debt is more than $17,000, she said.

IU has taken an important first step in helping students grasp the realities of the cost of a college education. But as important as that is, it will be inadequate unless the state and its public colleges work together to rein in the burgeoning costs of a college education.

Other colleges would benefit by adopting some of the approaches IU is taking to educating students about loan debt. So, too, would the communities that are being affected by that unpaid debt.

Fox 28: South Bend/Elkhart
Study says more Hoosiers completing college on time
July 15, 2015

The number of Hoosiers walking across the college graduation stage is on the uptick according to the 2015 Indiana College Completion Report.

Students earning four-year bachelor's degrees has increased seven percent in the past five years. The study also shows more students are completing their studies on time.

"We should be encouraged by Indiana's degree completion gains, especially for our low-income and minority students," said Indiana Commissioner for Higher Education Teresa Lubbers. "At the same time, we must not relent in our efforts to advance state policies and campus-level practices that encourage ongoing improvement."

In 2006, 36.1 percent of students earned their degrees in four-years, 64.8 percent earned their degrees in six years, and 70.5 percent earned their bachelor's degree in eight years. The number of students who completed their bachelor's degree in four years in 2010 went up to 36.1 percent.

The increase in Hoosiers graduating on time could be related to the growing number of full-time students on college campuses.

The Statehouse File
Seven Counties Recognized for Higher Education Efforts
Amanda Creech
June 9, 2015

State Commissioner for Higher Education, Teresa Lubbers, opened up the 2015 College Success Coalitions Award Ceremony on Tuesday by telling the representatives of the counties of the importance of what happens in the Statehouse.

"But today we're going to talk about what you do not in this building," Lubbers said. "This is an opportunity to say thank you and acknowledge your effort."

The College Success Coalition is a network of state and local organizations working to increase college access and success across the state. Member organizations include local businesses, government, colleges, schools, community groups, youth organizations and faith-based organizations.

This year, seven counties are being recognized for their efforts to increase the percentage of Hoosiers with education and training beyond high school. Last year, 15 counties were recognized during the ceremony.

Indiana Commission for Higher Education's Jason Bearce commended the counties for all of their efforts.

"As much as it's hard to get the ball rolling, it's even harder to keep that ball rolling," Bearce said, "and to stay the course to be an active, thriving, sustainable coalition."

Bearce also added that this ceremony shows a "connection between a strong education system and economic development and a community that's not committed to just talking about the challenges we all face in Indiana but that we're going to come together to do something about it."

Representatives of the seven counties were given a metal sign to place in their town, congratulating them for being a "college success county." The counties recognized were Cass, Daviess, Franklin, LaPorte, Posey, Spencer, and Warren.

Lubbers said that counties need to take an honest assessment of completion numbers, high school graduation rates, college going rates, and attainment rates and "have the courage to look at that and say we have some gaps here." And strive to fix those gaps.

Lubbers stressed the need to align education credentials with work needs in the community as well. She said 60 percent of Hoosiers have quality credentials and two-thirds of jobs require education beyond high school.

Carol Clark, executive director of the Warren County Community Foundation, represented her county to accept the award today. Her plan in her county is to bring awareness to credentials outside of a high school diploma.

"We facilitated discussions and meetings in the community to get organizations, businesses and schools on board to really get our students to have a plan after high school," Clark said. "Whether that is college, whether that's certification, whether that's the military."

Not only does Clark want the students in her community to have a plan, but she also wants them to complete the plan in a timely fashion.

As a community foundation, her organization funds several educational initiatives such as college visits. Her foundation has also begun reaching out to elementary and junior high schools to get them on college campuses early on in their educational career.

"We even have an initiative this summer where I'm getting third graders on college campuses," Clark said. "So we want them to know that this is just something that they're going to do, to know that it's a possibility and that we try to make that happen for them."

Chalkbeat Indiana
Indiana's high school diplomas are about to get a redesign
Shaina Cavazos
June 16, 2015

Indiana could soon offer fewer high school diplomas types, but the move is aimed at creating broader opportunities for students looking to prepare for college or jobs.

Students starting high school in 2018 would have three diploma options instead of four under a plan presented Monday — a "college and career ready" diploma, an "honors" diploma and a "workforce ready diploma." Currently there are four diploma options: general, Core 40, Core 40 honors and career and technical honors diplomas.

The proposed new options are intended to be simpler.

Teresa Lubbers, the head of the Indiana Commission for Higher Education told the Indiana Career Council on Monday that she and others on a committee tasked with the project want to make sure students seeking any diploma experience as high a level of academic challenge as possible.

“The goal was really to ensure college and career readiness and academic rigor with the diplomas going forward,” Lubbers said. “I actually lost track of the number of drafts. It has to exceed 50.”

The process of changing the diplomas is far from over. The career council, Commission for Higher Education, education department and Indiana State Board of Education all must still sign off. Plus, the original diploma subcommittee will make a presentation before lawmakers later this summer.

The proposed new diplomas won’t look completely unfamiliar to Hoosier students and parents. The differences lie mainly in how the programs are structured, with some changes to credits and courses required.

For example, to earn the new diplomas, all students would be required to take a personal finance class and an introduction to college and careers class.

But essentially, the categories would serve the same purposes — a diploma for students going directly to jobs with no plans for college, one for students who do want to pursue higher education and an honors diploma.

Click on the tabs below to compare Indiana’s current and proposed new diplomas. You can see more details of both current and new diplomas on the education department’s website.

College and Career Ready diploma

Replacing Indiana’s Core 40 diploma is the College and Career Ready diploma. It would require students to take more core classes, especially in math and science. It also would allow students to specialize in an interest area — what it’s calling a “sequence.” That could be classes in fine arts, for example, career and technical education or many more.

State Superintendent Glenda Ritz said this would be the default track for all students as they enter high school.

“Everybody is going to start out with the college and career ready diploma,” Ritz said. “That’s where we want kids to be.”

Indiana Honors diploma

Students looking for a greater challenge could take on the Indiana Honors diploma, which is a simplified version of the previous honors program that separated academic and career and technical honors. Students could still choose advanced classes in both areas, but general requirements, such as GPA and total number of credits, would remain the same.

Workforce Ready diploma

The third proposed diploma option, known as the Workforce Ready diploma, is not meant for a majority of students, Lubbers said. Rather, it is supposed to help students who struggle academically prove to employers that they have finished a well-rounded academic program and have the skills for jobs.

“Close to 90 percent of kids get the college and career ready diploma or honors,” Lubbers said. “So we are talking less than 10 percent there.”

Neil Pickett, a council member who works for IU Health, was unsure about the need for a modified general diploma. He said he thought employers might not necessarily be able to see the distinction between that and the college and career ready one.

“You are increasing the rigor pretty significantly,” Pickett said. “I wonder if we ought to just not just encourage people to get the extra credits and have college and career ready degree.”

But Ritz said some students, especially those receiving special education services, will need the modifications. To be eligible for that diploma, students must have their parents and principal sign off, she said.

“You can’t just go on this track,” Ritz said. “But students with special needs, they might make decisions earlier on that. We wanted to make sure the special education students who were on a workforce-ready track were going to actually end up being able to end up in the workforce.”

All changes needed to be finalized by December, Ritz said, so the legislature can have advanced notice of what changes might need to be made to state law for the diplomas to go into effect in 2018.

Fort Wayne Journal Gazette
Rethinking high school diplomas
Niki Kelly
June 16, 2015

Indiana students would have to earn additional credits and take more math classes under proposed new diploma requirements.

“It’s time to revisit and up the ante,” said Kevin Brinegar, president of the Indiana Chamber of Commerce.

He remembers the decade of work it took to get the Core 40 diploma requirements put into law, and he thinks the new proposal has a lot of merit.

He is a member of the Indiana Career Council, which got its first look at the draft for three proposed diplomas Monday.

The standard would be the College & Career Ready diploma, which would replace the Core 40 diploma. It would require a minimum of 44 credits, up from 40.

The second would be a Workforce Ready Diploma, which would replace the state’s general diploma and require a minimum of 40 credits. An Honors Diploma requiring 48 credits also would be available.

In general, the proposals include additional math classes, and for the first time ever, all students would be required to take a personal financial responsibility class.

A subcommittee of the Career Council has been working on new diploma requirements for about a year. It was co-chaired by Commissioner for Higher Education Teresa Lubbers and Superintendent of Public Instruction Glenda Ritz.

Lubbers said the group easily had 50 drafts over that time.

“The goal was to ensure college and career readiness and academic rigor with diplomas going forward,” she said.

The Indiana Department of Education, Commission for Higher Education and Career Council are all accepting feedback on the draft diplomas. More information can be found online at www.doe.in.gov/ccr/indiana-high-school-diploma-survey.

Ultimately, the State Board of Education would have to approve the proposal this year, and the General Assembly would have to change the law next session.

The new requirements would first take effect for the class of 2022, which is the students who enter high school in the 2018-19 school year.

Of the 44 credits required for the new College & Career Ready diploma, eight must come from English/language arts coursework, the same as now.

But under the draft, eight math credits would be required, up from six required under Core 40.

Science and social studies would still require six credits each. Health and wellness credits, including physical education, would remain at three.

The new proposal would require eight credits for college and career readiness. Most of these would come from a sequence of classes a student is interested in for a specific career. This largely replaces something now called “directed electives.”

Five electives would be required, down from six.

One big change is the requirement of a graduation capstone, which can come in one of three ways.

A student can earn a career credential, such as an industry certificate; a career experience, such as a project-based capstone or work-based learning experience; or earn at least three college credits.

Depending on how many semesters and classes a school has, Ritz said students at many schools can earn a maximum of 48 to 56 credits.

Career Council member Neil Pickett questioned whether there is even a need for the Workforce Ready diploma, noting there is only a four credit difference between it and the College & Career Ready diploma.

“Let’s encourage them to get over the goal line and get those extra four credits,” he said.

Pickett also thought a computer coding class should be required.

Ritz said some students struggle to obtain 40 credits now. Also, there is less math and science required under the general workforce diploma.

Council member Rep. Ben Smaltz, R-Auburn, also was concerned that there are no requirements for students to take world languages.

The proposed draft encourages students going to college to take four credits in world languages using electives.

And Lubbers noted that colleges require students to have language credits. But it's still only a suggestion for the College & Career Ready diploma.

Bedford Times-Mail
Commentary: A visitor's viewpoint
Mike Lewis
June 17, 2015

Teresa Lubbers was on the road Tuesday trying to sell more Hoosiers on the idea of pursuing higher education. But she also brought a fresh perspective to Bedford and Lawrence County.

It started as most of these things do — with a call from a bright and well-spoken staff member working for some politician or state official. In this case, it was a staff member working for Lubbers, who is Indiana's commissioner for higher education.

If you spend nearly a lifetime in community journalism, as I have, you become accustomed to such calls. The politician or state official will be swinging through your area of the state, the staff member will say over the telephone, and could they stop by for a visit? You negotiate a time and a place, and you wind up with a interview.
It's a swap, of sorts.

In Lubbers' case, for example, she was on the road trying to sell an idea or two. When you're doing that, it doesn't hurt to bop into the local newspaper office to chat with a reporter. Who knows? Perhaps the reporter will even write about the official's agenda.

From the journalist's viewpoint, it's relatively rare to hear first-hand from the people who are working for us in Indianapolis. These short interviews are chances to learn about their priorities, policies and programs, and communicate that to our readers — the taxpayers who are paying the bills. (Look for some of Lubbers' views about "finding the right fit" for students in a column this weekend.)

Lubbers and I talked about education for an hour Tuesday. But six words of hers stuck with me long into Tuesday night. And they taught me a bit about how we see ourselves.

We had touched on a wide range of topics, from community colleges to how technology is changing education. She mentioned that manufacturing is still important, and I mentioned that Bedford and Lawrence County are still struggling from the Great Recession.

She smiled and quickly said: "You're not struggling compared to some."

I must have looked surprised, because she followed with a list of things we have going for us — things that you won't find in many of Indiana's other small cities.

We still have strong employers, she said. True, we have lost many manufacturing jobs in the last decade or two — most places have. But we have adjusted and refocused (look at the businesses related to the Crane military base).

We have easy access to education, she said. Not only do we have branches of Oakland City University and Ivy Tech Community College right in Bedford, but Indiana University and a major Ivy Tech campus are just a short drive up the road in Bloomington.

We don't have an interstate running through our front yards, but we have better highway access than many other communities.

And we have a diverse regional economy, ranging from the GM foundry in Bedford to the tourist-oriented businesses in Orange County.

Thanks to Lubbers, I drove home with a fresh perspective on Bedford and our area.

No one will mistake us for the thriving communities on the outskirts of Indianapolis. We have very real challenges — not the least of which concerns education.

But we have opportunities right in our backyard.

It's up to us to make the best of them.

Journal and Courier
New Purdue Degree Based on Skills, not Grades
Joseph Paul
June 25, 2015

The Indiana Commission for Higher Education approved last week the state's first competency-based degree program at a public college: Purdue University's Bachelor of Science in transdisciplinary studies.

The degree is part of the College of Technology's re-branding last month as the Purdue Polytechnic Institute, which aims to integrate such skills as critical thinking, problem solving and communication into traditional technical degrees. It also comes after the university announced plans last week to open a polytechnic charter high school in Indianapolis, offering a direct pipeline to the campus for inner-city students.

Such changes are an effort to "serve the needs of society and employers who are now emphasizing the need for graduates who are technically competent yet well prepared for the 21st century 'thinking' economy — where integration, innovation, and unstructured problem solving are key skills," Dean Gary Bertoline said in an ICHE news release.

Under the program, students can craft a personalized plan of study based on their interests. Students advance based on their ability to demonstrate certain capabilities rather than their grades or credit hours. Focus will shift from the traditional classroom experience to blended learning and career training, such as cooperatives and internships.

“In the midst of today’s conversations about the value of college, competency-based models are gaining attention because they shift the focus away from the time students spend in the class to the relevant skills students develop and take with them into the workplace,” Commissioner Teresa Lubbers said in the release.

Kokomo Tribune
It’s Time to Apply
Editorial Board
June 23, 2015

Indiana’s Twenty-first Century Scholars program makes a simple promise: If you avoid drugs, stay out of trouble with the law and graduate high school with at least a 2.5 grade point average, the state will pay your college tuition.

The promise is working — for those students who apply.

The Indiana Commission for Higher Education says that in 2006, 79 percent of Twenty-first Century Scholars graduated from high school, compared to 59 percent of low-income students as a whole. These students were nearly three times as likely to go to college as other students in the same income bracket.

But in 2012 just 40 percent of Hoosier students receiving free or reduced-price lunches applied for the full-tuition scholarship.
The Twenty-first Century Scholars program currently is accepting applications. The deadline is June 30 — one week from today. If your child is in the seventh or eighth grade and qualifies for assistance in paying for school meals, log onto www.scholars.in.gov/enroll and sign up.

Don’t delay.

We all want our children to stay away from drugs, focus on their studies and chase their dreams by going to college. By making a simple pledge to remain drug-free and maintaining a GPA of 2.5, Indiana will pay your child’s tuition to a state-supported college or university.

Data gathered by the Commission for Higher Education suggest our Twenty-first Century Scholars must push themselves academically and earn an honors diploma in high school. Twenty-seven percent of Howard County’s scholars who enrolled in a state-supported college in 2013 required remediation their freshman year — a 10 percent improvement in just two years. Yet, countywide, just 3 percent of our 2013 honors graduates attending a public college needed such help.

Why is this so important? The commission has found that students who take a remedial college course have just a 1 in 4 chance of graduating.

A little more than 50 percent of Howard County students received free or reduced-price school lunches in 2013, the Indiana Youth Institute reports. Our five county school districts should endeavor to ensure each one of these students enrolls in the Twenty-first Century Scholars program before they enter high school and encourage the pursuit of an honors diploma.

Bedford Times-Mail
Spreading an Education Gospel
Mike Lewis
June 19, 2015

Talking with Teresa Lubbers, you get the impression she looks at education as a necessary and constant part of life.

Like breathing.

And, like a health advocate who wants you to breathe a lot better, Lubbers spreads a gospel that Indiana can do — must do — better in terms of education.

Lubbers, a former state senator who serves as the state's commissioner of higher education, talked a lot about each Hoosier finding the "right fit" when it comes to education.
"It doesn't have to be a four-year degree for everyone," she said.

But, clearly, Indiana needs to do better in that regard. The state ranks 40th in terms of the percentage of its population with at least a bachelor's degree. "Right now we're a little over 34 percent," she said.

To raise that figure means more than providing state money, holding down tuition costs and preparing students for college through appropriate high school classes.

It means changing the culture of the state. And it means convincing Hoosiers about the value of an education, not just in terms of earning power, but in terms of the quality of their lives.

That's a pretty tall order, and the commission has a range of programs and initiatives aimed at the challenge.
In a way, Indiana's strength is helping perpetuate our weaknesses.

Unlike some other states, Indiana still has a strong base of manufacturing facilities serving as employers. In general terms, that seems a familiar constant. But in specifics, nearly everything has changed.

There was a time when people could graduate from high school one day and walk into a manufacturing job the next day. At some places, a high school diploma wasn't even necessary.
Those days are gone.

"When the whole world shifted, we probably didn't change fast enough," Lubbers said. "Manufacturing looks very different now than it used to."

Locally, people have recognized that for some time. That's why there's an advanced manufacturing certificate available through a program sponsored by the Lawrence County Economic Growth Council and some area employers.

Lubbers also echoed the findings from studies conducted by Radius Indiana and other groups.
In short, we have too many people who are qualified for low-skilled jobs and not enough who are qualified for middle-level positions. In some cases, it doesn't require a college degree to move up into a better position.

But, as higher education commissioner, Lubbers' concern focuses on the state's public colleges and universities. And she acknowledged there's a chicken-and-egg situation with regard to degrees and the economy.

It's hard to argue that a high-tech company ought to locate in Indiana when there are not enough workers to fill the jobs. But it's hard to convince Hoosiers to get high-tech degrees when there are no jobs available.

Which comes first? The answer might be both.

As a starting place, Lubbers noted that 750,000 Hoosiers have some college experience behind them, but not enough to earn a degree. The commission is starting to reach out to those folks, with the goal of having 200,000 complete their degrees by 2020.

To that end, the state's higher education commission this week announced a new degree based on a person's knowledge and skills, not time and credits.

Through Purdue University, a student can earn a bachelor's degree in transdisciplinary studies in technology. Instead of marking off credits on their way to a degree, students will have to demonstrate expertise in key areas. The degree will mix traditional classroom courses with online and blended classes. It also will incorporate work-based experiences, such as internships.
Along the way, students will have to master some pretty diverse and broad topics, from effective communication to ethical reasoning.

According to a press release from the higher education commission, graduates will be able to work in a variety of positions, such as computer analysts, project managers and web and graphic designers.

For some students, though, that program will not be the right fit.

For example, Lubbers said, many Hoosiers go through what she called "stacking" — such as turning an associate degree in nursing, say, into a bachelor's degree, then a master's. Other places, such as traditional college settings and the online Western Governor's University, might be better fits for those people.

For others, she said, the right fit might be a place close to home and work — such as the classes offered by Oakland City University and Ivy Tech Community College here in Bedford.

One thing is for certain — higher education is changing fast, and probably will keep changing.
As Lubbers left Bedford and headed back to Indianapolis, it struck me that education really is a necessary and constant part of life.

Like breathing.

WFYI
Is it possible for Hoosier students to graduate high school college and career ready?
June 30, 2015

There's been a lot of emphasis in recent years about making sure Indiana high school students are "college and career ready" upon graduation.

But is it possible to accomplish both? Or would a more accurate goal be for students to be college or career ready?

The Indiana Career Council is in the process of redesigning the high school diploma requirements for the state's public schools beginning with the class of 2022.

The goal is to make sure whatever path students choose, they are getting as high a level of academic challenge as possible.

A subcommittee of the Indiana Career Council has been working on the new requirements for about a year.

The group is being co-chaired by Commissioner for Higher Education Teresa Lubbers and Superintendent of Public Instruction Glenda Ritz.

Lubbers says the current proposal includes three diploma options-- and much of the data being used in the redesign comes from the annual College Readiness report produced by the Commission for Higher Education.

Lubbers says the data is broken down by individual schools and is intended to let high schools see where their students—and possibly their curriculum-- are falling short.

"It allows them to look at their students and see how prepared they are," says Lubbers. "And then, of course, it allows the higher education institutions to know when they're looking at students whether there needs to be special efforts to make sure they're better prepared in certain areas and how we address that in college."

Lubbers says the report does show positive trends. She says from 2012 to 2013, 77 Indiana counties saw improvements in the percentage of students who are considered college-ready.

She says most educators believe some post-secondary schooling is necessary for the majority of students—even if that isn't at a four-year college.

“What we would say at the commission is that we have a goal of 60% of Hoosiers having quality degrees or credentials beyond high school," says Lubbers. "And right now as a state we’re at 34.7% in terms of an attainment level. And that might be a one-year certificate, a workforce certificate of some sort.”

TJ Rivard is an Assistant Vice President at Indiana University East. He also sits on the committee that is redesigning high school diploma options.

“There are very few people, I think, who can parlay a high school diploma into a remunerative career,” he says.

Rivard says while some people might be able to get a job out of high school, few will have the education or skills to pursue a career.

“High school, it does what it’s supposed to do in the sense that it gives you this foundation to do something very specific eventually," says Rivard. "So whether that’s an AAS or whether that’s a certificate of some sort or whether that’s a four-year degree and eventually graduate school.”

But not everyone believes that.

Ann Marie Circle is the principal of Delphi Community High School.

“To be honest, the statistics show that a lot of the stuff that kids are going to need for their future career they may not even need to go to college,” she says.

Circle likes that the diploma redesign is putting a focus on developing a career path for students. But she says just changing the number of credits required without changing the curriculum won’t get kids ready to go into the workforce. And Circle says all of the accountability measures are geared towards college-bound students.

“They used to have a business math or they used to have more of a practical English class for kids who may have been on a different path," says Circle. "They’ve taken away all those. We’re hitting a roadblock with a lot of our kids on the Algebra 2 piece for some of those lower level kids who may go out and be able to do an agricultural career and never need that Algebra 2 component.”

Crawfordsville Community School Corporation Superintendent Scott Bowling is seeing the same issues with his students. He says economic development leaders in Montgomery County aren’t necessarily asking for college graduates to fill jobs, just skilled workers.

“I think we do need to recognize what the economy is telling us in terms of jobs and training, and I think we do need to provide those vocational resources as well," says Bowling. "And there needs to be room

for that in the high school curriculum, and when you gear everything towards the Core 40 diploma I think you're ignoring that fact."

Bowling says his district has tried to respond to that need by creating an advanced manufacturing curriculum that can prepare students either for a job right out of high school or to move on to a certification program or an associate's degree at a community college.

He says it's a balancing act, though, because vocational education must be strengthened and students who want to go to college must be getting what they need.

"We do not want students hitting a 4-year university and looking back on their high school experience and saying 'Gosh, I wish they would have prepared me better.' That cannot happen," says Bowling.

Ann Marie Circle says she has already submitted feedback about the new diplomas, but wishes there was more regular communication between the people making the decisions and those who have to implement new policies.

"I wish we'd be more proactive and have these conversations with the people on the front lines ahead of time and say 'Hey, here's what we're thinking about doing. What do you think are going to be the benefits? What would be the best way to roll this out? What are going to be the drawbacks?" says Circle.

The diploma committee is expected to make a presentation to lawmakers later this summer.

Teresa Lubbers says changes need to be finalized by December so the legislature has time to look at what changes to state law might be necessary for the new diplomas to go into effect.

StateImpact Indiana
Purdue to offer new degree based on skills, not credits
Sarah Fentem
June 29, 2015

Starting next fall, Purdue University will become the first public institution in the state to offer a degree program based on competency and not credit hours.

The Indiana Commission for Higher Education last week approved Purdue's Bachelor of Science in Transdisciplinary Studies degree, which will be offered through the school's Polytechnic Institute.

The degree is one of the state's first examples of competency-based education, or "direct assessment"— a form of learning that awards students for skills they display rather than the credit hours they receive.

“[Competency-based] programs can look different from college to college and state to state, but what they all have in common is a move away from a typical seat-time credit measurement of what students know to really a project-based demonstration of student knowledge,” says commission spokesperson Stephanie Wilson. “Instead of progressing according to the hours you spend in the classroom or the credit you earn, you progress based on the knowledge you can demonstrate and the skills you bring to the table.”

Polytechnic Institute Dean Gary Bertoline says the program can be compared to earning merit badges.

“You get a badge for lighting a fire with sticks, you can either do it or you can’t,” he says. “You can’t earn a badge until you can actually light a fire with sticks. The same idea goes with competencies.”

Students will create e-portfolios to demonstrate their competence in multiple categories, such as ethical reasoning and systems thinking.

However, a hundred years of educational institutions is difficult to unseat completely.

While it’s easier for certain distance-learning and online schools such as Western Governors University to implement competency-based programs, more traditional four-year schools are bogged down by decades’ worth of administrative conventions.

For example, most financial aid is based on grades and credit hours, and it’s difficult to find an employer that isn’t curious about a job candidate’s GPA.

The result is what Wilson and Bertoline call a “blended” approach: While the skills learned by students are the primary focus of the program, Purdue will offer a more traditional transcript alongside the e-portfolio.

Despite the difficulties that come with direct assessment degree programs, proponents say they’re invaluable for both students and potential employers.

Employers “want to see a more granular level of the knowledge a student has,” says Berlotine. A direct assessment-based model showcases more completely students’ strengths, giving employers more confidence when it comes to the hiring process.

Additionally, Wilson says the degree’s flexibility serves as a valuable asset for schools that are seeing their numbers of traditional four-year students shrink.

“We have to expand our model of what higher education looks like,” she explains, noting that there are 750 thousand “returning adult” students going to college in Indiana. “It’s not just your 18-25 year olds,

it’s not just your traditional four-year campus college experience, or four-year or even two-year degrees…It’s all kinds of needs that we have to be able to accommodate, and competency-based education is one that helps us expand that and prepare everybody.”

Two other Big Ten schools are currently offering direct assessment-based curricula.