

List of Indiana Department of Transportation (INDOT) FY 2025 Research Needs (as of May 3, 2024)

Instructions: This listing is for use by Faculty from accredited Indiana Universities. For additional information or to express an interest in a Research Need listed, please contact the JTRP Program Director at snoueldin@indot.in.gov. If expressing an interest in a Research need, attach your CV/resume to your email response.

#	Status	SPR	Focus Group	Title
1	Proposal Pending	4711	Planning, Multimodal, Finance, Asset Management and Economic Impact, PMFAME	Expansion of SPR 4711: Equity impact assessment of transportation investments in Indiana
2	Awarded	4754	Deputy Commissioners, District Deputy Commissioners and Workforce, DC, DDC & WF	Expanding SPR 4754 INDOT Research & Development Testing Assessment
3	Awarded	4811	PMFAME	Expansion-Simulating current & future EV growth scenarios in Indiana & EV Equity Assessment of EV Planning Projects
4	Approval Pending	4815	PMFAME	Expansion: Analytics of Connected Vehicle Data to Assess Electric Vehicle Charging Infrastructure Utilization
5	Approval Pending	4857	TESMO	Expansion- Statewide Screening of Signalized Intersections for Capital Improvements
6	Awarded	4863	PMGC	Development of Traffic Speed Deflectometer Program
7	Approval Pending	4865	PMFAME	INDOT Research Program Benefit Cost Analysis – Return on Investment (ROI)
8	Awarded	4866	TESMO	CN Work Zone Speed Monitoring & Enforcement
9	Proposal Pending	4900	DC, DDC & WF	Attracting and Retaining the Transportation Workforce and At Risk Targeted Areas
10	Proposal Pending	4902	Maintenance Operations, MOP	Optimizing Vegetation Management-Enhancing Precision & Efficiency in Herbicide Application for Indiana's Roadways
11	Proposal Pending	4903		Data Analytics for Fleet Management and Developing a Tool for Enhancing Fleet Warranty Management
12	Proposal Pending	4905	PMFAME	Feasibility Study on the Development of Connected and Automated Vehicle Roadmap and Strategic Plan
13	Proposal Pending	4906		Development of Indiana-Specific Trip Generation Procedures & Models of e-Commerce Demand: Implications for INDOT's Travel Demand Modeling and Investment Planning
14	Proposal Pending	4907		Systemwide Asset Condition Assessment using Connected Vehicle Data

15	Proposal Pending	4908	Pavements, Materials, Geotechnical and Construction, PMGC	Potential implications of pore solution composition of Type IL cement on the durability of concrete
16	Proposal Pending	4909		Evaluation of Superpave 5 Asphalt Mixtures with Volume of Effective Binder Specification Changes
17	Proposal Pending	4910		Review of Pavement ME Design Version 3.0
18	Proposal Pending	4911		Concrete Pavement and Bridge Deck Friction Development and Retention
19	Proposal Pending	4912		Development of Level 1 Binder Property Input for AASHTO Pavement ME Design
20	Proposal Pending	4913		Investigation of longitudinal joint sealant properties for enhanced durability of HMA pavements
21	Proposal Pending	4914		REVIEW OF INDOT STANDARD AGGREGATE GRADATION
22	Proposal Pending	4915		3D GPR Applications for Network Level Testing
23	Proposal Pending	4916		Approaches to Enhance Pavement Condition Evaluation Based on Falling Weight Deflectometer (FWD) Data
24	Proposal Pending	4917		Performance-Based Mixture Design Parameters for Superpave 5 Asphalt Mixtures
25	Proposal Pending	4918		Enhancing Pavement Instrumentation and Monitoring: A Novel Edge-First, Network Level Solution for Pavement and Roadside Sensors and Live Data Visualization
26	Proposal Pending	4919		Develop Resilient Modulus Percent Within Limits (PWL) Values for Specifying Pavement Subgrade Construction in Performance-Based Specifications
27	Proposal Pending	4920	Statewide Safety, S	Three-dimensional Visibility and Legibility Zone and Human Information Processing of Arrow Boards on Truck-Mounted Attenuator (TMA) Trucks
28	Proposal Pending	4921		Exploring Autonomous Maintenance Technologies (AMT) in INDOT Road Maintenance Activities – A Feasibility Study
29	Proposal Pending	4922	Structural, Hydraulics and Environmental, SHE	Identify Bridge Design Guidelines for Wildlife Crossings
30	Proposal Pending	4923		Development of Design Guidelines and Static Design Method for Open-Ended Pipe Piles
31	Proposal Pending	4924		Numerical modeling for assessment and evaluation of new and retrofitted bridge rails under impact loads
32	Proposal Pending	4925		A synthesis study to identify and make recommendations on the appropriate nondestructive testing tools for bridge beam ends, piers, and abutments
33	Proposal Pending	4926		Assessment of Culvert Sumping in Successfully Accomplishing IDEM Permit Requirements
34	Proposal Pending	4927		Bridge Data Virtual Validator

35	Proposal Pending	4928	Traffic Engineering, Safety, Management & Operations, TESMO	Connected Vehicle Trajectory Data to Evaluate Entire Network Speeds and Hard Braking for Network Arterials Screening and Update Signal and Stop Controlled Performance Measures
36	Proposal Pending	4929		Deployment of LiDAR Based Detection Sensors at Road Intersections for Improved Pedestrian & Traffic Monitoring
37	Proposal Pending	4930		Anomalies in Traffic Patterns: Further Refinement and Integrated Platform for INDOT Traffic Management and Safety Toolset
38	Proposal Pending	4931		Utilizing Emergency Management Audio Messages for Traffic Incident Management Performance Measures
39	Proposal Pending	4932		Portable Driving Simulation Platform for Innovative Intersections
40	Proposal Pending	4933		Assessment of Automated Work Site Speed Enforcement Program
41	Proposal Pending	4934		RAMPCAST Phase II: CONNECTED VEHICLES TRAFFIC MANAGEMENT APPLICATION ON INDIANA HIGHWAYS
42	Proposal Pending	4935		Orange Contrast Markings in Work Zones
43	Proposal Pending	4936		Automated Characterization of Lane Markings and Road Surface Condition using Mobile LiDAR Data
44	Proposal Pending	4937		Enhanced Traffic Pattern Knowledge Abstraction and Presentation from 511 Database
45	Proposal Pending	4938	MOP	Cost Effectiveness of Weed Control Under Fixed Objects (Guardrail, Cable Barrier, etc.)
46	Under Consideration	Tier 2	MOP	Synthesis Study on Bridge Sensors:
47	Under Consideration	Tier 2		A Deep Dive into Optimized Vehicle Parts Inventory Management
48	Under Consideration	Tier 2		Enhancing Precision in Salt Application: A Comprehensive Approach to Prescription Map Generation
49	Under Consideration	Tier 2		Large Scale Demonstration Pavement Joint Repair Demonstration Project (Using Infrared Heating)
50	Under Consideration	Tier 2		Leveraging EV Chargers & New Technology to Raise Pavement Temperatures (Prevent Ice Pavement Bond)
51	Under Consideration	Tier 2		Install Bridges Sensors to Assist with Earthquake Recovery & Inspection Prioritization
52	Under Consideration	Tier 2	PMGC	EVALUATION OF INDIANA'S WARM MIX ASPHALT
53	Under Consideration	Tier 2		Study of Potential Implementation of the Off-Spec Coal Ashes in Production of Precast Concrete Elements
54	Under Consideration	Tier 2		Synthesis Study: Comparison of Steel and Polypropylene Fibers

55	Under Consideration	Tier 2	PMGC	Development of Design Methodology and Guide Specification for Stemmed Precast Modular Retaining Wall Systems
56	Not approved for funding	Tier 2		Alternative Methods for Stabilizing High Sulfate Content Subgrade Soils
57	Not approved for funding	Tier 2		Chemical Re-treatment of Pavement Subgrades
58	Not approved for funding	Tier 2		AI-based Approach to Mine Inspection Knowledge - ChatGPT-like System for Inspection Details are in the attached file.
59	Not approved for funding	Tier 2		Video Analytics for Construction Management
60	Under Consideration	Tier 2		Review of HMA pavement cracks for implementing AASHTO Pavement ME Design V. 2.6
61	Under Consideration	Tier 2		Understanding of HMA QA measurements based on pavement performance.
62	Under Consideration	Tier 2		SPR-4714 Implementation Phase: Developing a Web-Based Interface for Implementing Machine Learning-Based Resilient Modulus Prediction Models
63	Under Consideration	Tier 2		3D GPR for pavement condition assessment and construction inspection.
64	Under Consideration	Tier 2		Autonomous Robotic Assisted Pavement Crack Detection using Domain Adaptive Deep Learning
65	Under Consideration	Tier 2		An Automated and Adaptive Pavement Maintenance System Enabled by Data Fusion and Machine Learning
66	Under Consideration	Tier 2		Integrated Approach to Enhance Pavement Testing (FWD) and Data Analysis for INDOT
67	Under Consideration	Tier 2		Smartphone-Based Road Roughness Measurement
68	Under Consideration	Tier 2		Environmentally-induced Cracking Mitigation in Asphalt Pavements using Phase Change Materials
69	Under Consideration	Tier 2		Synthesis study on the use of surface treatments for concrete pavements to enhance durability and sustainability
70	Under Consideration	Tier 2		"AI-Enhanced Optimization Tool for High-Performance and Cost-Efficient Concrete Mix Design"
71	Under Consideration	Tier 2		Guidelines for Developing MSE Wall Geometric Design Constraints
72	Under Consideration	Tier 2		Development of Compaction QA/QC Based on the DCPT
73	Under Consideration	Tier 2		Advancing Geotechnical Safety: Real-Time Monitoring and Predictive Maintenance with Fiber Optic Technology
74	Under Consideration	Tier 2		Development of INDOT Geotechnical Infrastructure Database
75	Under Consideration	Tier 2		Risk Assessment of Geotechnical Assets along the Transportation Network using InSAR
76	Under Consideration	Tier 2		Implementation of Geotextiles in Soil Compaction Around Utility Lines
77	Under Consideration	Tier 2		Evaluating Backfill Compaction for Pipeline during Road Construction

78	Under Consideration	Tier 2	PMGC	Bayesian-based Calibration of Region-Specific Resistance Factors for LRFD-based Design of Deep Foundation in Indiana
79	Under Consideration	Tier 2		Impact of Climate Change on the Resilience of Treated Subgrades
80	Under Consideration	Tier 2		Construction Inspection List Based on Short-term and Long-term Performance. Details in the attached file.
81	Under Consideration	Tier 2		Extended Reality (XR) for Enhanced Construction Site Management
82	Under Consideration	Tier 2		Evaluation of XR and Laser Projection for Automated Construction Inspection
83	Under Consideration	Tier 2	SHE	Assess Measurement While Drilling (MWD) Techniques for Geotechnical Investigations
84	Under Consideration	Tier 2		Effective Bridge Component Inspection Using Advanced Computer Vision and Visualization Tools
85	Under Consideration	Tier 2		Bridge Inspection Training Using Virtual Reality Simulation of Field Conditions
86	Under Consideration	Tier 2		1. Synthesis Study: Comparison of Steel and Polypropylene Fibers
87	Under Consideration	Tier 2		2. Hybrid Reinforcing System with Steel Fibers and Mild Steel Bars in Concrete Members
88	Under Consideration	Tier 2		Harnessing NEXRAD Data to Inform the Design of Flood-Resilient Bridges
89	Under Consideration	Tier 2		BRR Bridge Model Visualization
90	Under Consideration	Tier 2		Geothermal Solutions for Winter Safety: Innovating Bridge Deicing solutions
91	Under Consideration	Tier 2		Bayesian-based Calibration of Region-Specific Resistance Factors for LRFD-based Design of Deep Foundation in Indiana
92	Under Consideration	Tier 2		A Synthesis Study on how INDOT can take Advantage on the use of CFRP in Prestressed Concrete Beams and Reinforced Concrete Decks
93	Under Consideration	Tier 2		Digitizing Bridge Design Work Flow and Processes for Efficiency
94	Under Consideration	Tier 2		Using AI for Bulk Documents Review and Virtual Data Validator
95	Under Consideration	Tier 2		Taking Advantage of 3D Van Bridge Deck Cracks Data for Bridge Condition Assessment and for Maintenance Planning
96	Under Consideration	Tier 2		Direct CPT Interpretation Method for Pile Design using Artificial Intelligence
97	Under Consideration	Tier 2		Health Monitoring of Bridges and their Foundations in Indiana

98	Under Consideration	Tier 2	SHE	Non-destructive Methods to Determine the Geometry of Unknown Foundations
99	Under Consideration	Tier 2		Development of Pile Driving Analysis and Static Design Method for Open-Ended Pipe Piles
100	Under Consideration	Tier 2		Identification of Risks and Prediction of Vibration from Pile Driving Operations
101	Under Consideration	Tier 2		Using spread footing for MSE Walls
102	Under Consideration	Tier 2		ISO 14001 Training and Implementation for INDOT
103	Under Consideration	Tier 2	TESMO	Integration of Whelen Telematics into Dashboards and INDOT Cloud
104	Under Consideration	Tier 2		Rainfall Intensity vs Driving Speed
105	Under Consideration	Tier 2		Feasibility of Human-Centered Mobile Mapping System (MMS) on Personal Electric Vehicle (PEV) for sidewalk mapping
106	Under Consideration	Tier 2		Development of a Low-Cost Mobile-Pack LiDAR for Signage Inventory and Visibility Analysis
107	Under Consideration	Tier 2		Best Practices of Using Renewable Energy for Highway Lighting Systems and Beyond
108	Under Consideration	Tier 2		Workzone Interstate Lane Capacities
109	Under Consideration	Tier 2		Establishment and Update of Statewide Precision Road Database for Autonomous Driving
110	Under Consideration	Tier 2		Accurate Positioning for Autonomous Driving
111	Under Consideration	Tier 2		Multi Source Data Integration for High-Definition Mapping In this proposed work we are going to enhance and update current Indiana road maps by integrating them with current publicly available road data as well as traffic data to establish a high quality statewide road database to support ongoing and future autonomous driving.
112	Under Consideration	Tier 2		Investigating and Mitigating Cantilevered Sign Support Collapse in Indiana's Road Infrastructure
113	Under Consideration	Tier 2		TScan Implementation to INDOT Practice
114	Under Consideration	Tier 2		Evaluating Feasibility of Augmenting Indiana Friction Testing Program with CV Data
115	Under Consideration	Tier 2		Update of INDOT CRF Tables
116	Under Consideration	Tier 2		Developing Safety Performance Functions and Crash Frequency Values for Indiana for the Crash Experience Signal Warrant
117	Under Consideration	Tier 2		Traffic Accident Response and Management: Leveraging UAV Systems for Rapid Assessment and Relief

118	Under Consideration	Tier 2	TESMO	Assessing safety in use of advanced driver-assisted system (ADAS) features when approaching work zones
119	Under Consideration	Tier 2		A Cost-Effective, Non-Invasive Camera System for Anomaly Detection of Equipment Operators (Submitted to TESMO)
120	Under Consideration	Tier 2		Best Practices of Using Renewable Energy for Highway Lighting Systems and Beyond (updated file)
121	Under Consideration	Tier 2		Leveraging CV Data to Develop Truck Parking Metrics to Assess Impact of New Facilities and Prioritize Future Investments
122	Under Consideration	Tier 2		Enhancing Bridge Safety through Thermal Imaging for Frost and Ice Detection
123	Not approved for funding	Tier 3	DDC & WF	Transportation Equity Toolkit Training for INDOT Staff
124	Not approved for funding	Tier 3	MOP	Multi-Function Units for Snow and Ice Response
125	Not approved for funding	Tier 3		Snow Fence Placement Tool
126	Not approved for funding	Tier 3		Porting of Heatmaps to INDOT Cloud
127	Not approved for funding	Tier 3		A Tool for Enhanced Fleet Warranty Management
128	Not approved for funding	Tier 3	PMFAME	Understanding Hoosiers' Attitudes towards and Use of E-commerce: Implications for INDOT's Travel Demand Modeling and Investment Planning
129	Not approved for funding	Tier 3		Right-Sizing Public Charging Station Capacity Considering the Effects on the Power Grid in Indiana
130	Not approved for funding	Tier 3		Considering Equity in Future Transportation Electrification Projects
131	Not approved for funding	Tier 3		An AI-Driven Conversational Agent for Efficient Transportation Planning
132	Not approved for funding	Tier 3		Assessing Essential Transportation Services During COVID-19 to Inform Equitable Transportation Resilience Planning
133	Not approved for funding	Tier 3		The Impact of Motorization Trends on Roadway and Bridge Funding
134	Not approved for funding	Tier 3		Improving Resilience of Indiana's Transportation Systems to Rising Temperatures
135	Not approved for funding	Tier 3		Emission Hotspot Estimation for Sustainable Transportation Planning
136	Not approved for funding	Tier 3		Freight Mobility Trends using Innovative Data Sources
137	Not approved for funding	Tier 3		Autonomous Inspection of Small and Narrow Culvert Systems
138	Not approved for funding	Tier 3		Smart Remote Inspection Rover for Culvert Inspections
139	Not approved for funding	Tier 3		Investigation of RTK-assisted Smartphones as a Cost-Effective Asset Management Tool
140	Not approved for funding	Tier 3		Drone Applications to Improve Multimodal Facilities Operations

141	Not approved for funding	Tier 3	PMFAME	Exploring the synergies between dynamic wireless power transfer (DWPT) and connected & autonomous driving technologies.
142	Not approved for funding	Tier 3		Feasibility Study and Economic Impact Assessment of High-Occupancy Vehicle Facilities on Indiana Highways
143	Not approved for funding	Tier 3		Analytics of Connected Vehicle Data To Assess Electric Vehicle Charging Infrastructure Utilization
144	Not approved for funding	Tier 3		AI-based Asset Management for Indiana's Transportation Infrastructure
145	Not approved for funding	Tier 3		SPR 4811 Expansion: Integrating Electric Vehicle Charging Stations into Indiana's Grid: Assessing Capacity and Planning for Future Expansion
146	Not approved for funding	Tier 3		Optimizing the investments on resilience enhancement interventions for the Indiana highways system against multiple hazards
147	Not approved for funding	Tier 3		Optimizing the investments in highway designs considering uncertain future mobility patterns and technological development
148	Not approved for funding	Tier 3		Advancing Electric Vehicle Charging Infrastructure: A Comprehensive Review of Charging Provision Technologies and Strategies
149	Not approved for funding	Tier 3	S	PREVENTING THERMAL STRESS AMONG WORKERS
150	Not approved for funding	Tier 3		Noise/Vibration Pollution Monitoring Dummy for Hearing Safety at Construction Sites
151	Not approved for funding	Tier 3		A Cost-Effective, Non-Invasive Camera System for Anomaly Detection of Equipment Operators
152	Not approved for funding	Tier 3	SHE	Field Implementation of Sandwich Panel Repair Method for Corroded Steel Girder Ends