

List of Indiana Department of Transportation (INDOT) FY 2025 Research Needs (as of March 1, 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 snoureldin@indot.in.gov. If expressing an interest in a Research need, attach your CV/resume to your email response.

#	Status	SPR	Focus Group	Working Title
1	Under Consideration	4900	Deputy Commissioners, District Deputy Commissioners and Workforce, DC, DDC & WF	Attracting and Retaining the Transportation Planning Workforce
2	Under Consideration	4901		Transportation Equity Toolkit Training for INDOT Staff
3	Under Consideration	4902	Maintenance Operations, MOP	Optimizing Vegetation Management: Enhancing Precision and Efficiency in Herbicide Application for Indiana's Roadways
4	Under Consideration	4903		Data Analytics for Fleet Management
5	Under Consideration	4904		A Tool for Enhanced Fleet Warranty Management
6	Under Consideration	4905	Planning, Multimodal, Finance, Asset Management and Economic Impact, PMFAME	Feasibility Study on the Development of Indiana's Connected and Automated Vehicle Roadmap and Strategic Plan
7	Under Consideration	4906		Development of Indiana-Specific Trip Generation Procedures and Models and Understanding Hoosiers' Attitudes towards and Use of E-commerce: Implications for INDOT's Travel Demand Modeling and Investment Planning
8	Under Consideration	4815		SPR 4815 Expansion: Analytics of Connected Vehicle Data to Assess Electric Vehicle Charging Infrastructure Utilization & Assessment of Smart EV Charging Fee Schedules for Indiana Highways: Impacts on Revenue and Congestion
9	Under Consideration	4907		Systemwide Asset Condition Assessment using Connected Vehicle Data
10	Under Consideration	4711		SPR 4711 Expansion Data-Driven Equity Assessment (including EV & Road Electrification) for Transportation Investments: An Accessibility and Environmental Justice Approach

11	Under Consideration	4908	Pavements, Materials, Geotechnical and Construction, PMGC	Potential implications of pore solution composition of Type IL cement on the durability of concrete
12	Under Consideration	4909		Evaluation of Superpave 5 Asphalt Mixtures with Volume of Effective Binder Specification Changes
13	Under Consideration	4910		Review of Pavement Design Pavement ME version 3.0
14	Under Consideration	4911		Concrete Pavement and Bridge Deck Friction Development and Retention. Optimize materials, design, and construction strategies for long term pavement friction performance on INDOT interstates and other heavy-duty routes
15	Under Consideration	4912		DEVELOPMENT OF LEVEL 1 BINDER PROPERTY INPUT FOR AASHTO PAVEMENT ME DESIGN
16	Under Consideration	4913		Investigation of longitudinal joint sealant properties for enhanced durability of HMA pavement
17	Under Consideration	4914		Review of INDOT Standard Aggregate Gradation
18	Under Consideration	4915		3D GPR Applications for Network Level Testing
19	Under Consideration	4916		Approaches to Enhance Pavement Condition Evaluation Based on Falling Weight Deflectometer (FWD) Data
20	Under Consideration	4917		Performance Based Mixture Design Parameters for Superpave 5 Asphalt Mixtures
21	Under Consideration	4918		Enhancing Pavement Instrumentation and Monitoring: A Novel Edge-First, Network Level Solution for Pavement and Roadside Sensors and Live Data Visualization
22	Under Consideration	4919		Develop Resilient Modulus Percent Within Limits (PWL) Values for Specifying Pavement Subgrade Construction in Performance-Based Specifications
23	Under Consideration	4920	Safety, S	Three-dimensional Visibility Zone and Human Information Processing of Portable Changeable Message Sign (PCMS)
24	Under Consideration	4921		Exploring Autonomous Maintenance Technologies (AMT) in INDOT Road Maintenance Activities – A Feasibility Study

25	Under Consideration	4922	Structural, Hydraulics and Environmental, SHE	Identifying Bridge Design Guidelines for Wildlife Crossings
26	Under Consideration	4923		Development of Design Guidelines and Static Design Method for Open-Ended Pipe Piles
27	Under Consideration	4924		Numerical modeling as a tool to assess the performance of new and retrofitted bridge rails under impact loads
28	Under Consideration	4925		A synthesis study to identify and make recommendations on the appropriate nondestructive testing tools for bridge beam ends, piers, abutments
29	Under Consideration	4926		Statistically compile sediment results of culvert structures.
30	Under Consideration	4927		Bridge Data Virtual Validator
31	Under Consideration	4928	Traffic Engineering, Safety, Management & Operations, TESMO	Connected Vehicle Trajectory Data to Evaluate Entire Network Speeds and for Network Arterials Screening Tools
32	Under Consideration	4929		Deployment of LiDAR Based Detection Sensors at Road Intersections for Improved Pedestrian & Traffic Monitoring
33	Under Consideration	4930		Anomalies in Traffic Patterns: Further Refinement and Integrated platform for INDOT traffic management and safety toolset
34	Under Consideration	4931		Utilizing Emergency Management Audio Messages for Traffic Incident Management Performance Measures
35	Under Consideration	4932		Digital Twin Simulation for Human-in-the-Loop Driver Training at Continuous-Flow Intersections (Submitted to TESMO)
36	Under Consideration	4933		Assessment of Automated Work Site Speed Enforcement Program
37	Under Consideration	4934		RAMPCAST Phase II: CONNECTED VEHICLES TRAFFIC MANAGEMENT APPLICATION ON INDIANA HIGHWAYS
38	Under Consideration	4935		Orange Contrast Markings in Work zones
39	Under Consideration	4936		Automated Classification of Lane Markings and Evaluation of Road Surface Condition using Mobile LiDAR Data
40	Under Consideration	4937		Enhanced Traffic Pattern Knowledge Abstraction and Presentation from 511 Database

41	Under Consideration	Tier 3	MOP	Synthesis Study on Bridge Sensors:
42	Under Consideration	Tier 3		A Deep Dive into Optimized Vehicle Parts Inventory Management
43	Under Consideration	Tier 3		Enhancing Precision in Salt Application: A Comprehensive Approach to Prescription Map Generation
44	Under Consideration	Tier 3		Large Scale Demonstration Pavement Joint Repair Demonstration Project (Using Infrared Heating)
45	Under Consideration	Tier 3		Leveraging EV Chargers & New Technology to Raise Pavement Temperatures (Prevent Ice Pavement Bond)
46	Under Consideration	Tier 3		Install Bridges Sensors to Assist with Earthquake Recovery & Inspection Prioritization
47	Under Consideration	Tier 3	PMFAME	Exploring the synergies between dynamic wireless power transfer (DWPT) and connected & autonomous driving technologies.
48	Under Consideration	Tier 3	PMGC	EVALUATION OF INDIANA'S WARM MIX ASPHALT
49	Under Consideration	Tier 3		Study of Potential Implementation of the Off-Spec Coal Ashes in Production of Precast Concrete Elements
50	Under Consideration	Tier 3		Synthesis Study: Comparison of Steel and Polypropylene Fibers
51	Under Consideration	Tier 3		Development of Design Methodology and Guide Specification for Stemmed Precast Modular Retaining Wall Systems
52	Not approved for funding	Tier 3		Alternative Methods for Stabilizing High Sulfate Content Subgrade Soils
53	Not approved for funding	Tier 3		Chemical Re-treatment of Pavement Subgrades
54	Not approved for funding	Tier 3		AI-based Approach to Mine Inspection Knowledge - ChatGPT-like System for Inspection Details are in the attached file.
55	Not approved for funding	Tier 3		Video Analytics for Construction Management
56	Under Consideration	Tier 3		Review of HMA pavement cracks for implementing AASHTO Pavement ME Design V. 2.6
57	Under Consideration	Tier 3		Understanding of HMA QA measurements based on pavement performance.
58	Under Consideration	Tier 3		SPR-4714 Implementation Phase: Developing a Web-Based Interface for Implementing Machine Learning-Based Resilient Modulus Prediction Models

59	Under Consideration	Tier 3	PMGC	3D GPR for pavement condition assessment and construction inspection.
60	Under Consideration	Tier 3		Autonomous Robotic Assisted Pavement Crack Detection using Domain Adaptive Deep Learning
61	Under Consideration	Tier 3		An Automated and Adaptive Pavement Maintenance System Enabled by Data Fusion and Machine Learning
62	Under Consideration	Tier 3		Integrated Approach to Enhance Pavement Testing (FWD) and Data Analysis for INDOT
63	Under Consideration	Tier 3		Smartphone-Based Road Roughness Measurement
64	Under Consideration	Tier 3		Environmentally induced Cracking Mitigation in Asphalt Pavements using Phase Change Materials
65	Under Consideration	Tier 3		Synthesis study on the use of surface treatments for concrete pavements to enhance durability and sustainability
66	Under Consideration	Tier 3		"AI-Enhanced Optimization Tool for High-Performance and Cost-Efficient Concrete Mix Design"
67	Under Consideration	Tier 3		Guidelines for Developing MSE Wall Geometric Design Constraints
68	Under Consideration	Tier 3		Development of Compaction QA/QC Based on the DCPT
69	Under Consideration	Tier 3		Advancing Geotechnical Safety: Real-Time Monitoring and Predictive Maintenance with Fiber Optic Sensor Technology
70	Under Consideration	Tier 3		Development of INDOT Geotechnical Infrastructure Database
71	Under Consideration	Tier 3		Risk Assessment of Geotechnical Assets along the Transportation Network using InSAR
72	Under Consideration	Tier 3		Implementation of Geotextiles in Soil Compaction Around Utility Lines
73	Under Consideration	Tier 3		Evaluating Backfill Compaction for Pipeline during Road Construction
74	Under Consideration	Tier 3		Bayesian-based Calibration of Region-Specific Resistance Factors for LRFD-based Design of Deep Foundation in Indiana
75	Under Consideration	Tier 3		Impact of Climate Change on the Resilience of Treated Subgrades
76	Under Consideration	Tier 3		Construction Inspection List Based on Short-term and Long-term Performance. Details in the attached file.
77	Under Consideration	Tier 3		Extended Reality (XR) for Enhanced Construction Site Management
78	Under Consideration	Tier 3		Evaluation of XR and Laser Projection for Automated Construction Inspection

79	Under Consideration	Tier 3	SHE	Assess Measurement While Drilling (MWD) Techniques for Geotechnical Investigations
80	Under Consideration	Tier 3		Effective Bridge Component Inspection Using Advanced Computer Vision and Visualization Tools
81	Under Consideration	Tier 3		Bridge Inspection Training Using Virtual Reality Simulation of Field Conditions
82	Under Consideration	Tier 3		1. Synthesis Study: Comparison of Steel and Polypropylene Fibers
83	Under Consideration	Tier 3		2. Hybrid Reinforcing System with Steel Fibers and Mild Steel Bars in Concrete Members
84	Under Consideration	Tier 3		Harnessing NEXRAD Data to Inform the Design of Flood-Resilient Bridges
85	Under Consideration	Tier 3		BRR Bridge Model Visualization
86	Under Consideration	Tier 3		Geothermal Solutions for Winter Safety: Innovating Bridge Deicing solutions
87	Under Consideration	Tier 3		Bayesian-based Calibration of Region-Specific Resistance Factors for LRFD-based Design of Deep Foundation in Indiana
88	Under Consideration	Tier 3		A Synthesis Study on how INDOT can take Advantage on the use of CFRP in Prestressed Concrete Beams and Reinforced Concrete Decks
89	Under Consideration	Tier 3		Digitizing Bridge Design Work Flow and Processes for Efficiency
90	Under Consideration	Tier 3		Using AI for Bulk Documents Review and Virtual Data Validator
91	Under Consideration	Tier 3		Taking Advantage of 3D Van Bridge Deck Cracks Data for Bridge Condition Assessment and for Maintenance Planning
92	Under Consideration	Tier 3		Direct CPT Interpretation Method for Pile Design using Artificial Intelligence
93	Under Consideration	Tier 3		Health Monitoring of Bridges and their Foundations in Indiana
94	Under Consideration	Tier 3		Non-destructive Methods to Determine the Geometry of Unknown Foundations
95	Under Consideration	Tier 3		Development of Pile Driving Analysis and Static Design Method for Open-Ended Pipe Piles
96	Under Consideration	Tier 3		Identification of Risks and Prediction of Vibration from Pile Driving Operations
97	Under Consideration	Tier 3		Using spread footing for MSE Walls
98	Under Consideration	Tier 3		ISO 14001 Training and Implementation for INDOT

99	Under Consideration	Tier 3	TESMO	Integration of Whelen Telematics into Dashboards and INDOT Cloud
100	Under Consideration	Tier 3		Rainfall Intensity vs Driving Speed
101	Under Consideration	Tier 3		Feasibility of Human-Centered Mobile Mapping System (MMS) on Personal Electric Vehicle (PEV) for sidewalk mapping
102	Under Consideration	Tier 3		Development of a Low-Cost Mobile-Pack LiDAR for Signage Inventory and Visibility Analysis
103	Under Consideration	Tier 3		Best Practices of Using Renewable Energy for Highway Lighting Systems and Beyond
104	Under Consideration	Tier 3		Work zone Interstate Lane Capacities
105	Under Consideration	Tier 3		Establishment and Update of Statewide Precision Road Database for Autonomous Driving
106	Under Consideration	Tier 3		Accurate Positioning for Autonomous Driving
107	Under Consideration	Tier 3		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.
108	Under Consideration	Tier 3		Investigating and Mitigating Cantilevered Sign Support Collapse in Indiana's Road Infrastructure
109	Under Consideration	Tier 3		TScan Implementation to INDOT Practice
110	Under Consideration	Tier 3		Evaluating Feasibility of Augmenting Indiana Friction Testing Program with CV Data
111	Under Consideration	Tier 3		Update of INDOT CRF Tables
112	Under Consideration	Tier 3		Developing Safety Performance Functions and Crash Frequency Values for Indiana for the Crash Experience Signal Warrant
113	Under Consideration	Tier 3		Traffic Accident Response and Management: Leveraging UAV Systems for Rapid Assessment and Relief
114	Under Consideration	Tier 3		Assessing safety in use of advanced driver-assisted system (ADAS) features when approaching work zones
115	Under Consideration	Tier 3		A Cost-Effective, Non-Invasive Camera System for Anomaly Detection of Equipment Operators (Submitted to TESMO)
116	Under Consideration	Tier 3		Best Practices of Using Renewable Energy for Highway Lighting Systems and Beyond (updated file)
117	Under Consideration	Tier 3		Leveraging CV Data to Develop Truck Parking Metrics to Assess Impact of New Facilities and Prioritize Future Investments
118	Under Consideration	Tier 3		Enhancing Bridge Safety through Thermal Imaging for Frost and Ice Detection

119	Not approved for funding	Tier 4	MOP	Multi-Function Units for Snow and Ice Response
120	Not approved for funding	Tier 4		Snow Fence Placement Tool
121	Not approved for funding	Tier 4		Porting of Heatmaps to INDOT Cloud
122	Not approved for funding	Tier 4	PMFAME	Understanding Hoosiers' Attitudes towards and Use of E-commerce: Implications for INDOT's Travel Demand Modeling and Investment Planning
123	Not approved for funding	Tier 4		Right-Sizing Public Charging Station Capacity Considering the Effects on the Power Grid in Indiana
124	Not approved for funding	Tier 4		Considering Equity in Future Transportation Electrification Projects
125	Not approved for funding	Tier 4		An AI-Driven Conversational Agent for Efficient Transportation Planning
126	Not approved for funding	Tier 4		Assessing Essential Transportation Services During COVID-19 to Inform Equitable Transportation Resilience Planning
127	Not approved for funding	Tier 4		The Impact of Motorization Trends on Roadway and Bridge Funding
128	Not approved for funding	Tier 4		Improving Resilience of Indiana's Transportation Systems to Rising Temperatures
129	Not approved for funding	Tier 4		Emission Hotspot Estimation for Sustainable Transportation Planning
130	Not approved for funding	Tier 4		Freight Mobility Trends using Innovative Data Sources
131	Not approved for funding	Tier 4		Autonomous Inspection of Small and Narrow Culvert Systems
132	Not approved for funding	Tier 4		Smart Remote Inspection Rover for Culvert Inspections
133	Not approved for funding	Tier 4		Investigation of RTK-assisted Smartphones as a Cost-Effective Asset Management Tool
134	Not approved for funding	Tier 4		Drone Applications to Improve Multimodal Facilities Operations
135	Not approved for funding	Tier 4		Feasibility Study and Economic Impact Assessment of High-Occupancy Vehicle Facilities on Indiana Highways
136	Not approved for funding	Tier 4		Analytics of Connected Vehicle Data To Assess Electric Vehicle Charging Infrastructure Utilization
137	Not approved for funding	Tier 4		AI-based Asset Management for Indiana's Transportation Infrastructure
138	Not approved for funding	Tier 4		SPR 4811 Expansion: Integrating Electric Vehicle Charging Stations into Indiana's Grid: Assessing Capacity and Planning for Future Expansion
139	Not approved for funding	Tier 4		Optimizing the investments on resilience enhancement interventions for the Indiana highways system against multiple hazards
140	Not approved for funding	Tier 4		Optimizing the investments in highway designs considering uncertain future mobility patterns and technological development
141	Not approved for funding	Tier 4		Advancing Electric Vehicle Charging Infrastructure: A Comprehensive Review of Charging Provision Technologies and Strategies

142	Not approved for funding	Tier 4	S	PREVENTING THERMAL STRESS AMONG WORKERS
143	Not approved for funding	Tier 4		Noise/Vibration Pollution Monitoring Dummy for Hearing Safety at Construction Sites
144	Not approved for funding	Tier 4		A Cost-Effective, Non-Invasive Camera System for Anomaly Detection of Equipment Operators