

## List of Indiana Department of Transportation (INDOT) FY 2022 Research Needs (as of June 4, 2021)

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 [snourelidin@indot.in.gov](mailto:snourelidin@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	Approval Pending	4253	PMGC	3Dimensional Laser Pavement Condition Survey Maintenance (Expansion)
2	Awarded	4532	SHE	Long-term durability of fire damaged and repaired bridges in Indiana
3	Awarded	4600	DDC	Impacts to Traffic Behavior from Queue Warning Truck - Current Pilot Project
4	Proposal Pending	4601	DDC	Field Handbook for Maintenance and Preservation Treatments of Concrete Pavements
5	Proposal Pending	4603	MOP	Crowdsourcing/Winter Operations Dashboard Upgrade
6	Proposal Pending	4604	MOP	Demonstration of Infrared Heating System for High-Volume Roadway HMA Patching in Cold Weather
7	Proposal Pending	4605	MOP	Automated Record Keeping for Maintenance Operations via Tracking of Maintenance Vehicles using Telematics Tracks
8	Proposal Pending	4606	PMFAME	Economic Analysis, Route Selection and Incentives for Permitting of Divisible Loads
9	Proposal Pending	4607	PMFAME	Full-scale Dynamic Wireless Power Transfer and Pilot Project Implementation
10	Proposal Pending	4608	PMFAME	Forecasting shifts in Hoosiers' travel demand and behavior
11	Proposal Pending	4609	PMFAME	Economic Effect of Active Transportation Features and Association of Health and Transportation
12	Proposal Pending	4610	PMFAME	Crawfordsville Technical Services Asset Management Work Flow Improvement Project
13	Proposal Pending	4615	PMGC	I-69 Added Travel Lanes Data Collection and Analysis
14	Proposal Pending	4616	PMGC	GIS based Geotechnical Database for Collaborative GIS
15	Proposal Pending	4617	PMGC	Evaluating Zero Speed Inertial Profiler for Utilization for Pavement Smoothness Testing in Urban Areas and the Evaluation of the ProVaL Rolling Straight Edge Simulation
16	Proposal Pending	4619	PMGC	Backcalculated Dynamic Modulus Mastercurve from the Time Histories of Falling Weight Deflectometer Surface Deflections
17	Proposal Pending	4620	PMGC	Developing AI-assisted In-situ NDT Method for Air-Void Distribution Testing in Fresh and Hardened Concrete (4620)

18	Proposal Pending	4622	PMGC	Integration of BIM for bridge modeling
19	Proposal Pending	4623	PMGC	Improved Light Weight Deflectometer Test (LWD) and Analysis (4623)
20	Proposal Pending	4625	PMGC	BIM standards for roads and related transportation assets
21	Proposal Pending	4628	S	Exploration of color patterns for improving work zone safety and perception
22	Proposal Pending	4629	S	Implementation and Assessment of Work Zone Intrusion Technologies
23	Proposal Pending	4630	S	Implementation Exploration of Autonomous Vehicles: Impacts of ATMA on INDOT roadway construction/maintenance crews' behavior, utilization, productivity, and safety 4630
24	Proposal Pending	4631	SHE	Evaluation of the Potential Benefits of Implementing the AASHTO Guide Specifications for the Analysis and Identification of Fracture Critical Members and System Redundant Members
25	Proposal Pending	4632	SHE	Steel Bridge Coating Evaluation and Rating Criteria
26	Proposal Pending	4634	SHE	Bridge Inspection Training Using Virtual Reality Simulation of Field Conditions
27	Proposal Pending	4635	SHE	New Repair Strategies for Cost Effective Repair of Corroded Steel Girder Bridges 4635
28	Awarded	4636	TESMO	Research Support to INDOT on I-465 Southeast Variable Speed Limit and Ramp Meter Project
29	Approval Pending	4637	TESMO	Speed Enforcement in Work Zones and Synthesis on Cost-Benefit Assessment of Installing Speed Enforcement Cameras on INDOT Road Network
30	Proposal Pending	4638	TESMO	Integration of the lane-specific traffic data generated from real-time CCTV videos into INDOT's traffic management system
31	Proposal Pending	4639	TESMO	Connected Vehicle Centric Dashboards for TMC of the Future
32	Proposal Pending	4640	TESMO	Geometric Constraints and Visual Field Related to Speed Management 4640
33	Proposal Pending	4642	TESMO	Effectiveness of Contrast Markings on Roadways and Orange Markings in Work Zones (4642)
34	Proposal Pending	4646	PMGC	Advancing INDOT's Friction Test Program for Seamless Coverage of System
35	Under Consideration	Tier 2	DDC	Review of Slope Stability Monitoring Practices (4602)
36	Under Consideration	Tier 2	PMFAME	Timing of Emerging Vehicle and Other Transportation Technologies and Rational Corrections to INDOT's Planning Practices and Models (4611)
37	Under Consideration	Tier 2	PMGC	Characterizing Asphalt Materials and Their Aging Properties using a Molecular Sensing Method (4621)
38	Under Consideration	Tier 2	PMGC	Automated Pavement Core Sample Analysis (4624)
39	Under Consideration	Tier 2	PMGC	Enhanced Methods to Evaluate Interface Bonding Conditions Using Falling Weight Deflectometer and 3D Ground Penetrating Radar (4626)

40	Under Consideration	Tier 2	PMGC	Life Cycle Cost Analysis (LCCA) of Flexible Pavement Longitudinal Joint Treatments (4627)
41	Under Consideration	Tier 2	TESMO	A Study of Suburban Arterial Safety Performance Based on Median Type (4641)
42	Under Consideration	Tier 2	TESMO	Driving Experience Related to Traffic Safety (4643)
43	Under Consideration	Tier 2	TESMO	RampCast: Traffic management Geocast Study with 5G Cellular V2X (C-V2X) Connected Cars on Indiana Highways (4644)
44	Under Consideration	Tier 2	TESMO	Safety Analysis of Major Diverge and Branch Connection Junctions at System Interchanges (4645)
45	Under Consideration	Tier 3	DDC, MOP, SHE, or TESMO	Implementation of Mobile Mapping Systems for the Rating of Workzones and Evaluating their Impact on Traffic Flow
46	Under Consideration	Tier 3	DDC, MOP, SHE, or TESMO	Development and Implementation of UAS Aerial Image Processing and Mapping Procedures
47	Under Consideration	Tier 3	DDC, MOP, SHE, or TESMO	Development of a Portable/Agile Mobile Mapping System Scoping, Construction and Post-Construction Surveys
48	Under Consideration	Tier 3	MOP	Development of a Photogrammetric System for Salt Inventory Reporting
49	Under Consideration	Tier 3	MOP	Development of a Suite of Remote Sensing Platforms and Data Analytics for Identifying Clear-zone Incursions and Roadside Vegetation Hazards
50	Under Consideration	Tier 3	MOP	Remote Sensing for Tree Risk Mitigation
51	Under Consideration	Tier 3	MOP	Use of Geothermal Energy in Transportation Infrastructure
52	Under Consideration	Tier 3	MOP	Culvert Replacement Backfill
53	Under Consideration	Tier 3	MOP	Pilot Study of Innovative Salt Inventory Reporting System
54	Under Consideration	Tier 3	MOP	Autonomous Attenuator Truck System
55	Under Consideration	Tier 3	MOP	Autonomous Mowing of INDOT Roadsides
56	Under Consideration	Tier 3	MOP	Cost Effective Improvement of Roadside Soil Health/Function
57	Under Consideration	Tier 3	MOP	Use of Bio-cementation for Landslide Prevention and Erosion Control
58	Under Consideration	Tier 3	MOP	Resource Tracking & Allocation (Driver Allocation)
59	Under Consideration	Tier 3	MOP	Development of Asset Planning Tool for Facilities Systems (HVAC, Mechanical, Plumbing): Determine Life Expectancy, Cost to Operate
60	Under Consideration	Tier 3	MOP	Salt Building Damage Mitigation Development: Lower Cost of Damage to Facilities During Winter Operations

61	Under Consideration	Tier 3	MOP	Development of System to Automate the Capture of Electrical and Natural Gas Utility Data to Monitor Usage and Proactively Deal with Equipment Failures
62	Under Consideration	Tier 3	MOP	Deicing Tank Failure Prediction: What is the expected life expectancy?
63	Under Consideration	Tier 3	MOP	Salt Dome Reroofing: Finding the most cost effective roofing system to increase life expectancy and lower cost
64	Under Consideration	Tier 3	MOP	Systematic Overview of Material Management Technologies to lower cost of managing
65	Under Consideration	Tier 3	PMGC-C1	Intelligent inspection assistant
66	Under Consideration	Tier 3	PMGC-C2	Natural language processing for automated requirements-gathering from construction specification
67	Under Consideration	Tier 3	PMGC-C3	Vision-based, non-intrusive robotic inspector
68	Under Consideration	Tier 3	PMGC-C4	Development of an Agile Mobile Mapping System for Evaluating Milling Depth for the Installation of Reflective Tape
69	Under Consideration	Tier 3	PMGC-C5	Addressing Roadway Surface Friction Issues through Innovations in Testing, Surface Texturing, and Sustainable Aggregates. Focus Group: Pavement, Materials, Geotechnical and Construction (PMGC)
70	Under Consideration	Tier 3	PMGC-C7	Improved Tools for Diagnosis of Maintenance and Repair Needs in Concrete Pavement Joints
71	Under Consideration	Tier 3	PMGC-C12	A Synthesis Study on the Feasibility and Cost Effectiveness of Various Measures to Protect Construction Sites from Natural Disasters
72	Under Consideration	Tier 3	PMGC-G1	Determination of soil water characteristic curve parameters for chemically treated Indiana soils
73	Under Consideration	Tier 3	PMGC-G3, SHE (14)	Use of Bio-cementation for Erosion Control
74	Under Consideration	Tier 3	PMGC-G5	PIs: Antonio Bobet, Peter Becker, and Boonam Shin Estimation of Soil Stiffness and Resilient Modulus from Small-Strain Testing
75	Under Consideration	Tier 3	PMGC-G6	Develop a Statewide Foundation Road Map
76	Under Consideration	Tier 3	PMGC-G7	Statewide calibration of CPT-based correlations for geoenvironmental properties and parameters and developing a user-friendly application
77	Under Consideration	Tier 3	PMGC-G9	Development of Database for Geotechnical Properties in Indiana
78	Under Consideration	Tier 3	PMGC-G10	Health Monitoring of bridges and their foundations in Indiana
79	Under Consideration	Tier 3	PMGC-G11	Improved intelligent compaction using machine learning methods
80	Under Consideration	Tier 3	PMGC-G12	Non-destructive methods to determine geometry of unknown foundations
81	Under Consideration	Tier 3	PMGC-G13	Development of Pile Driving Analysis for Open-Ended Pipe Piles
82	Under	Tier 3	PMGC-	Development of Design Methods for Piles in Gravelly

	Consideration		G14	Soils
83	Under Consideration	Tier 3	PMGC-G15	Reliability of Fall Cone Device over ASTM Standard Methods for Determining the Atterberg Limits and Shear Strength of Indiana Soils
84	Under Consideration	Tier 3	PMGC-M2	Performance Evaluation of Stone Matrix Asphalt with Recycled Components in Indiana
85	Under Consideration	Tier 3	PMGC-M3	Additional HMA Process Improvements. Materials and Tests Labs Process Improvement
86	Under Consideration	Tier 3	PMGC-M5	AI-enabled High-Reliability, Low-Cost, Concrete surface crack Fast automatic identification
87	Under Consideration	Tier 3	PMGC-M6	Applicability of IDEAL-CT to Superpave 5 Mixtures
88	Under Consideration	Tier 3	PMGC-M7	Developing In-situ Sensing and Testing Methods for Corrosion Mapping and Characterization in Concrete Structures
89	Under Consideration	Tier 3	PMGC-M8	Expanded Implementation of a Friction Performance Test for Compacted Asphalt Mixtures
90	Under Consideration	Tier 3	PMGC-M10	Life Cycle Cost Analysis (LCCA) of Using Cement Stabilized Subgrade (CSS) for Lower-Traffic Volume Roads
91	Under Consideration	Tier 3	PMGC-M12	Understanding of Reflective Cracking using APT
92	Under Consideration	Tier 3	PMGC-M13	Improving Compactibility and Durability of Superpave 5 Asphalt Mixtures
93	Under Consideration	Tier 3	PMGC-M14	Influence of the recycled concrete aggregate properties on freeze-thaw durability of sustainable INDOT 502 concrete pavements
94	Under Consideration	Tier 3	PMGC-M15	Effect of the recycled concrete aggregate (RCA) properties on reinforcement-concrete bond and freeze-thaw durability of sustainable RCA concrete structures made of INDOT 702 structural concrete
95	Under Consideration	Tier 3	PMGC-P1	Pavement and Materials for On-Road Electric Vehicle Charging Systems
96	Under Consideration	Tier 3	PMGC-P2	Inexpensive System for Autonomous and Quantitative Condition Assessment of Roads
97	Under Consideration	Tier 3	PMGC-P3	Improvement of Pavement Design Input with INDOT Virtual Weigh-In-Motion (VWIM) Data
98	Under Consideration	Tier 3	PMGC-P5	Analysis Tools and Guidelines to Implement Traffic Speed Deflectometer Device (TSDD) Measurements into Pavement Management
99	Under Consideration	Tier 3	PMGC-P6	Application of Induction Heating Technology to Pothole Repair
100	Under Consideration	Tier 3	S 4 and PMGC-C6	Ubiquitous Jobsite Hazard Identification and Training through EEG and VR
101	Under Consideration	Tier 3	SHE-06	Full-Scale Fire Testing, Fire-Fighting, and Post-Fire Assessment of Steel Girder Bridges in Indiana
102	Under Consideration	Tier 3	SHE-08	Evaluation of Newer Methodology for Bridge Deck Widening: Using Sawcut & Drille Epoxy Anchor

103	Under Consideration	Tier 3	SHE-09	Evaluation of Load Factors for State Legal Loads
104	Under Consideration	Tier 3	SHE-10 & PMFAME 22	Automated Data Extraction: A Feasibility Study
105	Under Consideration	Tier 3	SHE	Improved Link Slab Connections for Jointless Bridge Decks
106	Under Consideration	Tier 3	SHE	Feasibility Study for Use of Digital Twinning Technology for Life-Cycle Analysis, Design and Management of Indiana Bridges
107	Under Consideration	Tier 3	SHE and TESMO	Decision Support for Incident Command
108	Under Consideration	Tier 3	SHE & PMGC-G16	Development of Recommendations for Geotechnical Evaluations of Bridge Foundations to Enable Seismic Evaluation: Dynamic Properties to Sufficient Depth for Seismic Analysis
109	Under Consideration	Tier 3	TESMO	A Decision-Making Tool for The Selection of The Optimal Maintenance of Traffic (MOT) Strategy
110	Under Consideration	Tier 3	TESMO	Mobility Analytics using Mobile Phone Data
111	Under Consideration	Tier 3	TESMO	Fine-tuning and Optimization of Smart Segment Dissemination System for Road Users
112	Under Consideration	Tier 3	TESMO	Opportunities and Conditions of Embracing and Utilizing New Traffic Data from Emerging Technologies
113	Under Consideration	Tier 3	TESMO	Inexpensive and Autonomous Solution for Updating the Inventory of Traffic Signs and Road Marking
114	Under Consideration	Tier 3	TESMO and MOP	Integration of INDOT Automated Vehicle Location (AVL) with Connected Vehicle Data to Improve Winter Maintenance Operations
115	Under Consideration	Tier 3	TESMO	Pavement Marking Maintenance Decision Support System using Location-Based Visual Big Data and Deep Learning Approach
116	Under Consideration	Tier 3	TESMO	Decision Support System for Inspecting Temporary Traffic Control Devices using Deep Learning Approach
117	Under Consideration	Tier 3	TESMO	Safety Study of Rumble Stripe Crash Reduction Factors in Indiana
118	Under Consideration	Tier 3	TESMO	Flashing Yellow Arrows Impact on Crash Rates in Indiana
119	Under Consideration	Tier 3	TESMO	Speed Management in Work Zones
120	Under Consideration	Tier 3	TESMO	Safety Performance of Non-Signalized Traffic Control Strategies
121	Under Consideration	Tier 3	TESMO	Partial Width OAPL Study
122	Under Consideration	Tier 3	TESMO	Longer Term Trends Related to COVID
123	Not approved for funding	Tier 4	PMFAME 3	Right of Way Mapping
124	Not approved for funding	Tier 4	PMFAME 4	Synthesis study on digital twin for lifecycle asset management

125	Not approved for funding	Tier 4	PMFAME 6	An Integrated Ex-Ante Scheduling of Asset Management Operations in the Aftermath of COVID-19
126	Not approved for funding	Tier 4	PMFAME 7	A fiscal planning framework for assessing future needs (2020~2035) for highway networks in Indiana
127	Not approved for funding	Tier 4	PMFAME 10	Assessing Electric Vehicle Charging Infrastructure in Indian to Support Wide-Scale EV Adoption
128	Not approved for funding	Tier 4	PMFAME 12	Association of Health and Transportation
129	Not approved for funding	Tier 4	PMFAME 13	Forecasting long term transportation impacts on delivery services. Evaluating the impact of food and products delivery on travel demands and vehicle miles traveled
130	Not approved for funding	Tier 4	PMFAME 14	A synthesis study of past PPPs in the state of Indiana.
131	Not approved for funding	Tier 4	PMFAME 15, 16 (8)	Enhancements to INDOT's HAMS and Reducing maintenance needs through better management.(was 4613)
132	Not approved for funding	Tier 4	PMFAME 16	Reducing maintenance needs through better design.
133	Not approved for funding	Tier 4	PMFAME 17 (7)	Update of Indiana's Asset Valuation Study (was 4612)
134	Not approved for funding	Tier 4	PMFAME 18	Estimating future transportation planning & project development needs
135	Not approved for funding	Tier 4	PMFAME 19	Assessing the impact of "mis-information" on future transportation needs and solutions.
136	Not approved for funding	Tier 4	PMFAME 21 & TESMO	Evaluating Location Based Data for Data Collection Support
137	Not approved for funding	Tier 4	PMFAME	Developing a Tool to Combine Different Datasets for Transportation Studies
138	Not approved for funding	Tier 4	PMGC (submitted February 24)	Roadway design and construction encounters' many challenges during an execution of any project.
139	Not approved for funding	Tier 4	PMGC-M9 (1)	Hot Mix Asphalt (HMA) Performance-Based Pay Factor (PBPF) for Indiana was 4614.
140	Not approved for funding	Tier 4	PMGC-G2 (6)	Feasibility Study of Using Soil Scanner to Extract Soil Gradation Properties Required for Construction (was 4618)
141	Not approved for funding	Tier 4	S 5	Work Boot Study - Smart Boots: Matching boots and technology to ensure worker safety in work environments
142	Not approved for funding	Tier 4	SHE-03 & PMGC-M16	Implementation of UHPC Mix Design for Indiana (was 4633)
143	Not approved for funding	Tier 4	TESMO-02	A synthesis study on Cost-Benefit Assessment of Installing Speed Enforcement Cameras on INDOT Road Network
144	Not approved for funding	Tier 4	TESMO-04	Connected Vehicle Centric TMC of The Future