

## List of Indiana Department of Transportation (INDOT) FY 2020 Research Needs (as of September 4, 2019)

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](mailto:snoureldin@indot.in.gov). If expressing an interest in a Research need, attach your CV/resume to your email response.

#	Status	SPR	Focus Group	Submitter	Working Title
1	Awarded	4122	SHE (Expansion)	Hunter	Repair and Strengthening of Bridges in Indiana Using Fiber Reinforced Polymer (FRP) Systems
2	Approval Pending	4213	PMGC (Expansion)	Novak	Determining Concrete Patch Locations other than Visual
3	Awarded	4225	PMFAME (Expansion)	Partridge	INDOT Research Program Benefit Cost Analysis – Return on Investment (ROI)
4	Awarded	4351	SHE (Environmental)	Wilczynski	Air Cooled Blast Furnace Slag (ACBFS) Leachate Study. Follow-up study to SPR-4164.
5	Proposal Pending	4402	District Deputy Commissioners (DDCs)	Feagans	Procurement of Unmanned Airborne Systems (UAS) Services by INDOT
6	Proposal Pending	4404	Maintenance Operations (MOP)	Brooks	Improve and Gain Efficiency in Winter Operations
7	Proposal Pending	4405		Brooks	Synthesis Study on Best Practices for Mapping and Coordinating Detours for MOT, including Risk Assessment/Management for Duration of Traffic Control Activities
8	Proposal Pending	4406		Brooks	Frontline Employee Training Using Virtual Reality Simulation of Field Conditions.
9	Awarded	4407		Brooks and Habib	Roadway Ditch Line Mapping with Mobile LIDAR
10	Proposal Pending	4409	Planning, Multimodal, Finance, Asset Management & Economic Impact (PMFAME)	Packer Taylor Shields Feagans	Benefits of closing one direction of Interstate(outside of Indianapolis) during Construction work (Work zone configuration & duration planning)
11	Proposal Pending	4411		Pam Fisher and Jim Stark	Last mile delivery and route planning (freight not people)
12	Awarded	4413		Cai & Gkritza	Assessing the travel demand and mobility impacts of disruptive transportation technologies in Indiana
13	Awarded	4414	Pavements, Materials, Geotechnical & Construction (PMGC)	Siddiki	Use of Geosynthetics on subgrade and on low and variable fill foundations
14	Proposal Pending	4415		Haddock	Determining Asphalt Mixture Properties Using Imaging Techniques
15	Approval Pending	4416		Salgado & Zaheer	Development of Protocols for Reuse Assessment of Existing Foundations in Bridge Rehabilitation and Replacement Projects
16	Awarded	4417		Fegan	Use of recycled materials - subgrade focus
17	Proposal Pending	4418		Lu	Developing Smart QA/QC program for Concrete Construction through Data Enabled In-situ

18	Proposal Pending	4419	Pavements, Materials, Geotechnical & Construction (PMGC)	Erk	Superabsorbent Polymers for Internally Cured Concrete
19	Proposal Pending	4420		Shin	Estimating compressive strength from stiffness for chemically treated soils
20	Awarded	4421		Chen	Life Cycle Integration of Infrastructure Information Modeling
21	Awarded	4422		Cai	Automate the Generation of Construction Checklists from Specifications
22	Awarded	4423		Fegan	Temporary Pavement Marking for Pavement
23	Proposal Pending	4424	Safety Peer Group (S)	Safety Peer Group	Evaluate the current disruptive technologies for trainings, web apps, work zone, and vehicle jamming. Evaluate best practices for personal protective equipment (PPE) colors and traffic control devices as well as where it becomes a distraction. Evaluate driver behaviors in work zones. Develop a communication plan to achieve a safer environment for all
24	Awarded	4429	Structural, Hydraulics & Environmental (SHE)	Hart	Load Rating -- Development of Methodology to Use LRFR for Load Rating all INDOT Bridges.
25	Proposal Pending	4430		Schmidt	Multiple Water Course Joint Probability Analysis Procedure Development for Indiana Specific Watersheds
26	Awarded	4431		Thrall	A New Approach to Accelerated Fabrication of Steel Bridges: Design, Optimization and Demonstration
27	Proposal Pending	4432		Fitzgerald	Culvert Inspection Frequency Determination -- Guidelines for INDOT
28	Proposal Pending	4433		Schmidt	Unit Hydrograph Method Refinement at Higher Resolution
29	Awarded	4436	Traffic Engineering, Safety and Mobility (TESMO)	Cox	Virtual Sensors using Video Analytics
30	Awarded	4437		Tarko	Effective Design and Operation of Pedestrian Crossings (T-Scan field data collection)
31	Proposal Pending	4438		Bullock	Field Test bed for Evaluating Embedded Vehicle Sensors with Indiana Companies
32	Awarded	4439		Holowaty	Guidelines for Evaluating Safety Using Traffic Conflicts: Proactive Crash Estimation on Roadways with Conventional and Autonomous Vehicle Scenarios
33	Awarded	4440		Sturdevant	Smart Segment Information Dissemination
34	Proposal Pending	4441		Gkritza	Public Acceptance of INDOT's transportation services
35	Awarded	4442		Li	Highway Lighting Test-bed on INDOT Facility (Off-Roadway)
36	Proposal Pending	4443	Pavements, Materials, Geotechnical & Construction (PMGC)	Cho	Remaining Service Life Prediction of Asphalt Pavements Using Mechanistic Methods
37	Awarded	4444	Structural, Hydraulics & Environmental (SHE)	Baah	Improved Live Load Lateral Distribution Factors for use in Load Rating of Older Continuous and T-Beam Reinforced Concrete Bridges

38	Under Consideration		Pavements, Materials, Geotechnical & Construction (PMGC)	Beeson McDaniel	Expanded Implementation of a Friction Performance Test for Compacted Asphalt Mixtures
39	Under Consideration		District Deputy Commissioners (DDCs)	Fowler	Construction inspection Improvement. Covered in SPR 4418 and 4422.
40	Under Consideration			Fowler & Habib	Targeted UAS and Mobile LiDAR for Landslide Monitoring Drone Implementation - (Strategic Usage Material Stockpile Volume Estimation / Landslide Monitoring)
41	Under Consideration		Planning, Multimodal, Finance, Asset Management & Economic Impact (PMFAME)	Roy Nunnally, Pam Fisher & Jim Stark	Data Mining. Big data and data analytics (leverage big data for decision making). INDOT team wants to develop research project for data analytics. Potential ideas include: maximizing effectiveness of INDOT Answers, opt-in data research on scooters
42	Under Consideration		Structural, Hydraulics & Environmental (SHE)	Hunter	Pile Stability Analysis in Soft Soils -- Increased Guidance on Foundation Design Assumptions w.r.t Loose Soil Effects on Pile Lateral Capacity and Stability
43	Under Consideration			Ortiz	Pedestrian Bridge Inspection Guidance Development
44	Under Consideration		District Deputy Commissioners (DDCs)	Fowler	Smart Pavement/Bridges. Speed control based on speed signs/governing vehicles -- what is required on each mile of road to connect vehicles & infrastructure? Ice/temp alerting -- thru smart phones
45	Under Consideration			Fowler	Roadsides: Grass seed modified for pH soil range as opposed to modifying soil to grow a single spec (surely our crop research can support this...look at Monsanto).
46	Under Consideration			Fowler	Getting vacancies advertised. Match our job bank to social media and school networks -- integrate them into our system to simplify.
47	Under Consideration		Maintenance Operations (MOP)	Kyubung & Hastak	Synthesis Study of Selection and Utilization of Resources for Winter Operation
48	Under Consideration			Brooks	Best practices for the removal of concrete for small patching operations. Is there a better method than a jack hammer?
49	Under Consideration			Brooks	Best products available for substructure patching.
50	Under Consideration			Brooks	What are other states doing to prevent vegetation growth in MSE walls.
51	Under Consideration			Brooks	Use of a continuous feeder system for chip seal operations.
52	Under Consideration			Brooks	Drone vs. camera on track inside a salt some to measure inventory.
53	Under Consideration			Brooks	Study of mobile barrier, types, applications, cost.
54	Under Consideration			Brooks	Use of auto anti-icing/de-icing device on bridges.

55	Under Consideration		Maintenance Operations (MOP)	Brooks	Lidar for mapping clear zone.
56	Under Consideration			Brooks	Synthesis study on collecting HPMS data by INDOT vs Pathways
57	Under Consideration			Brooks	Chip Seals over new wedges.
58	Under Consideration			Brooks	Products for graffiti deterrent/solutions
59	Under Consideration			Brooks	Removal methods for temporary markings
60	Under Consideration			Brooks	Thermal mapping for Winter Operations to report the effectiveness of maintenance treatment and to report road conditions.
61	Under Consideration			Brooks	Best practices to prevent pavement failure, concerns, and issues after the completion of construction to reduce the need for maintenance operations to address items within 6 months to a year of project.
62	Under Consideration		Brooks	Measuring the impact of certified chip seal staff. What has been the impact to the operations?	
63	Under Consideration		Planning, Multimodal, Finance, Asset Management & Economic Impact (PMFAME)	Becky Packer	Relinquishment of state roads and all assets associated within city limits
64	Under Consideration			Becky Packer	Signage and performance of complex intersection combinations
65	Under Consideration			Gkritza	Assessing the Benefits of Rail-Highway Crossing Improvements on Local Roads of Indiana
66	Under Consideration			Mitra	Developing an Integrated Resiliency and Sustainability Model for Interdependent Transportation Infrastructure Systems
67	Under Consideration			Pam Fisher	Data mining linked to ridesharing (e.g., scooters)
68	Under Consideration			Pam Fisher	Developing measures of annual mobility impacts (all modes)
69	Under Consideration			Pam Fisher	Local trax program
70	Under Consideration			Pam Fisher	Mobility for impaired people
71	Under Consideration			Pam Fisher	Aviation infrastructure changes
72	Under Consideration			Pam Fisher	Impact of road closures on Agriculture industry during harvesting seasons
73	Under Consideration			Roy Nunnally	CAV / truck platooning / Geometric design of roundabouts
74	Under Consideration			Roy Nunnally	Economic impacts of delivery services
75	Under Consideration			Roy Nunnally	Ridesharing impacts on travel demand
76	Under Consideration			Roy Nunnally	New alternatives in technology to traffic data collection

77	Under Consideration		Planning, Multimodal, Finance, Asset Management & Economic Impact (PMFAME)	Hastak	Optimized Detour Mapping by Synthesizing Quantitative and Qualitative Factors
78	Under Consideration			Hastak	Economic Impact of Transportation Infrastructure Failure Induced by Natural Hazards
79	Under Consideration			Hastak	Synthesis Study of Best Practices of Interdependent Transportation Asset Management
80	Under Consideration			Habib	Ultra-High Accuracy Mobile LiDAR for Pavement Patching Planning
81	Under Consideration			Fricker, Gkritza & Nunnally	Impacts of Connected and Autonomous Vehicles on INDOT Planning
82	Under Consideration		Pavements, Materials, Geotechnical & Construction (PMGC)	Dunston	Protocol for Assessing the Impact of Initial Construction Quality on Long-Term Asset Performance
83	Under Consideration			Jahinshahi	Autonomous Construction Progress Monitoring and Documentation
84	Under Consideration			Cai	A Synthesis Study on BIM for Road and Bridge Construction
85	Under Consideration			Whelton	Plastic Liner Failures and Methods to Avoid Them
86	Under Consideration			McDaniel	Use of Thermal Imaging to Improve Asphalt Pavement Performance
87	Under Consideration			Kang	Refining Asphalt Pavement Warranties for INDOT
88	Under Consideration			Fegan	Use of GPS in Construction, A study of what technologies exist now that could be utilized for construction inspection and quantity calculations.
89	Under Consideration			Fegan	Electronic Plans and Modeling
90	Under Consideration			Fegan	Equipment Planning and Replacement in Construction. What equipment should we buy and what should be lease?
91	Under Consideration			Struewing	Correlation of classification and strength parameters to resilient modulus values
92	Under Consideration			Struewing	Variation of Excess Pore Water Pressure in Colluvium Soils above bedrock in Slide Prone areas of SE Indiana
93	Under Consideration			Ghani	Field Assessment of Large Diameter Trenchless Pipe Installation in Sandy Soils
94	Under Consideration			Ghani	Developing Predictive Model for Subsurface Investigation Using Machine Learning Techniques
95	Under Consideration			Salgado	Load-Carrying Capacity of Cap-Pile Group-Soil System
96	Under Consideration			Prezzi	Use of Piezocone Penetration Test to Estimate In Situ Consolidation Parameters
97	Under Consideration			Prezzi	Design of Piles in Gravelly Soils
98	Under Consideration			Becker	Durability and Performance of Chemically Modified Subgrades Subjected to Freezing and Thawing
99	Under Consideration			Becker	Development of soil water characteristic curve (SWCC) correlations for chemically treated soils

100	Under Consideration			Fegan & Habib	Virtual Inspection on MSE walls.
101	Under Consideration			Niazi	Improved Characterization of Karst Formations in Southern Indiana
102	Under Consideration			Williams	Development of Guidelines for the Implementation of Non-Proprietary UHPC in Indiana
103	Under Consideration			Varner	Performance based HMA testing
104	Under Consideration			Lu	Determining construction schedule using piezoelectric sensor to track cement hydration.
105	Under Consideration			Haddock	Investigating the Use of Warm-mix Stone Matrix Asphalt in Indiana
106	Under Consideration			McDaniel	Tack Coat and Spray Paver Performance
107	Under Consideration			Olek	Revisiting Relationship between Splitting Tensile Strength and Flexural Strength of Concrete
108	Under Consideration			Olek	Effects of penetrating sealers applied to saw-cut surfaces of the joints on their durability
109	Under Consideration			Velay	New curing procedures to improve durability of concrete pavements under winter weather conditions
110	Under Consideration			Velay	Early strength and long-term durability monitoring of concrete pavements using low-cost wireless devices
111	Under Consideration			McDaniel	Implementing a Performance-Based Grading System for Emulsified Asphalts in Indiana
112	Under Consideration			Lu	In-situ testing of size distribution and spacing factor of air-voids in concrete pavement
113	Under Consideration			Fegan	Concrete Curing.
114	Under Consideration			Habib	Hyper-spectral Imaging onboard Proximal Remote Sensing System for Pavement Inspection
115	Under Consideration			Shin	Field Drainage Test on I-69 Added Travel Lanes
116	Under Consideration			Lee	MEPDG calibration for SMA pavements
117	Under Consideration			Byers	Evaluate new technologies, GPR, etc. to detect soft/poor subgrade conditions under existing pavements
118	Under Consideration			Lu	Field evaluation of in-situ sensing of surface electrical conductivity to determine concrete quality
119	Under Consideration			Byers	Evaluate geotextiles & subgrade treatment technologies to improve pavement subgrade.
120	Under Consideration			Feagans Haddock	Validation of the Need for Drainage Layers in Asphalt Pavements.
121	Under Consideration			Haddock	Performance Evaluation of Indiana Superpave 5 Asphalt Mixtures
122	Under Consideration			Jahinshahi	Improved Tools for Diagnosis of Maintenance and Repair Needs in Concrete Pavement Joints
123	Under Consideration			Habib	Ultra High Accuracy Mobile LiDAR for Pavement Patching Planning

Pavements,  
Materials,  
Geotechnical &  
Construction  
(PMGC)

124	Under Consideration		Pavements, Materials, Geotechnical & Construction (PMGC)	Velay	Improving the durability of pothole repairs in concrete pavements by using computational modeling and experimental testing
125	Under Consideration			McDaniel	Refining asphalt warranty pavement for INDOT
126	Under Consideration		Safety Peer Group (S)	Safety Peer Group	Evaluate current training and accident ratio regarding body mechanics and injuries.
127	Under Consideration			Safety Peer Group	Color and visibility. Should we explore or look at changing it up? Do employees who work in work zones blend in with their surroundings? For example, when we chip and seal in rural areas, do our hard hats and vests blend in with a corn field? Have motorists become too complacent about the colors used in work zones—lime green and orange?
128	Under Consideration			Safety Peer Group	Rear-end collisions, why don't motorists see us?
129	Under Consideration			Safety Peer Group	Mandatory stretch and flex programs—will these help us? Body mechanics of workers.
130	Under Consideration			Safety Peer Group	Public work zone awareness – reach out to and teach the motoring public how to safely drive through our work zones.
131	Under Consideration			Safety Peer Group	Back of queue awareness – bottlenecks, how do we make people aware of an upcoming work zone when they're so far back in the queue?
132	<b>Under Consideration</b>			<b>Safety Peer Group</b>	<b>Behavioral based training/learning – how do we get the message across? How do we create a culture where our employees want to participate in training and safety-related activities?</b>
133	Under Consideration			Safety Peer Group	Maintain a speed through a work zone.
134	Under Consideration			Safety Peer Group	Attention-getting lights versus distraction. When is it too much? When is it too little?
135	Under Consideration			Safety Peer Group	"Jam" or "lock-up" cell phones in work zones. Conversely, using in-vehicle technologies for blasts in a motor vehicle – using the vehicle's technology to "push" information out to motorists. Similar to Amber Alerts, Severe Weather Alerts/Updates, etc.
136	Under Consideration			Safety Peer Group	Safety culture. How do we get people to buy-in and want to change?
137	Under Consideration			Safety Peer Group	DART rate – how do we reduce this rate?
138	Under Consideration			Safety Peer Group	Job matching/sharing and the potential impact on safety. Example: Two individuals work part-time and make-up a full-time-equivalent position.
139	Under Consideration			Safety Peer Group	How much does an incident (injury, crash, near-miss, etc.) really cost us—direct and indirect?
140	Under Consideration		Safety Peer Group	What could be the impact of an App such as Pulse Point—information on accidents, emergencies, location of life-saving devices (AEDs) in specific geographical areas?	

141	Under Consideration	Structural, Hydraulics & Environmental (SHE)	Wilczynski & Partridge	Feasibility Study for INDOT Storm water Compliance, Permitting, Training, and Solutions Initiative
142	Under Consideration		Varma	Pre-Stressed Concrete Girder Fire Damage Evaluation -- Phase 2 (Proposed Repair Methodology Development and Durability Determination)
143	Under Consideration		Hart	Load Rating -- Analysis of Curved Geometry Steel Bridges and Modelling to Account for Centrifugal Forces
144	Under Consideration		Hunter	Stream Bank Slope-Wall Stability and Best Practices for Design of Long-Term Solutions
145	Under Consideration		McCool	Culverts -- Evaluating neighboring state procedures for culvert load rating -- Load rating small structures: Making process cheaper, faster and better.
146	Under Consideration		Anwar	Underwater and Surface Autonomous Inspection Robot for Bridge / Infrastructure Inspection
147	Under Consideration		Baah	Field Deployment of Carbon Fiber Reinforced (Corrosion Free) Polymer for Pre-Stressed Girders
148	Under Consideration		Baah	Addition of Polypropylene Fibers to Reinforced Concrete Bridge Deck to Mitigate Cracking
149	<b>Under Consideration</b>		<b>Hubbard</b>	<b>Unmanned Aerial Systems for Enhanced Bridge Inspector Safety</b>
150	Under Consideration		Ramirez	Improved Connection Details of Link Slabs for Jointless Bridge Decks
151	Under Consideration		Ramirez	Improved Live load Lateral Distribution Factors in the Load Rating of Older Continuous and T-Beam Reinforced Concrete Bridges
152	Under Consideration		Strain	Development of Structural Engineering Emergency Response Teams and Training for Deployment During Nationwide Natural Disasters
153	Under Consideration		Williams	Implementation of Decked Girder Systems for Accelerated Bridge Construction in Indiana
154	Under Consideration		Zavattieri	Vibration responsive meta-structures for damping and energy harvesting
155	Under Consideration		Dyke	Rapid Data Gathering to provide Decision Support for Incident Command
156	Under Consideration		Williams	Development of Non-Proprietary UHPC Mix Design for Various Structural Applications
157	Under Consideration		Bowman	Investigation of Folded Plate Steel Girders (FPG) for Deployment in Indiana (previous installation in Nebraska and Ohio)
158	Under Consideration		Shickel	Evaluation of Newer/Innovative Bridge Deck Options for High Volume Roadways (Bridge Deck Protection Systems)
159	Under Consideration		McCool	ABC Workbook: Synthesis Study on when, where.
160	Under Consideration		Prakash	Further understanding disconnect between mechanical based deterioration model and inspection based evaluation.



161	Under Consideration		Jahanshahi	Use of Artificial Intelligence to Assist Bridge Inspections
162	Under Consideration		Partridge	Development of Enhanced Processes to Incorporate NDT Technologies into INDOT Business Practices
163	Under Consideration		McCool	Alternative Superstructure Types -- Can INDOT Provide Additional Value Engineering Flexibility to Contractors?
164	Under Consideration		Varma	Development of Rapid Assessment Tools for Bridge Deck Deterioration
165	Under Consideration		Shickel	Bridge Railing - Could Smaller Bridges Benefit from TL-5 Bridge Rail Installation?
166	Under Consideration		Bowman	Steel bridge coating systems for Indiana: updating study from 20ish years ago. Evaluation of galvanized systems, metallizing, two coat systems, etc. What is the most cost effective based on today's technology?
167	Under Consideration		Williams	Introduction of Bulb-Tee/Deck system to Indiana: Demonstration project to develop usage in Indiana and optimize designs for Indiana
168	Under Consideration		Jahanshahi	Study of NDT integration into INDOT business practices.
169	Under Consideration		Haikal	Bridge Railing -- Effect on Bridge Design
170	Under Consideration		Conner	Study of Steel Beams with end deterioration and coating systems to mitigate deterioration.
171	Under Consideration		Ortiz	Pin and Hanger Evaluation for current INDOT inventory -- how are we addressing potential failure modes?
172	Under Consideration		Williams	3 D Printing for Reinforced Concrete -- Prefabricated elements
173	Under Consideration		Hunter	Foundation re-use for bridge replacement: When is it appropriate to consider re-using foundations.
174	Under Consideration		Hunter	Bridge Deck Icing -- Are there new technologies to install polymeric overlays that inhibit ice formation at the freeze-thaw point.
175	Under Consideration		Hunter	AASHTO -- Fatigue Detail design manual evaluation: Are we providing the right level of information to designers?
176	Under Consideration		Hastak	Deferred Maintenance Management of the Bridge Inventory
177	Under Consideration		Jahanshahi	AI-assisted Inspection of Bridges
178	Under Consideration		Saha	Cost Effectiveness Analyses of Dust Suppressants on Gravel Roads Considering Detrimental Impacts of Dust on Human Health, Crops Yield, and Livestock Production.
179	Under Consideration		Whelton	Spray on plastics for infrastructure repair and strategies to ensure successful projects

Structural,  
Hydraulics &  
Environmental  
(SHE)

180	Under Consideration		Structural, Hydraulics & Environmental (SHE)	Boor	High Resolution data collection for Air Quality Monitoring using vehicle mounted sensors to improve understanding of air quality issues and exposure factors
181	Under Consideration			Boor	Air quality effects from electric vehicles: brake wear, tire deterioration contributions and its effects on air quality
182	Under Consideration			Zhou	Evaluation of emerging contaminants to support cost-effective storm water quality management
183	Under Consideration			Zhou	Smart storm water management-Zhou-Purdue
184	Under Consideration			Merwade	Gauge stream flow data simulation including development of database for future design usage
185	Under Consideration			Lyn	Scour Evaluation Using Purdue Hydraulics Lab Test Flume for 3 -Sided Culverts
186	Under Consideration			Lyn	Evaluation of softwares for scour analysis correctness. Is the software producing 10-15% error? ...Implication of errors in model predictions for scour protection design.
187	Under Consideration			Feagans	Integral abutment sleeper slab joint .Best Practices of Relief Joints for concrete pavements & Bridges
188	Under Consideration			Feagans	Best Practices for Thin Deck Overlays
189	Under Consideration			Dong	Innovative Concrete Additives to Prevent or Mitigate Corrosion of Concrete Pavements and Bridge Decks Caused by Deicing Salts
190	Under Consideration		Traffic Engineering, Safety and Mobility (TESMO)	Kaiser	Replacement Cycles for Special Markings
191	Under Consideration			Plattner	Effect of Various Mitigation Strategies on Work Zone Safety (Law Enforcement Strategies)
192	Under Consideration			Plattner	Field Verification of INDOT Queue Analysis Software for Freeway Work Zones
193	Under Consideration			Fegan	Maintenance of Traffic for 5 lanes To provide pre-warning at our current standard lengths the pre-warning often puts us past the next interchange and in some cases interchanges.
194	Under Consideration			Anwar	Traffic incident detection using multiple sensors (cameras / lidars) for improved accuracy
195	Under Consideration			Boruff	Traffic Volume limits of Driveway Assistance Devices at Temporary Traffic Signals
196	Under Consideration			Boruff	Develop a map, network, or database of viable detours for road closures due to highway construction or maintenance.
197	Under Consideration			Schmidt	Effect of Acceleration Lane Downstream of On- to Off-Ramp Weave Areas

198	Under Consideration		Wubeshet & Wang	Designing Noise Barriers to Mitigate Air and Noise Pollution
199	Under Consideration		Hubbard	Innovative Temporary Pavement Markings for Construction and Work Zones
200	Under Consideration		Bullock	Characterizing Impact of Scooters on Urban Street Design and Planning
201	Under Consideration		Ukkusuri	Scaled Down Testing Approach for Assessing AV Impact
202	Under Consideration		Ukkusuri	Assessment of Infrastructure Needs for Autonomous Vehicles
203	Under Consideration		Ukkusuri	Impact of Dedicated AV Lanes for Trucks
204	Under Consideration		Chen	Assessing Safety and Mobility Impacts of Shared E-Scooters and Shared E-Bikes
205	Under Consideration		Williamson	Secondary Crash Reduction Using Driving Simulator to Determine Optimal Warning Distance from Queue End
206	Under Consideration		Li	Crowd Source Video Harvesting for Asset Management Inventory
207	Under Consideration		Holowaty	Development of Guidelines for Freeway Work Zone Acceleration Lanes (vs. Yield Control Access)
208	Under Consideration		Williamson	Wrong Way Traffic (Alerting Other Drivers In Real Time)
209	Under Consideration		Kaiser	RPM Technology Evaluation -- New Technology to Improve Performance & Lower Cost?
210	Under Consideration		Holderread	Pavement Marking Friendly Fog Seal Alternatives
211	Under Consideration		Sturdevant	Calibration of Side-Fire Radar Vehicle Detectors
212	Under Consideration		Holowaty	Synthesis Study on Usage & Effectiveness of Advance Warning Flashers at High Speed Rural Intersections
213	Under Consideration		Holowaty	Analysis of Intersection Skew Angle vs. Crash History
214	Under Consideration		Bullock	Implementation of Traffic Ticker Tools
215	Under Consideration		Jahanshahi	Inexpensive and Autonomous Solution for Updating the Inventory of Traffic Signs and Road Markings
216	Under Consideration		Steckler	Safety Performance of Barrier End Treatments and Impact Attenuators
217	Under Consideration		Holderread	Detector Life-Cycle Cost Comparison (technology review)
218	Under Consideration		Drum	Review of Safety Countermeasures Effectiveness
219	Under Consideration		Holderread	Roadside Encroachment on Two-Lane Rural Roads

Traffic Engineering, Safety and Mobility (TESMO)

220	Not approved for funding		District Deputy Commissioners (DDCs)	Fowler	INDOT 100 year Celebration communication Plan Development. Will be done internally.
221	Not approved for funding			Fowler & Habib	Implementation of RC Vehicles for Culvert Inspection. Culvert inspection/access for evaluation -- Remote-Controlled Vehicle for Inspecting Small Culverts (Culvert Video Inspection Vehicle)
222	Not approved for funding		Maintenance Operations (MOP)	Brooks	Quantifying Benefits of Performance Graded Emulsions and Asphalt Rejuvenation Products
223	Not approved for funding. Combined With 4441		Planning, Multimodal, Finance, Asset Management & Economic Impact (PMFAME)	Fricker & Feagans & Labi	A Quantitative Appraisal of J Turns as Alternative Highway Intersections
224	Not approved for funding. Combined with 4441			Gkritza	Public Acceptance of INDOT's transportation services
225	Not approved for funding Combined with 4424		Safety Peer Group (S)	Safety Peer Group	Evaluate best practices for personal protective equipment (PPE) colors and traffic control devices as well as where it becomes a distraction.
226	Not approved for funding Combined with 4424			Safety Peer Group	Evaluate driver behaviors in work zones. Develop a communication plan to achieve a safer environment for all.
227	Not approved for funding. combined with SPR 4400		Structural, Hydraulics & Environmental (SHE)	Rearick	Exploring trade-off between amounts of inspection time vs. quality of delivered product -- what is the correct amount of inspection necessary to ensure that INDOT get what it expects from the contractor?
228	Not approved for funding Combined with 4405		Traffic Engineering, Safety and Mobility (TESMO)	Fegan	Minimize roadway closure time for maintenance and repair.