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BY THE NUMBERS

$3,315,179
Research Funding Awarded to MTTI Investigators

47%
Proposal Award Rate

Youth supported for on campus educational activities

60

49 Proposals Submitted

80 MTTI MEMBERS

$120,000
Awarded to MTTI Members for:
- Initiative Funding
- Facility Upgrades
- Travel

2017 Funding Partners
- Engineering & Software Consultants
- Environmental Protection Agency
- Federal Highway Administration
- Federal Railroad Administration
- Michigan Department of Environmental Quality
- Michigan Department of Transportation
  - University of Chicago
  - University of Washington
The Year in Review

With a newly elected director and executive committee, MTTI’s activities in FY17 concentrated on more closely aligning the Institute with its mission and the vision set forth in 2010 of “partnering for the future of transportation”.

PASI LAUTALA (CEE) was elected as the third director in MTTI history, taking over for the retiring RALPH HODEK (CEE) in November of 2016. New elections were also held for two Executive Committee members in the spring of 2017 for positions beginning in FY18.

Current EC members include:

Principal Members - COLIN BROOKS (MTRI), THOMAS OOMMEN (GMES), STAN VITTON (CEE)

Affiliate Members - CHRIS GILBERTSON (CTT), JAKE HILLER (CEE)

The new leadership was tasked with fulfilling MTTI activities previously identified in the FY 16 annual report to the Vice President for Research (VPR) including:

- Increase participation between institute and members providing more frequent updates on MTTI plans and strategies to make MTTI more transparent and welcoming.
- Implement a student summer research program similar to SURF.
- Continue development of a speaker series to increase number of invited guest speakers to campus.
- Increase funding for minor initiatives to encourage proposal development and return on investment to the institute.
- Make MTTI more visible across campus.
- Revamp and update MTTI website and produce marketing materials for better branding.

One of the first tasks undertaken by the Director was to provide an online survey to MTTI membership for input on better aligning MTTI support and services with the priorities of our members. The survey was also provided in paper format at the MTTI general membership meeting. The brief survey identified six areas of support offered by MTTI and was completed by 25 MTTI members. The key findings, in order of importance to membership, included:

MISSION
The Michigan Tech Transportation Institute will provide the operating structure, resources, recognition, and leadership, in a collaborative environment, that supports research, education, and outreach leading to sustainable solutions for transportation.
• Pre-award proposal support is considered the most valuable service provided by the MTTI.
• Administrative post award support
• Travel and event support
• Research funding
• Student support
• Other financial support

Complete results of the survey are provided in Appendix B.

**Administrative Updates**

The original MTTI Charter and Bylaws were incorporated in July 2010. Since that time, the organizational structure of MTTI has vastly changed as have the number of members who are eligible for MTTI membership. Vague and conflicting wording in the documents are being updated as well as new levels of participation being defined. Simplification of the voting procedures are being undertaken and as per the current Bylaws, will be offered to MTTI membership for approval. The updated Charter and Bylaws will be presented to the Vice President of Research Office for approval as well.

A cost share policy was created for all proposals with sponsor mandated cost share requirements submitted to the sponsor by MTTI membership. Previously, MTTI had no formal structure and cost share was granted on an individual basis by the Director. See Appendix C.

A new, easier to manage website has been designed and is under review by the Director and EC before being made public. The site is more dynamic, offers more detailed information and provides easier upgrades and maintenance.

A priority since the transition of the new Director has been increased campus collaboration. MTTI led or collaborated on multiple events including proposal preparation, campus tours, guest speaker invitations, and a mobility summit.

Overall, MTTI has stayed on track and either completed or made progress in most activities identified in FY16 report. A more detailed assessment of this progress is provided later in the report.

**Use of IRAD Funds**

MTTI is allocated IRAD funding by the Office of the Vice President for Research, used for operating expenses and for strategic investment for membership. MTTI IRAD returns (Figure 1), expenditures (Figure 2), and IRAD balances (Figure 3) are depicted for a five year period from FY13 – FY17. The IRAD returns have been on decline over the past five years.
years. Over the past two years, the main reason for the decline is the reduction in the IRAD return from projects proposed by the CTT, mainly caused by a formula change. MTTI has also lost some of its past contributors and there are several young faculty on campus who are only ramping up their research programs. It’s expected that trend will turn to positive during upcoming fiscal years, both through younger research faculty and through increased attention in attracting new contributors (members). MTTI expenditures have seen some volatility, caused mainly by strategic investments in major initiatives (in FY15) and most recently in CTT facility upgrades (FY17). These investments have brought down the overall MTTI balance by approximately 30% since FY14. Despite the reduction, MTTI’s balance is healthy and still has room for strategic investments when opportunities arise.

![IRAD Returns Graph](image)

**Figure 1: MTTI IRAD Returns**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY13</td>
<td>$188,432</td>
</tr>
<tr>
<td>FY14</td>
<td>$144,938</td>
</tr>
<tr>
<td>FY15</td>
<td>$155,865</td>
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<tr>
<td>FY16</td>
<td>$121,155</td>
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<tr>
<td>FY17</td>
<td>$101,199</td>
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</table>

MTTI FY17 ANNUAL REPORT TO THE VICE PRESIDENT OF RESEARCH
FIGURE 2 MTTI EXPENDITURES

<table>
<thead>
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<th>Year</th>
<th>Total</th>
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<tbody>
<tr>
<td>FY13</td>
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<tr>
<td>FY14</td>
<td>$95,982</td>
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<td>FY15</td>
<td>$188,571</td>
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<tr>
<td>FY16</td>
<td>$114,025</td>
</tr>
<tr>
<td>FY17</td>
<td>$204,540</td>
</tr>
</tbody>
</table>

FIGURE 3 MTTI IRAD BALANCE

- $320,206 (FY13)
- $369,162 (FY14)
- $336,456 (FY15)
- $343,585 (FY16)
- $240,243 (FY17)
RETURN ON INVESTMENT

The main priority of the Director and EC in allocating MTTI funds for investments is to increase transportation related research funding in the University. Resources are available to membership for: major and minor (seed funding) initiative research projects, proposal preparation support for larger proposals, data collection, proof-of-concept studies, equipment purchase, member travel, external speaker expenses and required cost share. In FY17, MTTI provided almost $130,000 in direct membership support, as depicted in Figure 4. In addition to direct support provided in the Figure, MTTI supports its membership through staff support for proposal development and in administering various tasks and events. These expenses accounted for approximately 1/3 of total MTTI expenses in FY17.

![MTTI MEMBERSHIP FUNDING](image)

**FIGURE 4 MTTI MEMBERSHIP FUNDING**

In FY2017, MTTI provided funding for outreach and youth education, cost share for Michigan Department of Environmental Quality proposals, purchased a new display unit for Dillman 315, sponsored the Clean Snowmobile Challenge, provided funding for renovations of the Center for Technology & Training, supplied MTTI members with networking opportunities through fees for transportation affiliated associations, financed the final years of funded major initiatives, subsidized membership travel and funded invited speaker travel costs. The highlight of the year was the organization of 1st Mobility Summit on campus. This will also be discussed later in the report.
Accomplishments

RESEARCH

MTTI researchers collaborated on proposal submissions to funding sponsors totaling $11,448,511 in 2017. 49 proposals were submitted of which 23 were awarded funding for an approval rate of 47%. Research awards amounted to $3,315,179. MTTI currently has 52 projects in progress.

The following charts provided a five year summary of MTTI research; Figure 5 provides an overview of research projects from proposal submissions to award, annual proposal submissions are depicted in Figure 6 with award funding shown in Figure 7. A list of all proposals submitted through MTTI in FY17 is included in Appendix A.

PROPOSALS, AWARDS AND CURRENT PROJECTS

FIGURE 5 PROPOSALS, AWARDS, AND CURRENT PROJECTS
TIM COLLING, Director of the Center for Technology & Training, was honored by the Michigan Transportation Asset Management Council (TAMC) with the Carmine Polumbo Individual Award for Colling’s asset management-related service in Michigan.
AARON DEAN, Rail Transportation Program (RTP) undergraduate student and research assistance, was awarded a grant from the Undergraduate Research Internship Program (URIP) for his project “Effectiveness of Using SHRP2 Naturalistic Driving Study (NDS) Data to Study Driver Behavior at Highway-Rail-Grade Crossings”.

STEVEN LANDRY, a PhD student in the Applied Cognitive Science and Human Factors program working on the National University Rail Center (NURail) project was selected NURail Student of the Year. The NURail Center designates an “outstanding graduate student” through a program jointly sponsored by the U.S. Department of Transportation and the Council of University Transportation Centers (CUTC). Landry’s research interests include in-vehicle information system design, driver safety, and multimodal interaction.

CEE and RTP student DARIAN REED was awarded a Summer Undergraduate Research Fellowship (SURF) to study the “Evaluation of Methods to Record Head Orientation in Driving Simulator and In-Vehicle Study Environments”.

OUTREACH
MTTI provides financial support of affiliation fees to multiple external organizations in which members can participate in workshops, respond to RFPs, collaborate with other researchers and showcase their expertise. Fees were financed to THE AMERICAN PUBLIC TRANSIT ASSOCIATION (APTA), COUNCIL FOR UNIVERSITY TRANSPORTATION CENTERS (CUTC), and the NATIONAL ROAD RESEARCH ALLIANCE (NRRA).

JAKE HILLER (CEE) represented MTTI at the NRRA annual meeting and at the 2017 Pavement Conference and Workshop held in St. Paul, MN. Jake is a member of the NRRA Rigid Pavement Team while ZHANPING YOU (CEE) works with the Flexible Pavement Team.

PAM HANNON (MTTI) traveled to the Transportation Research Board annual meeting in Washington, DC attending conferences and workshops as well as representing MTTI at the CUTC annual winter meeting.

EDUCATION
MTTI faculty and staff are committed to providing opportunities for students to explore their role in creating the transportation of the future through financial sponsorship of educational youth programs. The past year included funding for:

- **“Design a Sustainable Future” Teacher Institute** - Teachers of grades 4-12 convened on the MTU campus for a workshop providing them with the tools for sharing STEM education with their students including product life cycles, building design, renewable energy sources, low impact site design, water reuse, and smart transportation.
• **KBIC Middle School Exploration** - This 3 week Engineering Exploration camp at MTU answered the question of “What is Engineering” for local middle school students. Explorations included chemical engineering, biomedical engineering, civil engineering and bridge building, transportation engineering, environmental engineering and materials engineering.

• **Natural Resource & Engineering Career Exploration** - Michigan Tech hosted a 6-day trip to explore environmental science and engineering majors for all high school students in Detroit and Wayne Counties. Included in the exploration were forestry, natural resources, wildlife, engineering, and water quality activities.

• **Rail and Intermodal Transportation Summer Youth Program** - A week long exploration for students entering grades 9-12, the program is a collaboration between MTU and the University of Wisconsin-Superior. Hands-on and classroom activities include exploring the effects of rail stability, operating a computer locomotive simulator, and investigating logistics management operations with field experiences in Michigan, Wisconsin, and Minnesota.

**INTERCAMPUS SUPPORT**

In an effort to increase campus collaboration, MTTI took the lead in multiple events to increase the visibility and to explore new opportunities in transportation on and off campus.

**Mobility Related Activities**

MTTI led the organization and retrieval of campus data in response to an RFP issued by the U.S. Department of Transportation (USDOT) for a Beyond Traffic Innovation Center (BTIC). Michigan Tech was selected as one of the seventeen Beyond Traffic Innovation Centers (BTIC) in the nation; one of three universities to serve the rural areas of the US. Figure 8 identifies other campus entities involved in the proposal.
MTTI also collaborated with the KRC in their proposal submission to the USDOT for the Designated Automated Vehicle Proving Grounds Pilot Program. MTTI retrieved and organized campus data for the submission.

Prompted by the information collected for the Proving Grounds proposal and the realization that many on campus were not aware of KRC’s facilities, MTTI organized a campus tour of the winter proving grounds for faculty and staff.

Michelle Mueller, Senior Project Manager for MDOT’s Connected and Automated Vehicles (CV/AV) program, contacted MTU for a summary of Michigan Tech’s educational and workforce development activities in the CV/AV area, in order to provide an update to MDOT Director Kirk Steudle. MTTI gathered information on curriculum, programs, outreach, groups and associations, then provided a two page high level summary along with a 15 page overview of campus activities to Jay Meldrum (KRC), who forwarded on to Mueller.

As mentioned earlier, the most significant event for MTTI was the collaboratively organized Mobility Summit on campus. Encouraged by the mobility related activities outlined above, a group of Michigan Tech stakeholders decided to organize the Summit and MTTI took one of the leading roles. MTTI extended an invitation to Director Steudle for a campus visit to showcase MTU’s space in the mobility field and to provide a keynote address in the Summit. Also invited to provide comments was Dr. Paul Rogers, Director of the Tank Automotive Research, Development and Engineering Center (TARDEC).
Eighteen faculty and student researchers provided brief Tech Talks type of overviews on their projects. Topics ranged from connected and autonomous vehicles to technology enabling mobility, infrastructure, education, cybersecurity and human factors. Researchers from six university departments or centers took part in the presentations. In addition, a poster session provided more in-depth information on projects, facilities and opportunities at Michigan Tech.

As a consequence of the multiple CV/AC activities on campus, a mobility group list serve and website were created for better communication among campus players.

**Other Outreach Activities**

For the eighth consecutive year, MTTI financially sponsored the annual CLEAN SNOWMOBILE CHALLENGE, organized and led by the KRC.

MTTI also provided in-kind support to the UP ROAD BUILDERS ASSOCIATION for their annual auction, which raises funds through the donations for a student scholarship endowment. MTU CEE students were the recipients of $8,000 in scholarship funding plus two $500 cooperative awards in FY17.

Both CTT and MTTI cooperated to host the October 2016 First Friday Social in an effort to expand campus relations and create an environment for networking and socialization with all departments on campus.

The Rail Transportation Program (under MTTI umbrella) organized both on and off-campus professional events. 3rd annual Rail Day/Expo and Railroad Night XII brought a dozen industry companies on campus, allowing students, faculty and local technology companies to be immersed in latest rail technology developments. 4th annual Michigan Rail Conference, on the other hand, brought 160 rail transportation stakeholders to Marquette to discuss latest issues and trends within and outside Michigan.
CONFERENCES AND WORKSHOP TRAVEL

MTTI researchers, staff, and students participate in and lead transportation conferences and workshops at the local, state, national and international level. Much of the travel is covered by the individual through project funds, but a MTTI travel stipend is also available to all members to support their participation in such events, increasing the visibility and recognition of MTTI and Michigan Tech. The following activities were supported by MTTI travel stipends in FY 2017:

- SIYU CHEN, a PhD student in CEE, attended the 2017 Transportation Research Board (TRB) in Washington, DC where he presented a poster and attended sessions and workshops.
- Also attending TRB, QINGLI DAI (CEE) presented two papers and visited the National Science Foundation for meetings with her program manager on her NSF project.
- CEE PhD student ANDREW GROENEVELD presented research on Ultra High Performance Concrete (UHPC) in a technical session at the First International Interactive Symposium in Des Moines, Iowa.
- PASI LAUTALA (CEE) led the AR040 Standing Committee on Freight Rail Transportation meeting at the 2017 annual TRB meeting, plus presented a poster on his current research.
- Traveling to India, THOMAS OOMMEN (GMES) met with landslide experts in South Asia and was an invited presenter at the Indian Geotechnical Conference.
- CEE PhD student MOHAMMADHOSSEIN SADEGHIAHAMI presented a paper entitled “Slope Movement in Permafrost near Fairbanks Alaska” at the 2016 Geo-Chicago conference.
- XU YANG (CEE PhD) traveled to Ann Arbor, MI to participate in the 7th Rubber Modified Asphalt Conference.
- In Beijing, Fuzhou, and Xi’an, China, ZHANPING YOU presented on four topics at the Beijing University of Technology, presented in a workshop at Fuzhou University, and had committee meetings in Xi’an.
- KUILIN ZHANG (CEE) attended the 2017 TRB annual meeting for workshops, sessions and committee meetings.

Institute Membership

FY17 membership in MTTI increased to over 80 members in multi-disciplinary centers, institutes, programs and departments. Current MTTI members are listed below.

CENTERS, INSTITUTES AND PROGRAMS
CENTER FOR SCIENCE AND ENVIRONMENTAL OUTREACH (CSEO)
Joan Chadde, Director

CENTER FOR TECHNOLOGY AND TRAINING (CTT)
Chris Codere, Senior Project Manager
Tim Colling, Director
Chris Gilbertson, Associate Director
John Kiefer, Research Engineer II
Nick Koszykowski, Principal Programmer
Dale Lighthizer, Training Development Specialist
Luke Peterson, Principal Programmer
Gary Schlaff, Senior Project Manager
Peter Torola, Research Engineer II

GREAT LAKES RESEARCH CENTER (GLRC)
Guy Meadows, Director

KEWEENAW RESEARCH CENTER (KRC)
Russ Alger, Director, Snow Institute
Jay Meldrum, Director

MICHIGAN TECH RESEARCH INSTITUTE (MTRI)

RAIL TRANSPORTATION PROGRAM (RTP)
Pasi Lautala, Director RTP/Assistant Professor (CEE)
Dave Nelson, Senior Research Engineer

SUSTAINABLE FUTURES INSTITUTE (SFI)
Robert Handler, Operations Manager

TRIBAL TECHNICAL ASSISTANCE PROGRAM (TTAP)
John Velat, Director
Scott Bershing, Technical Editor

DEPARTMENTS AND SCHOOLS

BIOLOGICAL SCIENCES (BS)
Nancy Auer, Professor
Rupali Datta, Associate Professor

CHEMISTRY (CHEM)
Shiyue Feng, Professor
Pat Heiden, Professor

CIVIL AND ENVIRONMENTAL ENGINEERING (CEE)
Tess Ahlborn, Professor
Brian Barkdoll, Professor

Jennifer Becker, Associate Professor
Bill Bulleit, Professor
Qingli Dai, Assistant Professor
George Dewey, Associate Professor
Dave Hand, Department Chair
Jake Hiller, Associate Professor
Ralph Hodek, Associate Professor
Zhen Liu, Assistant Professor
Kris Mattila, Associate Professor
Amlan Mukherjee, Associate Professor
Eric Seagren, Professor
Bill Sproule, Professor
Andrew Swartz, Assistant Professor
Stan Vitton, Associate Professor
Dave Watkins, Professor
Veronica Webster, Associate Professor
Pengfei Xue, Assistant Professor
Zhanping You, Professor
Kuilin Zhang, Assistant Professor

COGNITIVE AND LEARNING SCIENCES (CLS)
Kedmon Hungwe, Associate Professor
Myounghoon Jeon, Assistant Professor
Kelly Steelman, Assistant Professor

COMPUTER RESOURCES
Gowtham Shankara, Director

COMPUTER SCIENCE (CS)
Laura Brown, Assistant Professor
Nilufer Onder, Associate Professor

ELECTRICAL AND COMPUTER ENGINEERING (ECE)
Zhuo Feng, Associate Professor
Tim Havens, Assistant Professor
Chee-Wooi Ten, Assistant Professor

GEOLICAL AND MINING ENGINEERING AND SCIENCES (GMES)
Snehamoy Chatterjee, Assistant Professor
John Gierke, Department Chair
Thomas Oommen, Associate Professor
Rudiger Escobar Wolf, Post Doctorate

HUMANITIES (HU)
Ann Brady, Professor
Karla Kitalong, Professor
Erin Smith, Principal Lecturer

MATERIALS SCIENCE AND ENGINEERING (MSE)
Jerry Anzalone, Lab Supervisor/Research Scientist I
Paul Sanders, Associate Professor
Larry Sutter, Professor

MATHEMATICAL SCIENCES (MS)
Jianping Dong, Professor
Min Wang, Assistant Professor

MECHANICAL ENGINEERING - ENGINEERING MECHANICS (ME-EM)
Andrew Bamard, Assistant Professor
Joshua Pearce, Associate Professor
Ye Sun, Assistant Professor

PHYSICS (PHYS)
Claudio Mazzoleni, Associate Professor

SCHOOL OF BUSINESS AND ECONOMIC (SBES)
Jon Leinonen, Mentor in Residence
Paul Nelson, Associate Professor

SCHOOL OF FOREST RESOURCES & ENVIRONMENTAL SCIENCES (SFRES)
Evan Kane, Assistant Professor

SOCIAL SCIENCES (SS)
Melissa Baird, Assistant Professor
Don Lafreniere, Assistant Professor
Carol MacLennan, Professor
Tim Scarlett, Associate Professor
Chelsea Schelly, Assistant Professor
Richelle Winkler, Assistant Professor
LouAnn Wurst, Professor

VAN PELT & OPIE LIBRARY (LIB)
Sarah Lucchesi, Instructional & Learning Librarian
Space and Facilities Requirements

MTTI doesn’t currently hold official ownership of facilities, but rather uses facilities that are officially designated for Departments, etc. It is believed that current space and facilities available to MTTI staff and researchers are sufficient at this time. However, due to significant investments that MTTI has made in various space improvements in the past, the “ownership” of these spaces will be discussed in more detail during FY 18. This is to secure that MTTI investments are protected in the long term.

Future Plans and Goals

The goals set by the Director and Executive Committee for the remaining portion of FY17 and communicated to the general membership at the semi-annual meeting in January 2017, are provided below. After each goal is the status at the end of FY 17:

1. “Simplify” Operations
   - Finalize/approve updated Charter/Bylaws - IN PROGRESS
   - Develop (and maintain) timely election schedule/structure - COMPLETED
   - Finalize EC policy and procedure document – IN PROGRESS
   - Updated cost share policy (for projects requiring cost share) - COMPLETED

2. Increase MTTI visibility
   - Improve web site – IN PROGRESS
   - Organize events (KRC test track tour/MTTI speakers, etc.) - CONTINUOUS
   - Discuss future opportunities with MDOT

3. Enhance member engagement
   - Increase transparency - CONTINUOUS
   - Survey MTTI membership (results and potential actions) - COMPLETED
   - General meetings each semester - CONTINUOUS
   - Cross-pollination with other transportation entities at Tech - CONTINUOUS
   - Leadership in collaborative PROPOSALS - CONTINUOUS

The goals above are also valid for the FY18. The progress is being monitored by the Director and the Executive Committee and additional goals are expected to be established at the end of 2017 calendar year, as some of the current items get completed.
The Director and Executive Committee also plan to realign MTTI spending priorities due to the reduction in center/institute IRAD return, recently introduced administrative fee on account balances, and potential loss of returns from CTT, if it becomes separated from MTTI umbrella.
<table>
<thead>
<tr>
<th>Principal Investigator</th>
<th>Co-Principal Investigators</th>
<th>Sponsor</th>
<th>Proposal Title</th>
<th>Project Value</th>
<th>Status</th>
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<td>Tim Colling</td>
<td>Chris Codere, John Kiefer</td>
<td>Michigan Department of Transportation</td>
<td>2017 MI Local Technical Assistance Program</td>
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<td>Zhen Liu</td>
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<td>National Science Foundation</td>
<td>CAREER: Understanding of Stresses in Porous Materials based on Atom-level Forces</td>
<td>$569,934</td>
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<td>Kuilin Zhang</td>
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<td>National Science Foundation</td>
<td>CAREER: Data-driven optimization and control of connected vehicles for resilient and independent smart grid and intelligent transportation systems</td>
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<td>Pasi Lautala</td>
<td>Myounghoon Jeon, Dave Nelson</td>
<td>Federal Railroad Administration</td>
<td>Driver Behavior at Highway-Rail Grade Crossings Using NDS Data and Driving Simulators</td>
<td>$271,223</td>
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<td>John Velat</td>
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<td>Federal Highway Administration</td>
<td>TTAP</td>
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<td>University of Michigan Dearborn</td>
<td>Connected and Automated Accessible Transportation</td>
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<td>RSG, Inc.</td>
<td>MDOT Statewide Passenger and Freight Travel Demand</td>
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<td>Gary Schlaff</td>
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<td>Tim Colling</td>
<td>John Kiefer</td>
<td>Michigan Department of Transportation</td>
<td>TAMC Activities 2017</td>
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<td>Zhanping You</td>
<td>Chris Gilbertson</td>
<td>Michigan Department of Transportation</td>
<td>Identify Best Practices in Pavement Design, Construction and Maintenance in Wet Freeze Climates Similar to Michigan</td>
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<td>Tim Colling</td>
<td>John Kiefer, Chris Gilbertson</td>
<td>Michigan Department of Transportation</td>
<td>2017 TAMC Education Work Program</td>
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<td>Zhanping You</td>
<td>X. Yang, S. Chen</td>
<td>Michigan Department of Transportation</td>
<td>Pavement Thickness Evaluation Using 3D GPR</td>
<td>$162,858</td>
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<td>Zhanping You</td>
<td>X. Yang</td>
<td>Minnesota Department of Transportation</td>
<td>Is Seal Coating Counterproductive or Not?</td>
<td>$136,508</td>
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<td>Qingli Dai</td>
<td>Xu Yang</td>
<td>Minnesota Department of Transportation</td>
<td>High Density Hot Mix Asphalt (HMA)</td>
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<td>Snehamoy Chatterjee</td>
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<td>Truck Station Location Optimization Using Genetic Algorithm Based Metaheuristic Algorithm</td>
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<td>Biomimic Design of MicroHydrojets for Reduced Alkali Silica Reaction</td>
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<td>Thomas Oommen</td>
<td>National Science Foundation</td>
<td>Landslide Prediction and Measurement Using Satellite Remote Sensing to Advance Hazard Mitigation for Civil Infrastructure</td>
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<td>Tim Colling</td>
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<td>Continuing RoadSoft Support and Development for MDOT Safety Services Unit</td>
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<td>2017 RoadSoft Asset Management System Development and Support</td>
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<td>Kuilin Zhang</td>
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<td>An Integrated Behavior Based Simulation Platform to Model Freeway Traffic in a Connected Driving Environment</td>
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<td>2017 MERL Development &amp; Support</td>
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<td>Zhen Liu</td>
<td>National Science Foundation</td>
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<td>Hyungchul Yoon</td>
<td>University of New Mexico</td>
<td>Objective Monitoring of Transit Operations Safety Using UAVs</td>
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<td>Zhanping You</td>
<td>University of Iowa</td>
<td>Rapid Tests and Specifications for Construction of Asphalt-Implementation of RoadSoft for MDOT Safety Services</td>
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<td>Pending</td>
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<td>Michigan Department of Transportation</td>
<td>New Plastic Concrete with Pulverized Polyester/Nylon Fibers and Rubber Particles for Structure Construction</td>
<td>$34,789</td>
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<td>Qingli Dai</td>
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<td>Develop and Implement a Freeze Thaw Model Based Seasonal Load Restriction Decision-Support Tool</td>
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<td>Snehamoy Chatterjee</td>
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<td>Hui Yao</td>
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<td>Foamed GTR Asphalt for High Traffic Volume and the Recyclability of GTR Asphalt</td>
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<td>CR: Exploring Aftershock-induced Structural Damages and their Cascading Effect to Disaster Response</td>
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<td>Understanding Stress Formulation in Multiphase Porous Materials with Hybrid Statistical Mechanics Simulations</td>
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<td>Qingli Dai</td>
<td>Bruce Lee</td>
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<td>Monitoring Lateral Earth Pressure and Movements of Cut Retaining Wall</td>
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<td>Hyungchul Yoon</td>
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<td>CPS: Collaborative Research: Monitoring Aftershock-Induced Structural Damages and their Cascading Effect to Disaster Response using Cyber-Physical Systems</td>
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<td>John Velat</td>
<td>Federal Highway Administration</td>
<td>Proposal to Establish the Eastern Regional TTAP Center at MTU</td>
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<td>Zhanping You, Qingli Dai</td>
<td>Michigan Department of Environmental Quality</td>
<td>Tire Rubber Modified Asphalt Emulsion for Effective Pavement Preservation</td>
<td>$997,004</td>
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<td>Image-Data-Driven Deep Learning in Geosystems: Exploratory Investigation into the Stability of Retaining Walls</td>
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<td>Environmental Protection Agency</td>
<td>EPA Environmental Finance Center for Great Lakes Region</td>
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<td>Bob Shuchman</td>
<td>Thomas Oommen</td>
<td>World Bank Group</td>
<td>Building Resilience to Landslide and Geo-hazard Risk in Afghanistan Phase II</td>
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<td>Hyungchul Yoon</td>
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<td>Monitoring of Transit Operations Using Crowdsourcing with Smartphones</td>
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<td>Qingli Dai</td>
<td>Dave Hand, Min Wang</td>
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<td>Research on Reduction of pH Levels from Roadway Underdrain Outlets</td>
<td>$243,039</td>
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<td>Qingli Dai</td>
<td>Zhanping You, Min Wang</td>
<td>Michigan Department of Transportation</td>
<td>Effects of Concrete Cure Time on Epoxy Overlay &amp; Sealant Performance</td>
<td>$196,106</td>
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<td>Amlan Mukherjee</td>
<td>Andrew Swartz, Colin Brooks, Tess Ahlbom</td>
<td>Michigan Department of Transportation</td>
<td>Research on 3D Bridge Models</td>
<td>$191,794</td>
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Appendix B: MTTI Membership Survey Results

A goal of the Director and Executive Committee has been to enhance member engagement in MTTI. To better understand how members perceive MTTI activities and to capture their wants/needs, a survey was provided to members both online and at the semi-annual general meeting. 25 of 60 members participated in the survey of which the results are listed below.

1. Current Membership Status:

What is your current membership status?

![Figure 1: Membership Status](image)

2. Rank the following 6 areas of MTTI support in order of importance to you with 1 being the least important, 6 being the most important.

![Figure 2: MTTI Support](image)
In order from most to least important:

1. Other Financial Support  
2. Student Support  
3. Research Funding  
4. Travel and Event Support  
5. Admin Post-Award Support  
6. Administrative Pre-Award Support

3. From your personal perspective, rate the subcategories of support MTTI can provide in Administrative: Pre-Award Support.

![Bar Chart: Most to Least Important: Administrative Pre-Award Support]

Figure 3: Administrative Pre-Award Support

1. In order from most to least important:
2. Budget preparation
3. Transmittal and Contract Documentation Prep
4. RFP Scouting
5. Support Letters
6. Proposal Editing

4. From your personal perspective, rate the subcategories of support MTTI can provide in Administrative: Post-Award Support
1. In order from most to least important:
2. Budget/financial tracking and reporting
3. Progress report preparation
4. Technical report writing/editing
5. Project website support

5. From your personal perspective, rate the subcategories of support MTTI can provide in Travel & Event Support.

1. Most to Least Important:
2. Member and student travel
3. External speaker travel (For MTTI sponsored speakers)
4. Providing on-campus opportunities for "transportation dialog" (guest speakers, etc)
4. Providing on-campus opportunities for “transportation dialog” (guest speakers, workshops, tech talks, social gatherings)

6. From your personal perspective, rate the subcategories of support MTTI can provide in student support.

![Bar chart showing student support rankings]

**Figure 6: Student Support**

Most to Least Important:

1. MTTI Summer Internships
2. Marketing/promotion of transportation field to student candidates
3. Financial support for youth programs

Responses: One person commented that they were not aware MTTI offered student internships.

7. From your personal perspective, rate the subcategories of support MTTI can provide in Research Funding.
**Figure 7: Research Funding**

Most to least important:
1. Cost share support
2. Minor (seed funding) initiatives ($10K with 1:1 match requirement)
3. Major initiatives (2-3 years, typically $20-30K per year)

8. From your personal perspective, rate the subcategories of support MTTI can provide in Other Financial Support.

**Figure 8: Other Financial Support**

Most to Least Important:
1. Financial proposal writing support
2. Stop gap funding for programs when necessary
3. Facilities upgrades
Appendix C: Cost Share Policy

Applicable when sponsor mandated cost share is required.

<table>
<thead>
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<th>Level of IDC Return</th>
<th>Any Level</th>
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| **Cost Share Policy** | • 0% for the first $1,500 of MTTI IRAD.  
• Max. 80% of remaining MTTI IRAD Return.  
• No more than 50% of total project cost share. |