ANNUAL REPORT

for the

Research and

Innovation in STEAM

Education (RISE)

Institute

Fiscal Year 2024

submitted to

The Vice President of
Research Michigan
Technological University

Attn: Kathleen Halvorsen
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submitted by

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Michigan Technological University

RISE Institute Annual Report

1. Mission Statement

Maintain a robust and diverse community of stakeholders at Michigan Tech, who will serve as the bridge from proposal preparation and submission through empirical activities to outreach and dissemination by engaging in the following activities:

- serve the research and scholarship activities of the community of educational researchers at Michigan Tech;
- build capacity and diversity in STEAM disciplines through networking, scholarly pursuits and interdisciplinary research related to innovative pedagogy, transformative learning, and cutting-edge teaching and learning practices; and
- maximize inter-department collaboration to eliminate program duplication, enabling effective use of resources while maximizing the impact made on the Michigan Tech community.

Vision: A collaborative, interdisciplinary community fostering excellent and inclusive STEAM opportunities for all.

Core Values: Cooperation, Loyalty, Perseverance, Honesty, Objectivity

2. Summary of FY24 Activities and Highlights

During FY24 the RISE leadership worked with the Executive Directors and Membership to address the recommendations for continued support. Objectives and Strategies were developed to be the go-to institute for education-focused proposals and for incorporating strong "broader impacts" education sections for researchers. RISE staff includes Dr. Yin-Yin (Sarah) Tan, Program Development Specialist has been very instrumental in meeting the Institutes objectives, and is also coordinating with Thomas Oliver, Center for Science and Environmental Outreach CSEO.

i. The Institute is governed by a Director who collaborates with a 4-member Executive Committee. The Director and Executive Committee's governance is guided by an external Advisory Board.
ii. The Executive Committee was updated with the replacement of Susan Amato-Henderson (retired) with the nomination of Kedmon Hungwe.
iii. Members in RISE use the google group rise-l@mtu.edu. There is a join link on the RISE website for people who want to be members. This sends an email to the Director to contact that person. They are then added to the google group and added to the website. The membership list was reviewed purging and verifying current members.
iv. Six new members joined in FY24, Jon Sticklin, Jaclyn Johnson, Amber Kemppainen, Pritam Mandal, Emily Geiger, and Aneet Narendranath bringing the total membership to 70.
v. Two meetings of the membership were held in FY24. The fall meeting was on December 14, 2023, was the spring meeting was May 3, 2024. Presentation slides along with meeting minutes were distributed to all members following the meeting.
vi. An NSF-RFE proposal group was formed, and the proposal was successfully submitted in May 2024. An NSF-ATE proposal group

was formed, and two submissions are in process.

vii. A workshop resulted from the NSF- ATE proposal group that was held in summer 2024 for RISE members to learn from NSF-ATE mentor Mel Cosette, Edmonds College, WA, and tips for completing bio sketch, C&P, COA, and synergistic activities.

viii. Links to proposal opportunities are posted on the RISE website. In addition, messages are sent by the RISE Director to members with updates, as well as external sponsored opportunities that are generated through Grantforward.com.

ix. Current center/institute member list (See appendix F)

3. Budget Overview
    a. FY24 budget summary includes $27,872 in revenue plus $50,408 in carry forward. Expenditures were $32,015. Balance at year end equals $46,266. (see appendices A & B for detailed expenditures and income).
    b. Rise Institute IRAD was used to enhance member capacity in the enterprise program senior project support, and for the Pavlis Honors College I-Corps program ($4,997), RISE staff salary and fringe ($26,531), and food for member meetings/travel/books/supplies ($486). These services and assistance were provided directly impact members to help them to be more competitive for external sponsored awards.
    c. Total Awards for FY24 are (34, $635,660), number of projects are 28, expenditures $1,147,345, and $22,619 IRAD return.
    d. Research proposals reported during FY24 included (3, $1,164,022) and awards (2, $139,367). (see appendix D)
    e. Senior project/enterprise proposals reported during FY24 included (36, $553,793) and awards (32, $496,293). (see appendix D)
    f. Budget projection chart from ASPIRE database with five-year forecast of proposals in progress (NET ICR $100,978), current and awarded projects (NET ICR $409,134), anticipated ($0), and total projected IRAD returns ($79,067) (See appendix E).
4. Future Plans and Goals
    a. Strategic goals for the next year and the future are to continue support the Research Development Specialist position. The FTE for this position has been increased to 75% for FY25 with the goal to be self-supporting 100% in future years. Also, to continue to coordinate with the new CSEO Director and the new Director of CTL, Jeff Toorongian to develop workshops to assist researchers in developing proposals.
    b. Financial goals are to increase the amount of IRAD to fully fund the RISE staff. Membership goals are to be more widely recognized on campus for faculty and staff from all colleges.
    c. No space or facility needs/goals are needed for RISE institute and members.
    d. Collaborations with other centers and institutes on projects, as well as CSEO and CTL is necessary for visibility and benefit for members.
    e. With successfully funded large proposals going through RISE there will be IRAD available to fully support RISE staff.
5. Challenges and Barriers
    a. The lack of teacher education faculty at Michigan Tech with expertise in educational assessment strategies.
    b. Few MTU faculty have experience in STEAM education research.

Appendix A: Major expenditures FY24

Category	Expense ($)
Staff S&W	19,087.29
Fringe Benefits	7,444.08
Other Non-Mandatory Transfers (Out) – Pavlis I-corps Enterprise/SP	4,997.47
Food – Membership meetings & travel meals	294.81
Books and Supplies – STEM reading group (Amber Kemppainen)	191.16
Total Expenditures:	**32,014.81**

Appendix B: Total revenue & budget FY24

Category	Revenue ($)
IRAD Transfers In	22,619.17
Other Transfers In (Senior Project return)	5,253.18
Total Revenue:	**27,872.35**
Carryforward:	**50,408.23**
Expenditures: (See Appendix A)	-32,014.81
Account Budget Balance:	**46,265.77**

Appendix C: Ongoing research proposals, FY24

1) Michigan Middle School Master Teachers Fellowship Program
Principal Investigator: Jacqueline E. Huntoon
Division/Dept: Administration/Provost Office
Sponsor: National Science Foundation
Requested Amount: $1,887,979
Budget Start: March 2018
Budget End: Feb 2024

2) Collaborative Research: NSF-RISE-CAREER: Cavitation
Principal Investigator: Roohollah Askari
Division/Dept: Geological & Mining Eng & Sciences
Sponsor: National Science Foundation
Funding Amount: $301,108
Budget Start: May 2023
Budget End: April 2028

3) Research Initiation: Factors Motivating Engineering Faculty to Adopt and Teach New Engineering Technologies
Principal Investigator: Michelle Jarvie-Eggart
Division/Dept: College of Engineering/Engineering Fundamentals
Sponsor: National Science Foundation
Funding Amount: $199,633
Budget Start: Sep-2020
Budget End: Aug-2024

4) Research Initiation: Collaborative Research: Recognition of Gender Stereotyping as a Determinant of Stereotype Assimilation and Contrast Effects Resulting from Subtle Bias Exposure in STEM
Principal Investigator: Lorelle Meadows
Division/Dept: College of Sciences and Arts/Cognitive and Learning Sciences
Sponsor: National Science Foundation
Funding Amount: $328,757
Budget Start: Aug-2020
Budget End: Jul-2024

5) Engineering Technology Scholars - IMProving REtention and Student Success (ETS-IMPRESS)
Principal Investigator: John Irwin
Division/Dept: College of Engineering/MMET
Sponsor: National Science Foundation
Funding Amount: $999,483
Budget Start: Jan-2018
Budget End: Dec-2025

6) COPPE-RISE-CTE Mechatronics
Principal Investigator: John Irwin
Division/Dept: College of Engineering/MMET
Sponsor: CCISD
Funding Amount: $40,000
Budget Start: July-2023
Budget End: June-2024

7) UPWAR-RISE-MiLEAP
Principal Investigator: John Irwin
Division/Dept: College of Engineering/MMET
Sponsor: Upper Peninsula Michigan Works
Funding Amount: $ 123,406
Budget Start: July-2021
Budget End: June-2024

Appendix D: Proposals submitted affiliated with RISE, FY24

Table 1: Research Project Proposals 7/1/2023 – 6/30/2024

STATUS	PRINCIPAL NAME	DIVISION NAME	FULL PROJECT TITLE	SPONSOR	TOTAL SPONSOR COST
Closed	Michelle Jarvie-Eggart	College of Engineering	Developing at-scale spatial skills interventions for STEM success informed by cognitive, affective, and neural underpinnings	NSF	$386,413
Funded	Michelle Jarvie-Eggart	College of Engineering	Collaborative Research: Research Initiation: Understanding the Opportunities and Impacts of Undergraduate Engineering Students' Adoption of Software Engineering Practices and Tools	NSF	$61,770
Submitted	Shari Stockero	Psychology and Human Factors	Collaborative Research: Learning to Build on MOSTs	NSF	$715,839
				Total	**$1,164,022**

Table 2: Research Project Awards

STATUS	PRINCIPAL NAME	PI UNIT	FULL PROJECT TITLE	SPONSOR	TOTAL SPONSOR COST
Active	Michelle Jarvie-Eggart	Engineering Fundamentals	Collaborative Research: Research Initiation: Understanding the Opportunities and Impacts of Undergraduate Engineering Students' Adoption of Software Engineering Practices and Tools	NSF	$61,770
Active	Mary Raber	Engineering Fundamentals	NSF I-Corps - Midwest Region	University of Michigan	$ 77,597
				Total	**$139,367**

Table 3: Enterprise/Senior Project Proposals

STATUS	PRINCIPAL NAME	DIVISION_NAME	SPONSOR	TOTAL SPONSOR COST
Submitted	Sean Kirkpatrick	College of Engineering	Stryker Corp	$5,000.00
Funded	Nagesh Hatti	Administration	Los Alamos National Laboratory	$17,500.00
Funded	Sean Kirkpatrick	College of Engineering	Resolve Surgical Technologies	$17,500.00
Funded	Robert Pastel	College of Computing	Stevens Institute of Technology	$10,000.00
Submitted	Christopher Cischke	College of Engineering	Gentex Corp	$17,500.00

Funded	William Endres	College of Engineering	Kohler Co	$17,500.00
Funded	David Labyak	College of Engineering	Lear Corp	$17,500.00
Funded	William Endres	College of Engineering	Stryker Instruments	$35,000.00
Submitted	Robert Pastel	College of Computing	General Dynamics Land Systems	$17,500.00
Funded	Sean Kirkpatrick	College of Engineering	Barologics	$2,000.00
Funded	Sunil Mehendale	College of Engineering	Components Express Inc	$3,500.00
Funded	Glen Archer	College of Engineering	Stevens Institute of Technology	$10,000.00
Funded	Glen Archer	College of Engineering	Stevens Institute of Technology	$10,000.00
Funded	Glen Archer	College of Engineering	Oshkosh Corp	$15,000.00
Funded	David Labyak	College of Engineering	Waupaca Foundry Inc	$17,500.00
Funded	Christopher Cischke	College of Engineering	Stevens Institute of Technology	$10,000.00
Funded	Anthony Pinar	College of Engineering	Riverbend Lepak LLC	$3,500.00
Funded	Christopher Cischke	College of Engineering	Stellantis/North American Headquarters	$17,500.00
Funded	William Endres	College of Engineering	Cummins Inc	$17,500.00
Funded	Jon Herlevich	College of Engineering	Koppers Inc/Koppers Performance Chemicals Inc	$17,500.00
Funded	William Endres	College of Engineering	Consolidated Nuclear Security LLC	$8,000.00
Funded	William Endres	College of Engineering	Paper Converting Machine Company	$11,500.00
Funded	Glen Archer	College of Engineering	Stevens Institute of Technology	$10,000.00
Funded	William Endres	College of Engineering	Milwaukee Elec Tool Co	$17,500.00
Submitted	Sean Kirkpatrick	College of Engineering	Stryker Corp	$17,500.00
Funded	Sean Kirkpatrick	College of Engineering	Stevens Institute of Technology	$10,000.00
Funded	William Endres	College of Engineering	John Deere Co/Construction and Forestry	$17,500.00
Funded	Paulus Van Susante	College of Engineering	Blue Origin	$31,793.00
Funded	William Endres	College of Engineering	John Deere Co/Construction and Forestry	$17,500.00
Funded	Nagesh Hatti	Administration	Miller Electric Mfg Co	$17,500.00
Funded	William Endres	College of Engineering	Our Next Energy	$17,500.00
Funded	Anthony Pinar	College of Engineering	Kimberly-Clark Corp	$17,500.00
Funded	Anthony Pinar	College of Engineering	ThermoAnalytics Inc	$17,500.00
Funded	Smitha Rao Hatti	College of Engineering	Kimberly-Clark Corp	$17,500.00
Funded	Jon Herlevich	College of Engineering	Glaxosmithkline LLC(GSK)	$28,500.00
Funded	William Endres	College of Engineering	Nucor Corp/Nucor Steel	$17,500.00
			Total	**$553,793**

Table 4: Enterprise/Senior Project Awards

STATUS	PRINCIPAL NAME	PI UNIT	SPONSOR	TOTAL SPONSOR COST
Active	Smitha Rao Hatti	Biomedical Engineering	Kimberly-Clark Corp	$17,500.00
Active	Sean Kirkpatrick	Biomedical Engineering	Stevens Institute of Technology	$10,000.00
Active	Sean Kirkpatrick	Biomedical Engineering	Barologics	$2,000.00
Active	Sean Kirkpatrick	Biomedical Engineering	Resolve Surgical Technologies	$17,500.00
Active	Jon Herlevich	Chemical Engineering	Glaxosmithkline LLC(GSK)	$28,500.00
Active	Jon Herlevich	Chemical Engineering	Koppers Inc/Koppers Performance Chemicals Inc	$17,500.00
Active	Robert Pastel	Computer Science	Stevens Institute of Technology	$10,000.00
Active	Christopher Cischke	Electrical and Computer Engineering	Stellantis/North American Headquarters	$17,500.00
Active	Glen Archer	Electrical and Computer Engineering	Stevens Institute of Technology	$10,000.00
Active	Anthony Pinar	Electrical and Computer Engineering	Riverbend Lepak LLC	$3,500.00
Active	Christopher Cischke	Electrical and Computer Engineering	Stevens Institute of Technology	$10,000.00
Active	Glen Archer	Electrical and Computer Engineering	Oshkosh Corp	$15,000.00
Active	Anthony Pinar	Electrical and Computer Engineering	Kimberly-Clark Corp	$17,500.00
Active	Anthony Pinar	Electrical and Computer Engineering	ThermoAnalytics Inc	$17,500.00
Active	Glen Archer	Electrical and Computer Engineering	Stevens Institute of Technology	$10,000.00
Active	Glen Archer	Electrical and Computer Engineering	Stevens Institute of Technology	$10,000.00
Active	Nagesh Hatti	Enterprise	Miller Electric Mfg Co	$17,500.00
Active	Nagesh Hatti	Enterprise	Triad National Security LLC	$17,500.00
Active	David Labyak	Manufacturing & Mech Eng Technology	Waupaca Foundry Inc	$17,500.00
Active	David Labyak	Manufacturing & Mech Eng Technology	Lear Corp	$17,500.00
Active	Sunil Mehendale	Manufacturing & Mech Eng Technology	Components Express Inc	$3,500.00
Active	William Endres	Mechanical & Aerospace Engineering	John Deere Co/Construction and Forestry	$17,500.00
Active	Paulus Van Susante	Mechanical & Aerospace Engineering	Blue Origin	$31,793.00
Active	William Endres	Mechanical & Aerospace Engineering	Paper Converting Machine Company	$11,500.00
Active	William Endres	Mechanical & Aerospace Engineering	John Deere Co/Construction and Forestry	$17,500.00

Closed	William Endres	Mechanical & Aerospace Engineering	Consolidated Nuclear Security LLC	$8,000.00
Active	William Endres	Mechanical & Aerospace Engineering	Kohler Co	$17,500.00
Active	William Endres	Mechanical & Aerospace Engineering	Milwaukee Elec Tool Co	$17,500.00
Active	William Endres	Mechanical & Aerospace Engineering	Stryker Instruments	$35,000.00
Active	William Endres	Mechanical & Aerospace Engineering	Cummins Inc	$17,500.00
Active	William Endres	Mechanical & Aerospace Engineering	Nucor Corp/Nucor Steel	$17,500.00
Active	William Endres	Mechanical & Aerospace Engineering	Our Next Energy	$17,500.00
			Total	**$496,293**

Appendix E: Budget projection chart from ASPIRE

Table 1: Budget Projection Graph - RISE

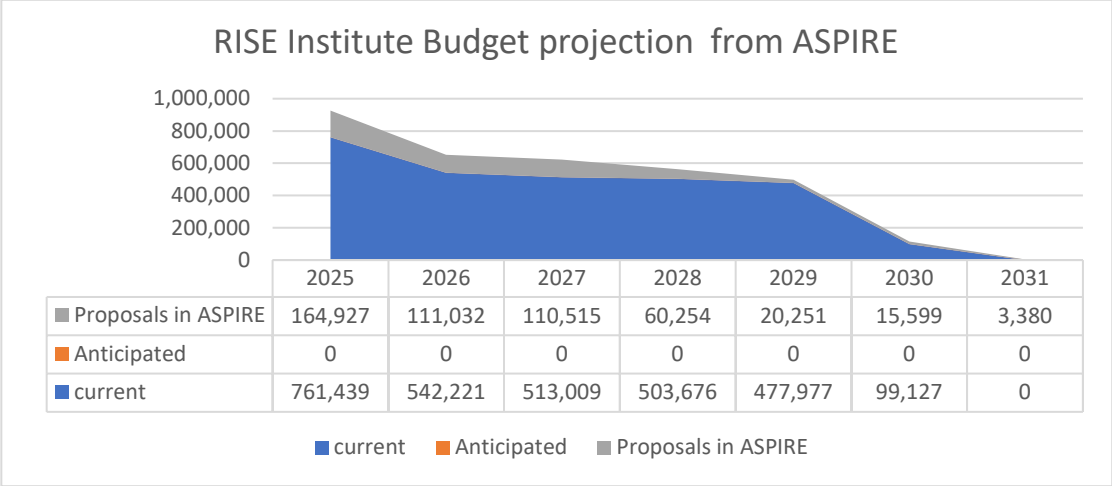

Table 2: Budget Projection Table - RISE

	2025	2026	2027	2028	2029	2030	2031	Total
Combined Current & Proposals in Progress	926,366	653,253	623,524	563,930	498,228	114,726	3,380	3,383,406
RISE Return (15.5%)	21,313	16,367	14,790	13,118	10,674	2,670	136	79,067
Current awarded net ICR	111,366	81,487	70,941	68,706	63,470	13,165	0	409,134
Anticipated Net ICR	0	0	0	0	0	0	0	0
Proposals in progress Net ICR	26,134	24,106	24,478	15,926	5,393	4,060	880	100,978

Appendix F: RISE Membership FY24

Email	College	Department	Member Name
asmirnov@mtu.edu	Engineering	geological and Mining	Aleksey Smirnov
algonczi@mtu.edu	Sciences and Arts	Psychology and Human Factors	Amanda Gonczi
amber@mtu.edu	Engineering	Engineering Fundamentals	Amber Kemppainen
arbarnar@mtu.edu	Engineering	Mechanical and Aerospace Engineering	Andrew Barnard
ajburton@mtu.edu	Forest Resources and Env Science	Forestry	Andrew J. Burton
raswartz@mtu.edu	Engineering	Civil, Environmental, and Geospatial	R. Andrew Swartz
dnaneet@mtu.edu	Engineering	Mechanical and Aerospace Engineering	Aneet Narendranath
anmorse@mtu.edu	Engineering	Civil, Environmental, and Geospatial	Audra Morse
bhhamlin@mtu.edu	Engineering	Engineering Fundamentals	Brett Hamlin
bcbettin@mtu.edu	Computing	Computer Science	Briana Bettin
cjandrew@mtu.edu	Forest Resources and Env Science	Forestry	Carrie Andrew
heldt@mtu.edu	Engineering	Chemical	Caryn Heldt
wallace@mtu.edu	Computing	Computer Science	Charles Wallace
cmcischk@mtu.edu	Engineering	Electrical and Computer	Christopher (Kit) Cischke
clwojick@mtu.edu	Staff	Civil, Environmental, and Geospatial	Christopher Wojick
djflaspo@mtu.edu	Forest Resources and Env Science	Forestry	David J. Flaspohler
dmlabyak@mtu.edu	Engineering	Manufacturing & Mechanical Engineering Technology	David M. Labyak
drshonna@mtu.edu	Engineering	Chemical	David R. Shonnard
dllandsb@mtu.edu	Computing	Computer Science	Denise Landsberg
ealaitil@mtu.edu	Engineering	Material Science and Engineering	Edward A Laitila
egeiger@copperisd.org		Western U.P. MiSTEM Network	Emily Geiger
ecvye@mtu.edu	Staff	GLRC	Erika Vye
ersmith@mtu.edu	Sciences and Arts	Humanities	Erin Smith
gearcher@mtu.edu	Engineering	Electrical and Computer	Glen E. Archer
gmodegar@mtu.edu	Engineering	Mechanical and Aerospace Engineering	Gregory M. Odegard
hademelo@mtu.edu	Engineering	Civil, Environmental, and Geospatial	Henrique De Melo E Silva
imiski@mtu.edu	Engineering	Mechanical and Aerospace Engineering	Ibrahim Miskioglu
jenesbit@mtu.edu	Engineering	Mechanical and Aerospace Engineering	Jaclyn Johnson
jeh@mtu.edu	Engineering	geological and Mining	Jacqueline E. Huntoon
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jjworm@mtu.edu	Engineering	Mechanical and Aerospace Engineering	Jeremy Worm
jdeclerck@mtu.edu	Engineering	Mechanical and Aerospace Engineering	Jim DeClerck

jaszczak@mtu.edu	Sciences and Arts	Physics	John A Jaszczak
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jsgierke@mtu.edu	Engineering	geological and Mining	John S. Gierke, PE
sticklen@mtu.edu	Engineering	Engineering Fundamentals	Jon Sticklen
khungwe@mtu.edu	Sciences and Arts	Psychology and Human Factors	Kedmon N. Hungwe
steelman@mtu.edu	Sciences and Arts	Psychology and Human Factors	Kelly S. Steelman
kevinj@mtu.edu	Engineering	Manufacturing & Mechanical Engineering Technology	Kevin M. Johnson
lebrown@mtu.edu	Computing	Computer Science	Laura E. Brown
lkfiss@mtu.edu	Pavlis	Humanities	Laura Kasson Fiss
ureel@mtu.edu	Computing	Computer Science	Leo Ureel
linda@mtu.edu	Computing	Computer Science	Linda Ott
ljbowman@mtu.edu	Engineering	geological and Mining	Luke Bowman
mjbergst@mtu.edu	Sciences and Arts	Humanities	Maria Bergstrom
maseigel@mtu.edu	Pavlis	Humanities	Marika Seigel
mraber@mtu.edu	Engineering	Engineering Fundamentals	Mary Raber
mrmeyer@mtu.edu	CTL	Center for Teaching & Learning	Michael R. Meyer
mejarvie@mtu.edu	Engineering	Engineering Fundamentals	Michelle Jarvie-Eggart
nhatti@mtu.edu	Engineering	Electrical and Computer	Nagesh Hatti
ndmanser@mtu.edu	Engineering	geological and Mining	Nathan D. Manser
paheiden@mtu.edu	Sciences and Arts	Chemistry	Patricia A. Heiden
pjvansus@mtu.edu	Engineering	Mechanical and Aerospace Engineering	Paul van Susante
Pmanda2@mtu.edu	Sciences and Arts	Physics	Pritam Mandal
rtewari@mtu.edu	Engineering	Mechanical and Aerospace Engineering	Radheshyam Tewari
pastel@mtu.edu	Computing	Computer Science	Robert Pastel
ratowles@mtu.edu	Engineering	Mechanical and Aerospace Engineering	Ryan A. Towles
kuhl@mtu.edu	Computing	Computer Science	Scott A. Kuhl
stockero@mtu.edu	Sciences and Arts	Psychology and Human Factors	Shari L. Stockero
slwu@mtu.edu	Engineering	geological and Mining	Shiliang Wu
smithar@mtu.edu	Engineering	biomedical	Smitha Rao Hatti
sdlehman@mtu.edu	Engineering	Biomedical	Steven D. Lehmann
slamato@mtu.edu	Sciences and Arts	Psychology and Human Factors	Susan L. Amato-Henderson
smalladi@mtu.edu	Engineering	Mechanical and Aerospace Engineering	Sriram Malladi
toommen@mtu.edu	Engineering	geological and Mining	Thomas Oommen
twakeham@mtu.edu	Sciences and Arts	Biological Sciences	Travis R. Wakeham
yinyint@mtu.edu	Engineering	Manufacturing & Mechanical Engineering Technology	Yin-Yin (Sarah) Tan
cai@mtu.edu	Computing	Applied Computing	Yu Cai