

ANNUAL REPORT

for the

Research and
Innovation in STEAM
Education (RISE)
Institute

Fiscal Year 2022

submitted to

The Vice President of
Research Michigan
Technological University

Attn: Kathleen
Halvorsen

Associate Vice President for Research Development

submitted by

John L. Irwin, RISE Institute Director,
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September 13, 2022

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 FY22 Activities and Highlights

On December 3, 2021 the VPR office approved RISE to be renewed for five years with an end date of 12/31/2026. During FY22 the RISE leadership worked with the Executive Directors and Membership to address the recommendations of the Deans and VPR's office. 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. The Director is actively recruiting as a member on the search committee for the GLRC position of Assistant Research Scientist in STEM Education to coordinate with RISE to meet our objectives. The Director is also coordinating with the Chair of CEGE to provide input for the Center for Science and Environmental Outreach [CSEO](#) Director position search.

- i. The Institute is governed by a Director who collaborates with a 3-member Executive Committee. The Director and Executive Committee's governance is guided by an external Advisory Board.
- ii. 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.
- iii. Two new members joined in FY22, Carrie Andrew & Erika Vye.
- iv. Members were involved in voting in support of the new governance of RISE in September, 2021. Members unanimously supported the election for FY22-25 renewing Director: John Irwin, Executive Committee Members: Cassy Tefft de Munoz, Susan Amato-Henderson, and New Executive Committee Members: Jean Kampe and Amanda Gonczi. In October there was a member update

- meeting that was recorded and sent to all members.
- v. Links to [proposal opportunities](#) are posted on the RISE website. In addition, messages are sent by the RISE Director to members with updates, and new external sponsored opportunities that are generated through Grantforward.com.
- vi. Current center/institute member list (See appendix F)

3. Budget Overview

- a. FY22 budget summary includes \$36,411 in revenue plus \$27,725 in carry forward. Expenditures were \$23,464. Balance at year end equals \$40,671. (see appendices A & B for detail 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 (\$12,886), the Director salary and fringe (\$9,400), providing matching grants (\$261), and books/supplies/software (\$917). These services and assistance were provided directly impact members to help them to be more competitive for external sponsored awards.
- c. Research/outreach proposals submitted during the FY22 included (17, \$3,328,341) and awards (5, \$262,093). (see table 1 in appendix D for individual proposals/awards)
- d. Senior project/enterprise proposals submitted during the FY22 included (33, \$481,340) and awards (32, \$472,590). (see table 2 in appendix D for individual proposals/awards)
- e. Budget projection chart from ASPIRE database with five-year forecast of proposals in progress (12, \$684,081), current projects ((13) LIFT plus (29) RISE, \$2,030,500), total projected IRAD returns (\$96,045) (See appendix E).

4. Future Plans and Goals

- a. Strategic goals for the next year and for the next five years are to continue to work with GLRC Assistant Research Scientist in STEM Education new hire to assist RISE. Also, 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 fund full time 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. There is a substantial financial gap in regards to hire fully funded RISE staff, so this is why we are coordinating with the GLRC, CSEO and CTL.
- e. With successful funded large proposals going through RISE there will be IRAD available to hire dedicated RISE staff in the future.

5. Challenges and Barriers

- a. The CLS Department has eliminated programs and has decreased the number of Teacher Education faculty with knowledge of educational assessment strategies.
- b. The search for candidates in STEM education is challenging in the current employment climate.

Appendix A: Major expenditures FY22

Category	Expense (\$)
MMET Department IRAD: Release time for John Irwin, Director	6,592.00
Fringe Benefits	2,808.25
Other Non-Mandatory Transfers (Out) – Pavlis I-corps Enterprise/SP	12,886.30
Purchasing Qualtrics License – RISE contribution	500.00
Books and Supplies – STEM reading group (ME-EM Nancy Barr)	417.35
Matching Grant Funds – Educational Outreach Proposal	261.00
Total Expenditures:	23,464.90

Appendix B: Total revenue & budget FY22

Category	Revenue (\$)
IRAD Transfers In	27,512.41
Other Transfers In (Senior Project return)	8,898.68
Total Revenue:	36,411.09
Carryforward:	27,725.09
Expenditures: (See Appendix A)	-23,464.90
Account Budget Balance:	40,671.28

Appendix C: Ongoing research proposals, FY22

- 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: 1/1/2018
Budget End: 2/2024

- 2) Collaborative Research: Building on MOSTs: Contributing to a Theory of Productive Use of Student Mathematical Thinking
Principal Investigator: Shari Stockero
Division/Dept: College of Sciences and Arts/Cognitive and Learning Sciences
Sponsor: National Science Foundation
Funding Amount: \$532,890 + \$57,700 Part Supp Building on MOST
Budget Start: 9/1/2017
Budget End: 5/2023

- 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-2023

- 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-2023

- 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: Sept-2024

Appendix D: Proposals submitted affiliated with RISE, FY22

Table 1: Research Proposals

STATUS	PRINCIPAL_NAME	DIVISION_NAME	SPONSOR	REQUESTED_AMOUNT
Pending	Michelle E. Jarvie-Eggart	College of Engineering	National Science Foundation	\$ 39,313
Pending	Roohollah Askari	College of Engineering	National Science Foundation	\$ 616,892
Declined	Michelle E. Jarvie-Eggart	College of Engineering	National Science Foundation	\$ 299,967
Closed	Leo C. Ureel II	College of Computing	US Dept of State	\$ 4,914
Closed	Cassy A. Tefft de Munoz	Administration	Detroit Area PreCollege Engineering Program	\$ 13,575
Closed	Cassy A. Tefft de Munoz	Administration	Michigan Dept of Labor and Economic Opportunity	\$ 102,145
Awarded	Cassy A. Tefft de Munoz	Administration	Michigan Dept of Labor and Economic Opportunity	\$ 181,727
Pending	Katie Knapp	Administration	Stanley Black and Decker inc	\$ 15,000
Declined	Shari Stockero	College of Sciences & Arts	National Science Foundation	\$ 814,175
Awarded	Jannah Tumey	Administration	University of Michigan-Michigan Space Grant Consortium	\$ 2,201
Pending	Bradley A. Wells	Administration	Michigan Dept of Transportation	\$ 46,834
Awarded	Jannah Tumey	Administration	Detroit Area PreCollege Engineering Program	\$ 13,165
Pending	Jannah Tumey	Administration	Detroit Area PreCollege Engineering Program	\$ 13,918
Declined	Leo C. Ureel II	College of Computing	National Science Foundation	\$ 499,647
Awarded	Laura K. Fiss	Administration	Teagle Foundation	\$ 25,000
Pending	Roohollah Askari	College of Engineering	National Science Foundation	\$ 599,868
Awarded	John Irwin	College of Engineering	Copper Country Intermediate School District (CCISD)	\$ 40,000

Table 2: Enterprise/Senior Design Proposals

STATUS	PRINCIPAL_NAME	DIVISION_NAME	SPONSOR	REQUESTED_AMOUNT
Awarded	Tony J. Pinar	College of Engineering	Lansing Board of Water & Light	\$ 17,500
Awarded	Sean J. Kirkpatrick	College of Engineering	Boston Scientific Corp	\$ 17,500
Awarded	Kent A. Cyr	College of Sciences & Arts	Destination Calumet LLC	\$ 17,500
Awarded	Tony J. Pinar	College of Engineering	Britten Studios	\$ 17,500
Awarded	Paul G. Sanders	College of Engineering	Lear Corp	\$ 17,500
Awarded	Tony J. Pinar	College of Engineering	Stromberg Carlson Products Inc	\$ 17,500
Awarded	Tony J. Pinar	College of Engineering	ThermoAnalytics Inc	\$ 17,500
Awarded	Christopher M. Cischke	College of Engineering	FCA US LLC (Fiat Chrysler Automobiles)	\$ 17,500
Awarded	Kevin M. Johnson	College of Engineering	Equinox Bicycleworks and Engineering LLC	\$ 8,500
Awarded	David M. Labyak	College of Engineering	Oshkosh Defense LLC	\$ 17,500
Awarded	Glen E. Archer	College of Engineering	Oshkosh Defense LLC	\$ 8,500

Awarded	Glen E. Archer	College of Engineering	Stevens Institute of Technology	\$ 5,000
Awarded	Sean J. Kirkpatrick	College of Engineering	Imricor	\$ 8,750
Awarded	Glen E. Archer	College of Engineering	Stevens Institute of Technology	\$ 5,000
Awarded	Sean J. Kirkpatrick	College of Engineering	Stevens Institute of Technology	\$ 5,000
Awarded	Timothy C. Havens	College of Engineering	Stevens Institute of Technology	\$ 5,000
Awarded	Paulus J. van Susante	College of Engineering	JLG Industries	\$ 17,500
Closed	Christopher M. Cischke	College of Engineering	Whirlpool Corporation	\$ 8,750
Awarded	Christopher M. Cischke	College of Engineering	Whirlpool Corporation	\$ 17,500
Awarded	Tony J. Pinar	College of Engineering	John Deere Co	\$ 14,340
Awarded	Steven D. Lehmann	College of Engineering	Cleveland-Cliffs Tubular Components LLC	\$ 17,500
Awarded	Scott A. Miers	College of Engineering	A&D Technology Inc	\$ 15,000
Awarded	Nagesh Hatti	College of Engineering	Miller Electric Mfg Co	\$ 17,500
Awarded	Sean J. Kirkpatrick	College of Engineering	Medtronic Inc	\$ 17,500
Awarded	Sean J. Kirkpatrick	College of Engineering	Stryker Instruments	\$ 17,500
Awarded	Sean J. Kirkpatrick	College of Engineering	Stryker Instruments	\$ 17,500
Awarded	Sean J. Kirkpatrick	College of Engineering	Colder Products Co	\$ 17,500
Awarded	Robert Pastel	College of Computing	National Center for the Advancement of STEM Education	\$ 22,500
Awarded	Jeremy P. Bos	College of Engineering	National Center for the Advancement of STEM Education	\$ 7,500
Awarded	David M. Labyak	College of Engineering	Deringer-Ney Inc	\$ 17,500
Awarded	Robert Pastel	College of Computing	General Dynamics Land Systems	\$ 17,500
Awarded	Brett H. Hamlin	College of Engineering	Jacquart Fabric Products	\$ 17,500
Awarded	Tony N. Rogers	College of Engineering	Org Chem Group	\$ 17,500

Appendix E: Budget projection chart from ASPIRE

Table 1: Budget Projection Graph - RISE

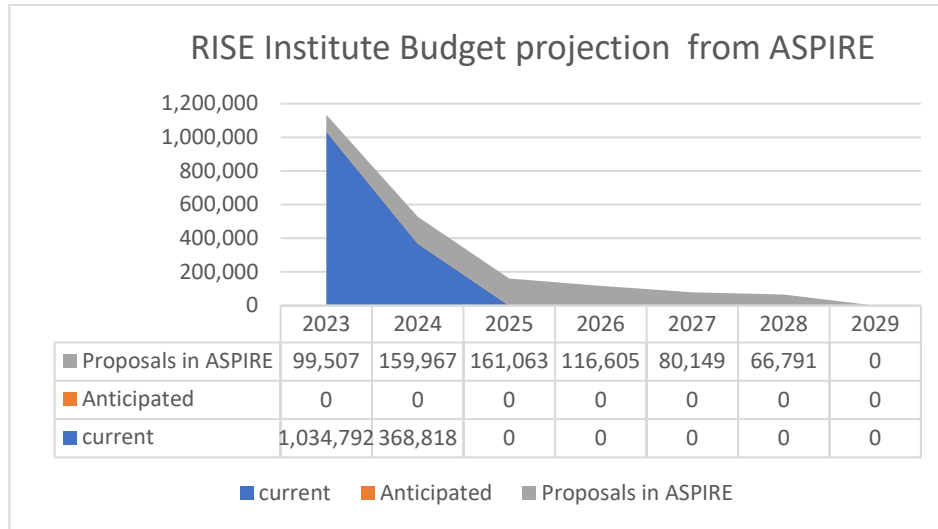


Table 2: Budget Projection Graph – LIFT

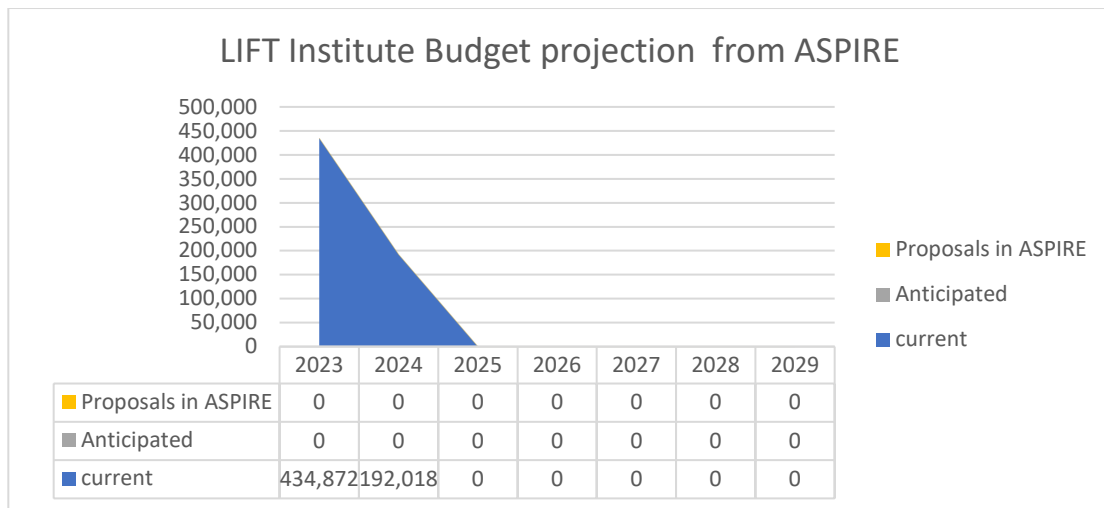
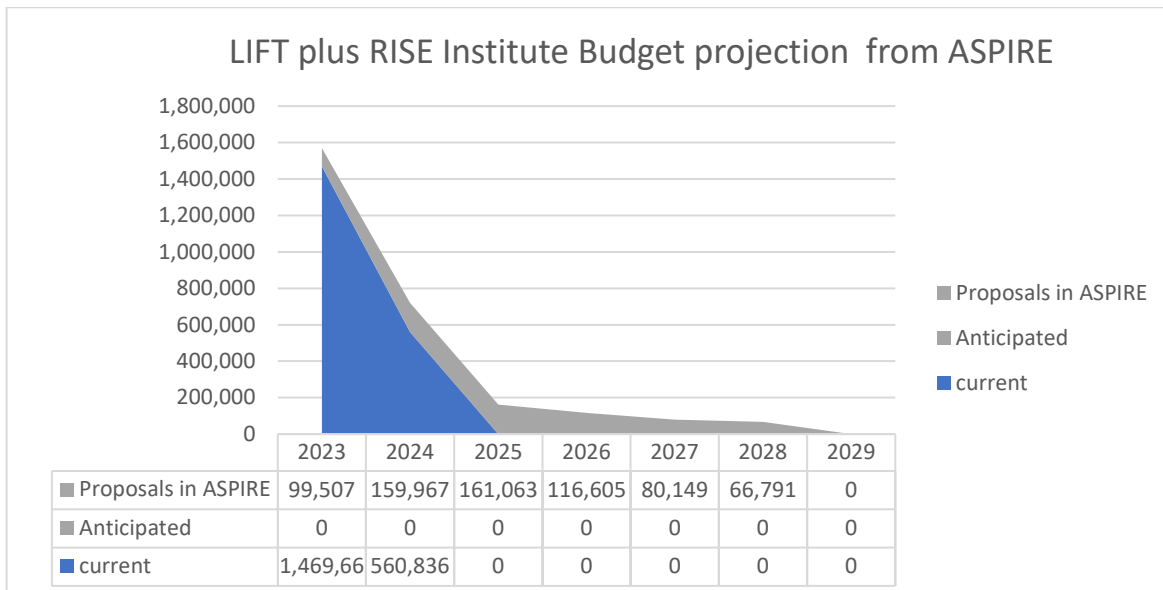


Table 2: Budget Projection Graph – Combined LIFT/RISE



Appendix F: RISE Membership FY22

Email	College	Department	Member Name
asmirnov@mtu.edu	Engineering	geological and Mining	Aleksey Smirnov
algonczi@mtu.edu	Sciences and Arts	Cognitive and Learning Sciences	Amanda Gonczi
arbarnar@mtu.edu	Engineering	ME-EM	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
anmorse@mtu.edu	Engineering	Civil, Environmental, and Geospatial	Audra Morse
brad@mtu.edu	Sciences and Arts	Cognitive and Learning Sciences	Bradley H. Baltensperger
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
cpjoshi@mtu.edu	Sciences and Arts	Biological Sciences	Chandrashekhar P. Joshi
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
eegochis@mtu.edu	Staff	GLRC	Emily Gochis
ecvye@mtu.edu			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	ME-EM	Gregory M. Odegard
hademelo@mtu.edu	Engineering	Civil, Environmental, and Geospatial	Henrique De Melo E Silva
imiski@mtu.edu	Engineering	ME-EM	Ibrahim Miskioglu
jeh@mtu.edu	Engineering	geological and Mining	Jacqueline E. Huntoon
jdeclerck@mtu.edu	Engineering	ME-EM	James DeClerck
jrblough@mtu.edu	Engineering	ME-EM	Jason R. Blough
jmeldrum@mtu.edu	Staff	Keweenaw Research Center	Jay Meldrum
jsdecler@mtu.edu	CTL	Center for Teaching & Learning	Jean Straw DeClerck
jelbrown@mtu.edu	Sciences and Arts	Chemistry	Jeremy Brown
jpbos@mtu.edu	Engineering	Electrical and Computer	Jeremy P. Bos

jjworm@mtu.edu	Engineering	ME-EM	Jeremy Worm
jaszczak@mtu.edu	Sciences and Arts	Physics	John A Jaszczak
jlirwin@mtu.edu	Engineering	Manufacturing & Mechanical Engineering Technology	John L. Irwin
js gierke@mtu.edu	Engineering	geological and Mining	John S. Gierke, PE
khungwe@mtu.edu	Sciences and Arts	Cognitive and Learning Sciences	Kedmon N. Hungwe
steelman@mtu.edu	Sciences and Arts	Cognitive and Learning Sciences	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
liz@mtu.edu	Engineering	Electrical and Computer	Liz Fujita
lameadows@mtu.edu	Sciences and Arts	Cognitive and Learning Sciences	Lorelle A. Meadows
ljbowman@mtu.edu	Engineering	geological and Mining	Luke Bowman
mjbergst@mtu.edu	Sciences and Arts	Humanities	Maria Bergstrom
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	ME-EM	Paul van Susante
rtewari@mtu.edu	Engineering	ME-EM	Radheshyam Tewari
pastel@mtu.edu	Computing	Computer Science	Robert Pastel
ratowles@mtu.edu	Engineering	ME-EM	Ryan A. Towles
kuhl@mtu.edu	Computing	Computer Science	Scott A. Kuhl
stockero@mtu.edu	Sciences and Arts	Cognitive and Learning Sciences	Shari L. Stockero
slwu@mtu.edu	Engineering	geological and Mining	Shiliang Wu
sdlehman@mtu.edu	Engineering	Biomedical	Steven D. Lehmann
slamato@mtu.edu	Sciences and Arts	Cognitive and Learning Sciences	Susan L. Amato-Henderson
toommen@mtu.edu	Engineering	geological and Mining	Thomas Oommen
tnrogers@mtu.edu	Engineering	Chemical	Tony N. Rogers
twakeham@mtu.edu	Sciences and Arts	Biological Sciences	Travis R. Wakeham
yinyint@mtu.edu	Sciences and Arts	Cognitive and Learning Sciences	Yin-Yin (Sarah) Tan
cai@mtu.edu	Computing	Applied Computing	Yu Cai