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, MMET Dept. Chair, and MET Professor

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RISE Institute Annual Report

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.

- The Institute is governed by a Director who collaborates with a 3member 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 <u>proposal opportunities</u> 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

- 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/SF	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	nding Michelle E. Jarvie- College of National Science Eggart Engineering 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

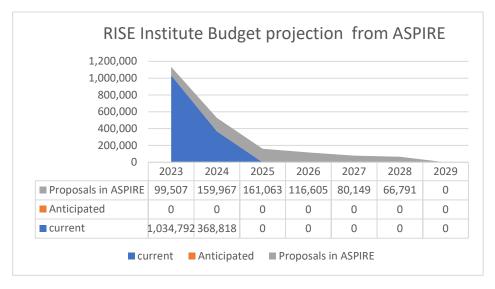


Table 2: Budget Projection Graph - LIFT

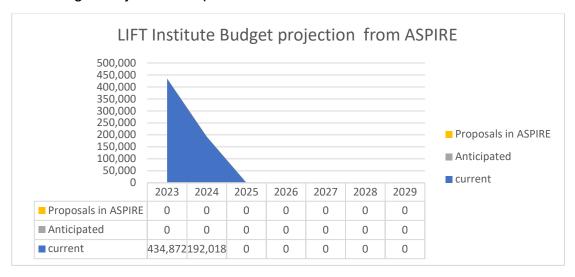


Table 2: Budget Projection Graph - Combined LIFT/RISE

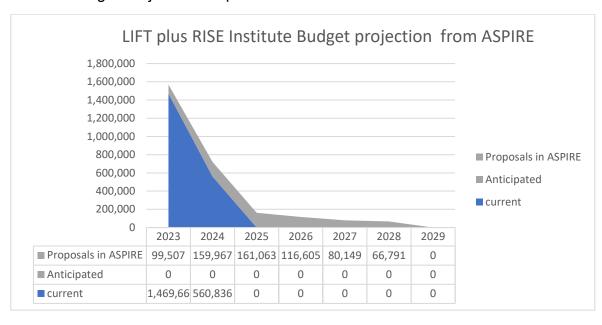


Table 4: Budget Projection Table - RISE

	2023	2024	2025	2026	2027	2028	2029	Total
Combined proposals, anticipated & current	1,134,299	528,785	161,063	116,605	80,149	66,791	0	2,087,691
RISE Return (15.5%)	27,720	14,196	7,370	5,399	3,794	3,161	0	61,640
Current awarded net ICR	159,694	44,396	0	0	0	0	0	204,090
Anticipated Net ICR	0	0	0	0	0	0	0	0
Proposals Net ICR	19,144	47,190	47,548	34,831	24,476	20,397	0	193,586

Table 5: Budget Projection Table – LIFT

	2023	2024	2025	2026	2027	2028	2029	Total
Combined proposals, anticipated & current	434,872	192,018	0	0	0	0	0	626,890
RISE Return (15.5%)	32,587	1,817	0	0	0	0	0	34,405
Current awarded net ICR	210,241	11,724	0	0	0	0	0	221,965
Anticipated Net ICR	0	0	0	0	0	0	0	0
Proposals Net ICR	0	0	0	0	0	0	0	0

Table 6: Budget Projection Table – Combined LIFT/RISE

	2023	2024	2025	2026	2027	2028	2029	Total
Combined proposals, anticipated & current	1,569,171	720,803	161,063	116,605	80,149	66,791	0	2,714,581
RISE Return (15.5%)	60,307	16,013	7,370	5,399	3,794	3,161	0	96,045
Current awarded net ICR	369,935	56,120	0	0	0	0	0	426,055
Anticipated Net ICR	0	0	0	0	0	0	0	0
Proposals Net ICR	19,144	47,190	47,548	34,831	24,476	20,397	0	193,586

Appendix F: RISE Membership FY22

asmirnov@mtu.edu algonczi@mtu.edu Sciences and Arts Science and Erv Science and Ergineering Technolology are Ergineering Erginee	Email	College	Department	Member Name
arbarnar@mtu.edu Engineering ME-EM Andrew Barnard ajburton@mtu.edu Forest Resources and Env Science raswartz@mtu.edu Engineering Civil, Environmental, and Geospatial anmorse@mtu.edu Engineering Civil, Environmental, and Geospatial anmorse@mtu.edu Engineering Civil, Environmental, and Geospatial Bradley H. Sciences and Arts Cognitive and Learning Bradley H. Sciences Baltensperger Bhhamlin@mtu.edu Engineering Engineering Fundamentals Brett Hamlin bebettin@mtu.edu Computing Computer Science Briana Bettin cjandrew@mtu.edu Forest Resources and Env Science heldt@mtu.edu Engineering Chemical Caryn Heldt cpjsshi@mtu.edu Engineering Computer Science Chandrashekhar P. Joshi Chand	asmirnov@mtu.edu	Engineering	geological and Mining	Aleksey Smirnov
arbarnar@mtu.edu Engineering ME-EM Andrew Barnard ajburton@mtu.edu Forest Resources and Env Science raswartz@mtu.edu Engineering Civil, Environmental, and Geospatial anmorse@mtu.edu Engineering Civil, Environmental, and Geospatial anmorse@mtu.edu Engineering Civil, Environmental, and Geospatial brad@mtu.edu Sciences and Arts Cognitive and Learning Sciences bhhamlin@mtu.edu Engineering Engineering Fundamentals Brett Hamlin bcbettin@mtu.edu Computing Computer Science Briana Bettin cjandrew@mtu.edu Engineering Chemical Caryn Heldt cpjoshi@mtu.edu Engineering Chemical Caryn Heldt cpjoshi@mtu.edu Engineering Electrical and Computer Charles Wallace cmcischk@mtu.edu Engineering Electrical and Computer Christopher (kit) Cischke clwojick@mtu.edu Engineering Manufacturing & Mechanical dfifaspo@mtu.edu Engineering Chemical David J. Flaspohler and Env Science dmlabyak@mtu.edu Engineering Manufacturing & Mechanical Engineering En	algonczi@mtu.edu	Sciences and Arts	Cognitive and Learning	Amanda Gonczi
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