

Sustainable Futures Institute Annual Report Fiscal Years 2017 and 2018

Mission

The mission of the Sustainable Futures Institute is to enhance knowledge, develop technologies, and expand capabilities in working towards a sustainable future.

Vision

The Sustainable Futures Institute (SFI) will have an international impact through its teaching, research, and outreach contributions to the field of sustainable systems.

Description of Proposed Activities

SFI will engage in multidisciplinary research and education activities in order to realize the vision of an internationally recognized institute in the areas of environmental, economic, and societal sustainability.

Strategic Plan Objectives

Objective 1: Support large-scale multidisciplinary research to advance sustainability

Objective 2: Increase the engagement of all stakeholders with SFI

Objective 3: Grow the level of external funding

Objective 4: Engage well-educated, globally aware, diverse student population

Sustainability Focus Areas

Focus Area 1: Sustainable Energy

Focus Area 2: Education in Sustainability

Focus Area 3: International Development

Focus Area 4: Materials, Design and Manufacturing for Sustainability

Focus Area 5: Complex Systems Analyses

SFI Facts and Figures

New Awards and Expenditures: The SFI's activities in Fiscal Years '17-'18 align with the focus areas listed above. Ten new awards totaling \$4,618,793 were initiated over this two-year period. Total expenditures from all new and continuing awards totaled \$1,458,412 in FY '17, but data is not currently available from FY '18.

Projects and Proposals:

The graphs below (Figures 1 and 2) contain data on numbers of proposals, new awards, ongoing active projects, as well as financial indicators of SFI operations. Recently, the SFI has had more of a focus on large multi-disciplinary proposals, resulting in a smaller number of submitted proposals, new awards and active projects than in the time period prior to FY '09 and '10. 23 new projects were submitted through the SFI, resulting in 10 new awards in FY '17 & '18.



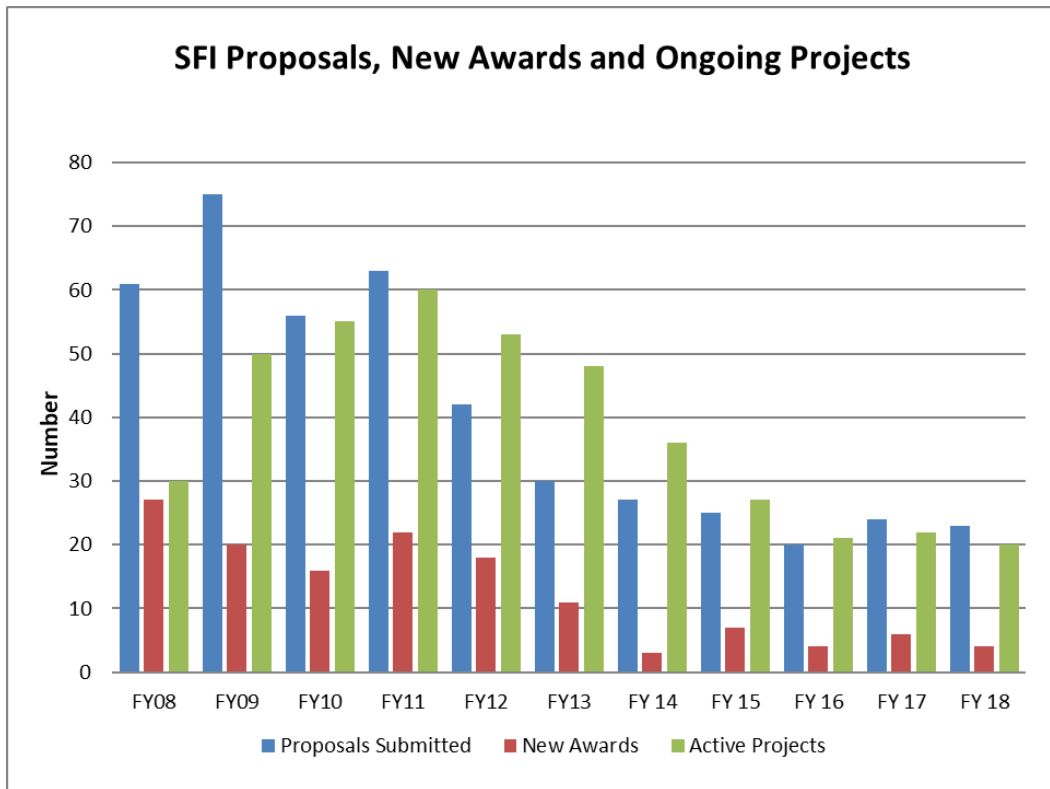


Figure 1. New proposals, new awards, and ongoing projects

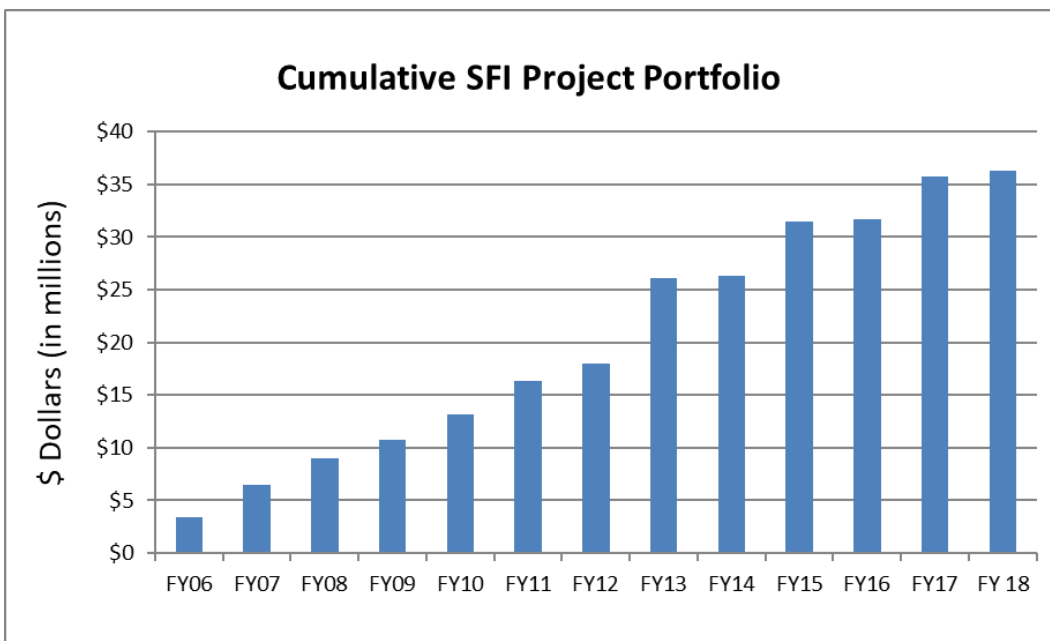


Figure 2. Cumulative value of all SFI projects since FY06.

The total value of all projects managed currently and in the past by the SFI is increasing and now is just over \$36 million. After increasing markedly in FY '17, only a small change was observed



in FY '18, but it often takes time for new project initiatives, such as our recent involvement in DOE advanced Manufacturing efforts, to result in large funded projects.

Institute Operations: SFI operations were sustained through funds generated from

- a) internal research and development (IRAD) returns from ongoing project expenditures (\$70,664 in '17 and \$64,564 in '18),
- b) from tuition return to SFI for the off-campus online enrollments in ENG5510 and ENG5520 (\$29,077 in FY '17 and \$21,578 in FY '18),

These courses include ENG4510-5510 Sustainable Futures 1 (SF1) and ENG5520 Sustainable Futures 2 (SF2). Enrollments in these courses has risen significantly over the last 5 years as shown in Figure 3, which shows historical enrollment data for both courses in sections for in-class as well as online students. These enrollment trends demonstrate strong interest by graduate students, and some under-graduate students as well, in multidisciplinary education.

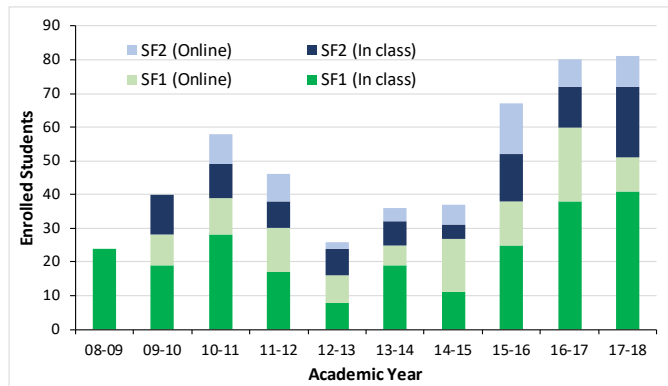


Figure 3. Historical enrollment data for core courses in the Graduate Certificate in Sustainability.

- c) by including SFI staff (Operations Manager + postdoc) on funded activities on research grants for project management and research functions (\$93,898 in FY '17 and 93,675 in FY '18), and
- d) donations (\$418 in FY '17 and \$250 in FY '18).

SFI operations funds are shown below in Figure 4, reflecting the changing nature of SFI support in recent years. Other Income (red in Figure 4) includes direct support of SFI staff from ongoing funded projects, as opposed to staff support from internal research and development (IRAD) funds, also known as Incentive Income. IRAD represent funds from the Michigan Tech general account and is based on the Facilities and Administrative (F&A) costs on external grants to the university through the SFI. IRAD income (in blue on Figure above) has been decreasing over the past three fiscal years, reflecting reductions in IRAD return rates given by Michigan Tech, as well as lower periodic research expenditures. Our financial cushion has stabilized in the past 2 fiscal years, with carryforward (green in Figure 4) of at least \$70,000 in the past four years. This is a level that we deem necessary to manage the long planning horizons and hit-or-miss nature of funding large, multidisciplinary research projects associated with sustainability themes.

The summary of expenses from the SFI IRAD account in FY '17 and '18, totaling \$207,500, provides overview of how the SFI manages its funds while supporting research and education efforts at Michigan Tech. These are shown in Table 1 and Figure 5. 37% of IRAD funding was used to pay the Operations Manager, with the rest of Operations Manager funding coming from externally funded research projects. Over the long term we would like to keep the Operations Manager supported at ≥50% from IRAD funds as opposed to direct support from research projects, to ensure the Operations Manager has enough time to work on developing new research



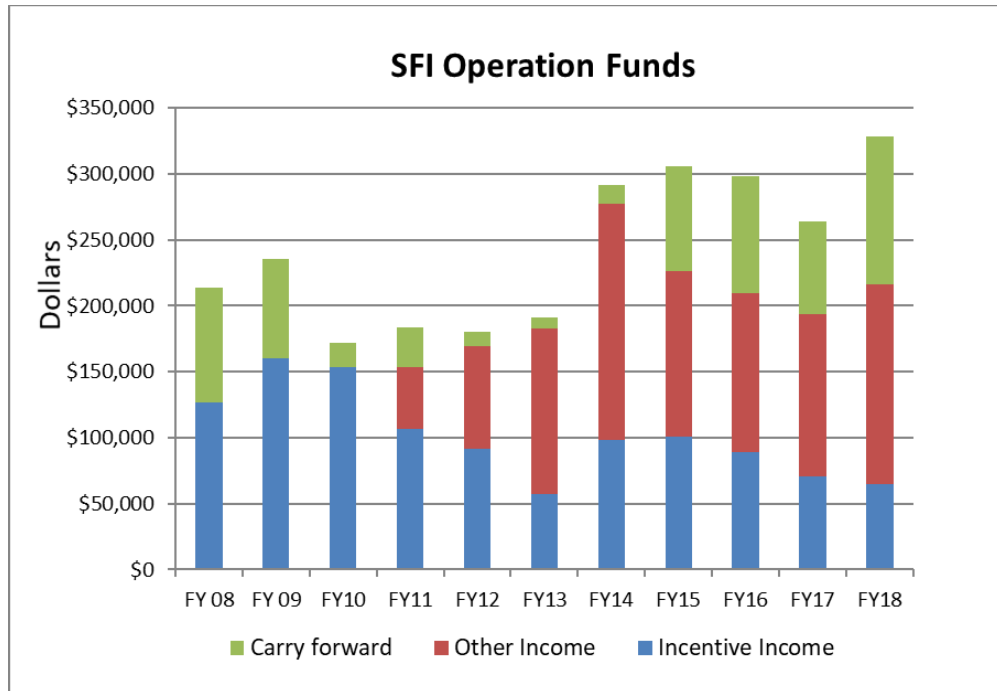


Figure 4. Historical accounting of SFI operational income

and education projects with faculty and students at Michigan Tech. Partially supporting a postdoc, along with employing undergraduate and graduate students, accounted for 8% of IRAD expenses, which can be variable from year to year. We expect this amount to be typically less than \$10,000 per year, but when project timelines don't work as anticipated, we need to support researchers on IRAD funds until more direct project funding becomes available. A significant amount of SFI IRAD expenses, nearly 20%, were for monetary returns to other Centers and Institutes on campus as a result of memorandums of understanding (MOUs) developed with those organizations when developing large, multidisciplinary proposals. This obviously affects the funding structure of the SFI, but these MOUs were required by collaborating Centers and Institutes and will likely represent the future realities of proposal development within the SFI, as more Centers and Institutes emerge on campus, with missions and interest areas that converge with our sustainability focus. These MOUs are for large projects that have been developed since 2012. 19% of SFI IRAD funds are used for supporting research and education projects, which

Table 1. SFI IRAD funds spent on the following positions and activities

Category	FY '17 Expenses	FY '18 Expenses	2-Year Total
Operations Manager	\$56,977.67	\$20,322.08	\$77,299.75
SFI Director Support	\$12,300.00	\$8,924.16	\$21,224.16
Postdoc / Student Support	\$16,313.70		\$16,313.70
IRAD Transfers to Other Centers	\$22,444.93	\$17,009.76	\$39,454.69
SFI Office Expenses	\$925.61	\$462.28	\$1,387.89
Research / Education Support	\$8,080.62	\$31,071.14	\$39,151.76
Staff Travel for Research Development	\$10,161.86	\$2,522.98	\$12,684.84



includes providing conference calling and project management services to large projects under the SFI, life cycle assessment software licenses for classroom and research use, stipends to instructors who co-taught ENG 5520, special requests such as the KBIC Middle School Summer Camp (Joan Chadde) and D80 Conference (David Watkins), and membership fees for DOE Advanced Manufacturing Institutes (VPR and Dean of Engineering will reimburse 2/3 of this membership cost in FY19). 6% of IRAD was used to support SFI staff travel to develop new research projects, related almost entirely to the planning of the three DOE Advanced Manufacturing Institutes that MTU has joined in the last two years, this is more travel than normally required in the SFI. Just 1% of SFI IRAD funds were used for office expenses such as office supplies, normal MTU IT/phone charges, and the like.

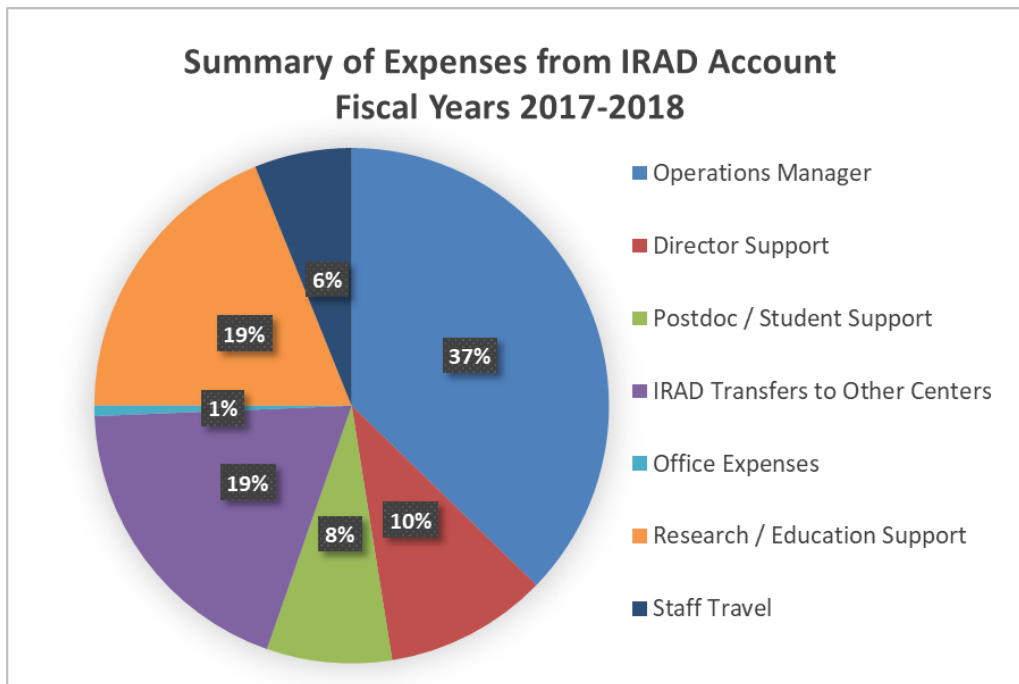


Figure 5. Distribution of SFI IRAD expenditures

Activities and Plans for FY'19

MS Program: Develop a proposal for a new interdisciplinary coursework MS in Sustainable Engineering with the goal of boosting enrollments in the graduate program,

SFI Renewal: Apply for renewal of the SFI with the VPR office (Dr. Jason Carter).

Increase Funding: Significantly increase research funding for projects run through the SFI enabled by research development involving faculty from multiple departments.

Advanced Manufacturing USA Institutes: SFI will lead campus efforts to submit proposals to and gain awards from three of these institutes; REMADE, RAPID, and CESMII.

