About Innovation & Industry Engagement

Our Mission

Promote and enable innovation and discovery.

Innovation and Industry Engagement (IIE) personnel strive to achieve this mission in support of the Michigan Tech Strategic Plan by fostering the following guiding principles:

• The development and application of the University’s intellectual and physical resources
• The creation and growth of partnerships in research, innovation, and education
• The expansion of dynamic experiential learning for students

What We Do

IIE reports to the Vice President for Research and is a primary interface between the University and industry. IIE is actively involved in many aspects of industry partnerships, technology innovation, discovery, entrepreneurship, and research on campus and throughout the region. Responsibilities and core activities include:

• Commercializing University intellectual property
• Negotiating and administering:
  ➤ Industrial research contracts
  ➤ Nondisclosure and material-transfer agreements
  ➤ Restricted and unrestricted funding arrangements for Senior Design and Enterprise
  ➤ Education and training on innovation and intellectual property, including seminars, for-credit courses, and certificate programs
• Supporting start-up technology companies and inventors from campus and the community, including active support of student Senior Design and Enterprise teams
• Licensing, registration, and management of University trademarks
• Development and management of partnerships with industry designed to most effectively make connections with relevant campus resources, including talent recruitment, research and technology licensing, and educational opportunities
IIE continues to lead or participate in programs and activities that support the University’s strategic plan and goals. Here are some significant programs and accomplishments from 2014:

• **Startup Business Development**
  Innovation Corps continues to have a strong positive impact for researchers on campus seeking to commercialize their discoveries. Michigan Tech has placed five teams in the NSF-funded national program and is developing plans for a local program offering. Members of all five of Michigan Tech’s national NSF I-Corps teams have gone on to start companies and most of those companies have recruited early-stage funding through the federal Small Business Technology Transfer program, as well as, in some cases, through angel investors.

• **Commercialization Process Improvement**
  The Technology Commercialization unit has recently formalized its technology assessment and commercialization method into a documented stage-gate process. Implementation of this process is expected to improve overall understanding among researchers who are engaged in commercialization regarding the important steps that follow discovery toward following through on a market opportunity.

• **Career Services**
  The Fall 2014 Career Fair hosted a record 341 companies on campus. The high demand for Michigan Tech talent helped the second full year of the Career Services Tiered Partner Program experience growth with new Gold and Silver Partners. Current Gold and Silver Partners include: (Gold) Dow Chemical, DTE Energy, and Nucor; and (Silver) ArcelorMittal, Black & Veatch, Ford Motor Company, Jackson, Nexteer Automotive, Systems Control, and Union Pacific. Thirty-one Copper Partners round out 42 total partners, which receive special recruiting benefits such as custom interview rooms, campus-wide branding, and first-come announcements of new ways to engage students. A new program titled Industry Days allows students to explore careers in specific industries in a concentrated, interactive environment. These periodic events bring companies from around the world to share their industries with students in a casual atmosphere. 2014 featured Steel and Petroleum Days with a planned 2015 expansion to Medical, Automotive, Aerospace, and Mining Days. Career Services also welcomed new Director Steve Patchin, formerly from the Center for Pre-College Outreach. Steve is excited to continue helping students and corporations achieve their goals.
• **Student Projects—Enterprise and Senior Design**
Enterprise and Senior Design projects continue to be well-supported by industry. 66 companies supported 105 projects and team sponsorships, totaling $1.42M in program support in 2014. Eight major partners contributed nearly 40 percent of total support, each sponsoring three or more projects/teams: ArcelorMittal, Chrysler Group, DTE Energy, Ford Motor Company, John Deere, General Motors, MacLean-Fogg Component Solutions, and Target Corporation. In addition to many repeat and long-time supporters, first-time sponsors made up 25 percent of total industry involvement, including MacLean-Fogg, who were introduced to campus and its students through the annual SAE Clean Snowmobile Challenge at the Keweenaw Research Center. During their recent visit to campus, group President Robert Whitney and others toured a variety of departments for the first time. After several follow-up discussions, they developed five mechanical engineering Senior Design projects. MacLean-Fogg designs and manufactures a variety of fastener components for many industries.

• **K–12 STEM Outreach**
The Center for Pre-College Outreach and its flagship program, Summer Youth Programs, week-long science and engineering camps on campus in June and July, have long been recipients of industry support. Last year’s support was more than $50,000 from Dow Corning, 3M Foundation, and Georgia-Pacific Corporation. These programs, along with others such as Mind Trekkers, help develop the talent pipeline of the future by engaging youth with hands-on, experiential learning. Forty-one companies contributed $242,000 to support Mind Trekkers—a student-led traveling science road show—in attending more than a dozen events throughout the country. Mind Trekkers has an aggressive schedule for 2015 with stops in Houston, St. Louis, and Knoxville.

• **Industry Partnerships**
**Nucor Corporation**, the largest manufacturer of steel products in the United States, has found success in recruiting top talent from Michigan Tech over the past seven years. Nucor wanted to strengthen the relationship, specifically with industrial controls and automation, by helping prepare engineers and technologists with the knowledge and skills that industry needs. Therefore, in partnership with the School of Technology and Department of Electrical and Computer Engineering, Nucor provided a gift of $255,000 to create the Nucor Industrial Controls and Automation Lab. Funding will help renovate an existing lab by providing all-new programmable logic control (PLC) units and additional mechatronics to simulate industrial environments.

**Southwestern Energy Company (SWN)**, a Houston-based natural gas company, through a $2.1M research project, has partnered with Michigan Tech and Calumet-based engineering company, REL Inc., to develop next-generation conformable compressed natural gas (CNG) tanks for the transportation market. The goal is to create more-affordable and better-packaged CNG tanks for the consumer market. CNG is a cleaner burning fuel than gasoline or diesel and is more domestically abundant than oil. Their support is designed to move the technology from research towards commercialization.
Benchmarking Data

FY14 Licenses Per $10 Million of Research

National Average = 1.12

FY14 Invention Disclosures Per $10 Million of Research

National Average = 4.44
Invention Disclosure &
License Statistics

License/Option Agreements—Patents Filed and Patents Granted

Proportion of Invention Disclosures Involving Faculty, Staff, Graduate Students, and Undergraduate Students

Disclosures Submitted FY12—FY14

FY12 FY13 FY14

License/Option
Patents Filed
Patents Granted

FY12 FY13 FY14

Graduate Students
Undergraduates
Faculty
Staff

FY12 FY13 FY14

50 51 45
**FY14 Proportion of Disclosures by Academic/Research Units**

- Geological and Mining Engineering and Sciences
- Chemistry
- Electrical and Computer Engineering
- Materials Science and Engineering
- School of Forest Resources and Environmental Science
- Physics
- Student Life
- School of Technology
- Biological Sciences
- Biomedical Engineering
- Civil and Environmental Engineering
- Keweenaw Research Center
- Chemical Engineering
- Michigan Tech Research Institute
- Mechanical Engineering–Engineering Mechanics

**FY14 Royalty Disbursements by Academic/Research Units**

- Keweenaw Research Center
- Biomedical Engineering
- Mechanical Engineering–Engineering Mechanics
- Student Life
- Electrical and Computer Engineering
- Physics
- Civil and Environmental Engineering
- Center for Technology and Training

**Gross Royalty**

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**Royalties Disbursed to Departments**

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**Royalties Disbursed to Innovators**

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Patent Applications

Patent Title, Name, Filing Date

Frequency Sweep Rate Dependence on the Dielectrophoretic Response of Polystyrene Beads and Red Blood Cells, Tayloria Adams, Kaela Leonard, Adrienne Minerick, 10/3/2013*

Plants with increased stress tolerance, Yinan Yuan, Chung-Jui Tsai, 7/19/2013*

Lysosomal targeting probes, Lanrong Bi, 8/9/2013

Superior Analyzer For Raman Spectra With High Acceptance Cone, Resolution, Transmission, Quantum Efficiency, And Strong Background Reduction, Jacek Borysow, Manfred Fink, 7/29/2013

Novel probes and targeting compounds for mitochondria, Lanrong Bi, 10/18/2013

I-Line Method for Mass Production of Silicon Nanowire Arrays, Paul Bergstrom, Thomas Daunais, 11/13/2013*

Purification of synthetic peptides using a catching full-length sequence by polymerization approach, Shiyue Fang, Durga Pokharel, Mingcui Zhang, 2/13/2014*

Generating electrospray from a ferrofluid, Lyon B. King, 2/28/2014

Useful products from aluminum extraction waste materials, Gerard Caneba, 3/4/2014*

Plants with increased stress tolerance, Chung-Jui Tsai, Yinan Yuan, 7/19/2013*

Lysosomal Near-Ir Fluoro Probe, Giri Vegesna, Ashutosh Tiwari, Haying Liu, 5/21/2014*

Room Temperature Tunneling Switches And Methods Of Making And Using The Same, Yoke Khin Yap, 5/21/2014

Wire Neutralization System (WNS), Scott Bradley, Jason, Wiitanen, Tim Smigowski, John Niemeyer, Andrew Culkin, 6/11/2014

Powered steerable ankle-foot prosthesis, Mohamad Rastgaar Aagaah, Evandro Ficanha, 3/19/2014**

* Denotes provisional patent applications
** Denotes refiled provisional patent applications

Patents Issued
to Michigan Tech in FY14

Patent Title, Patent Number, Issue Date, Country

Water removal from gas flow channels of fuel cells, 8,524,410, 9/3/2013, United States

Anti-icing coatings and methods, 8,647,709, 2/11/2014, United States

Method for modulating electrical activity of opto-electronic protein by proximity of quantum dots, 8,551,407, 10/8/2013, United States

Production of iron using environmentally-benign renewable or recycled reducing agents, 2.01E+11, 10/16/2013, China

Rotational Torque Measurement Device, 8,666,682, 3/4/2014, United States

Fiber-specific promoter elements, 8,536,406, 9/17/2013, United States

Synthesis of Carbon Nitrides and Lithium Cyanamide from Carbon Dioxide, 8,632,743, 1/21/2014, United States

Method for Coating Mineral Granules to Improve Bonding to Hydrocarbon-Based Substrate and Coloring of Same, 8,568,524, 10/29/2013, United States

Superior Analyzer For Raman Spectra With High Acceptance Cone, Resolution, Transmission, Quantum Efficiency, And Strong Background Reduction, 8,675,191, 3/8/2014, United States

For a listing of all technologies available for licensing, go to techfinder.mtu.edu.
Promote and enable innovation and discovery.
Innovation and Industry Engagement
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