



## Message from the Chair

Dear Friends,

Greetings! Hope you are having a great summer so far!

We welcomed one new NEIM staff member at the end of 2023, Madeline Sticht, Administrative Specialist III. Dr. Marc Skinner joined as the Idaho Falls Center Executive Officer (CEO) in Dec. 2023. The NEIM Department is located in the Idaho Falls Center, and we are excited to have a new CEO here.

We are grateful to be able to be a part of our students' journey in achieving their degrees and moving forward with their careers. We continue to be inspired by their performance and hard work.

In April this year, we had members from the Association of Technology, Management, and Applied Engineering (ATMAE) visit our Idaho Falls campus, to review our Industrial Management undergraduate program. They were very impressed with our facilities, faculty, and students.

As Steve Jobs said, "The only way to do great work is to love what you do." Wishing you and yours a happy sunny summer. Go Vandals!

Indrajit (Indy) Charit  
Department Chair  
Nuclear Engineering and Industrial Management (NEIM)  
icharit@uidaho.edu



*Indrajit Charit, Ph.D., P.E.  
Department Chair and Professor  
Nuclear Engineering and Industrial Management*

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## 2024 Energy and Climate-Tech Innovation Policy “Boot Camp”

**Amin Mirkouei**

Congratulations to Associate Professor Amin Mirkouei on being invited to attend the weeklong 2024 Energy and Climate-Tech Innovation Policy “Boot Camp” for Early Career Researchers in Washington, D.C.

Mirkouei will participate in discussions shaping the energy and climate-tech policy landscape in the United States, spanning Congress, the executive branch, international organizations, NGOs, businesses, and other players.

The event is hosted by George Mason University - Schar School of Policy and Government and the University of Maryland's Center for Global Sustainability and strengthens researchers' understanding of how energy and climate-tech policy is made so their research has greater impact on real-world clean energy and climate innovation outcomes.

Mirkouei is a Forbes sustainability contributor, certified Professional Engineer (PE), and experienced Technologist. With over two decades of hands-on experience in engineering and science research, he has developed a deep knowledge of the principles, concepts, and methods that underpin successful project leadership. This is exemplified by his current role as a faculty member in several programs (e.g., Industrial Technology, Technology Management, Mechanical Engineering, Biological Engineering, Computer Science, and Environmental Science) at U of I, where he has led diverse research teams to develop pioneering engineering solutions, many of which have received local and international recognition, and reflecting the interdisciplinary nature of his funded projects.



*Amin Mirkouei  
Department of Nuclear Engineering  
and Industrial Management*

Mirkouei's proficiency in research and technology development, grant management, and strategic planning has been honed through a state and federal funding portfolio of over \$2.8 million. He has published and co-authored over 55 articles in scientific journals and peer-reviewed conference proceedings, and recently published his first book. He received many honors and awards, including a “2022 University of Idaho Interdisciplinary and Collaboration Excellence Award” and “2024 College of Engineering Mid-Career Faculty Award.”

Learn more about his research at <https://webpages.uidaho.edu/rsml/> and <https://www.uidaho.edu/engr/news/features/agromining-bioleaching>.

# New NEIM Faculty Machine Acquisition: Raman Confocal Microscopy and Imaging Facility

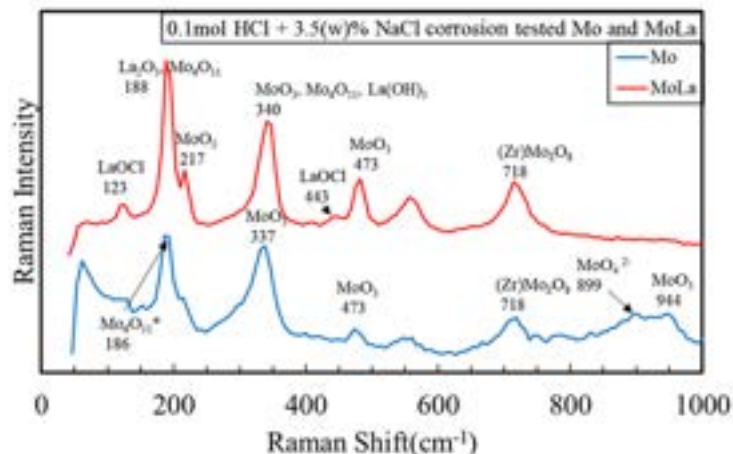
Krishnan S Raja

What is Raman microscopy? It combines a Raman spectrometer with a standard optical microscope, allowing high magnification and 2D imaging of a sample and Raman analysis with a microscopic laser spot. This results in mapping the sample's elemental or phase distribution. Raman microscopy has a resolution of about 360 nm. Confocal Raman microscopy is the ability to spatially filter the sample's analysis volume in the XY (lateral) and Z (depth) axes.

What can Raman Microscopy do? Raman microscopy finds application in several areas, such as energy materials (nuclear reactors, batteries, solar cells), chemicals and pharmaceuticals, polymers, geology and mineralogy, electronics (semiconductors), and life sciences. Raman spectroscopy can analyze samples in solid, liquid, and gas states. Raman microscopy can identify the microscopic phases present in the solid state based on the bond length, bond strength, vibration mode, and vibration frequency of constitutive atoms. Raman spectroscopy analyzes stress/strain field, polymorphism in materials, and molecular interactions.



*Confocal Raman Microscope (Horiba, XploRA Plus) with a Linkam Hot stage. Raman spectra can be obtained in-situ while heating the samples to 1100 °C*

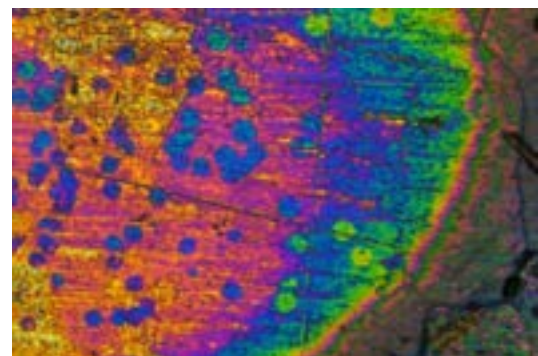


*Raman spectra of the Mo and Mo-La<sub>2</sub>O<sub>3</sub> composite samples' corroded surfaces show the formation of different types of oxide films.*

Raman Microscopy for Nuclear Research: Raman microscopy can be carried out in situ while heating the specimens at high temperatures (up to 1100 °C). This technique is very handy in analyzing the nuclear fuel-cladding interactions, degradation of TRISO fuel layers, and evaluation of the degradation behavior of nuclear materials exposed to light water reactor (LWR) environments, molten salts, molten metals (LBE), or high-temperature gases. Information on crystal structure, phase content, phase distribution, stress/strain field, and molecular interactions can be obtained without additional sample preparation steps. This technique is simple to use and fast. Figures (a) and (b) show the Raman analyses of metallic surfaces after corrosion testing.

Raman Microscopy in other areas of research: This instrument can also be very useful for anyone involved in the study of materials characterization in the fields of chemical engineering (design of catalysis, energy storage, coatings), agriculture, life sciences, and industrial manufacturing.

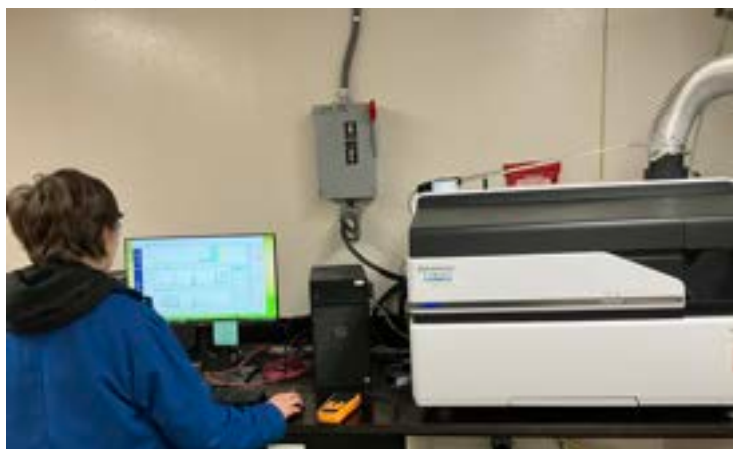
*Optical image of the molybdenum surface after corrosion testing in acidified chloride solution at room temperature.*





# New NEIM Faculty Machine Acquisition: Inductively Coupled Plasma Mass Spectrometry

Inductively coupled plasma mass spectrometry (ICP-MS) is a tool used for detection of metals and other larger elements present in a sample in very low concentrations. Liquid samples are introduced into the unit and are then vaporized by an argon plasma flame. The incredibly high heat separates the sample into its component ions, which pass through a magnetic field that bends an ion's path based on its mass and charge. The ions then pass through the unit's detector, providing data on the concentration of each element of interest. Dr. Amin Mirkouei is the supervising faculty for this project.

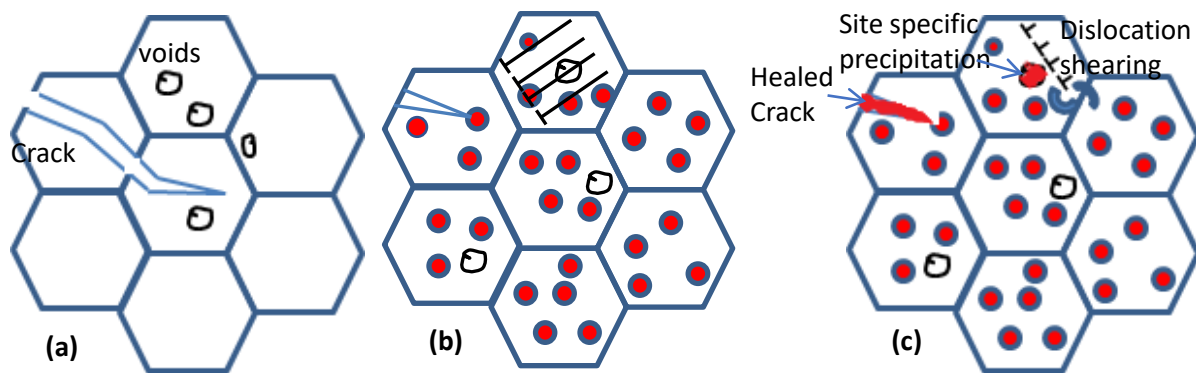


Student at work with the ICP-MS

## Self-healing Composites for Aggressive Environments

Krishnan S Raja and Indrajit Charit

Nuclear and other power plant components are exposed to aggressive service conditions, including high temperatures, high stresses, irradiation, and corrosion, which lead to damage accumulation and restricted service lifetime. If the structural materials used in these components can self-heal the microscopic damages induced by irradiation, creep, and other degradation mechanisms, their lifetime can be extended considerably. The self-healing approach can also improve the reliability, sustain safety, and extend the life of current or advanced reactors. Self-healing of metallic components is considered a holy grail.



*Schematic illustration of self-healing behavior of the proposed material. (a) conventional material having a crack and irradiation induced cavities and voids. (b) Composite material with uniform distribution of metal core-oxide shell nano-capsules. (c) Healing of crack by filling with the metal from the core of the broken nano-capsules, and site-specific filling of the vacancies by the metal-core when dislocations shear the nano-capsules.*

Self-healing bulk composite materials will be developed using a powder metallurgy route. These materials will be further processed by different approaches, such as spark plasma sintering, 3-D printing by laser fusion, or cold-spray coating. They will show self-healing of micro-cracks and superior resistance to crack initiation, irradiation damage, and corrosion. Microscopic damage to coatings will be healed by distributing core-shell configured nano-capsules of metal-core/oxide shell (MCOS). Healing of a propagating crack occurs when the micro-capsules are sheared and the metal core fills the crack.

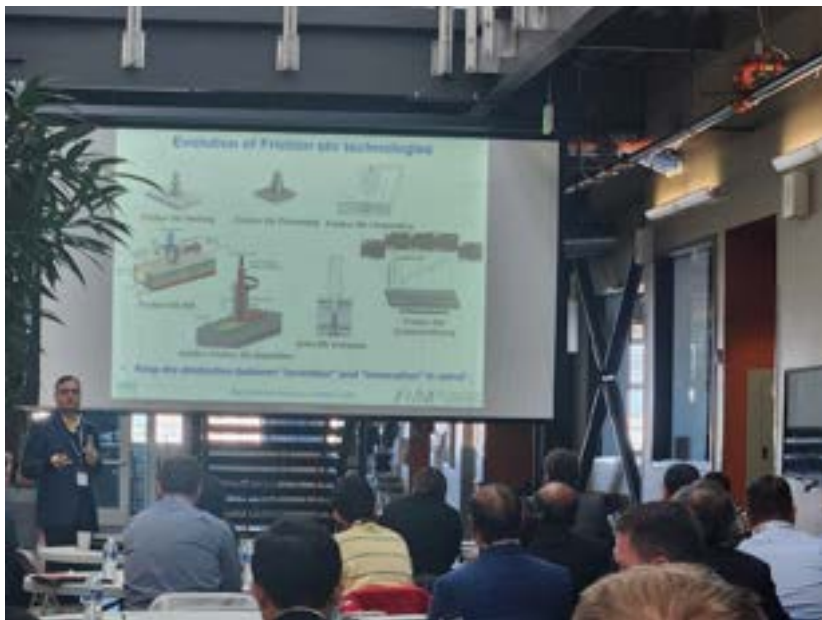
The Idaho State Board of Higher Education and USDOE-STTR fund this project. This project will support one Ph.D. and two M.S. students.

# Workshop: Intelligent Manufacturing for Extreme Environments

May 2024

Previously, NSF had funded our proposal that sought funding to host a two-day workshop at the Center for Advanced Energy Studies (CAES) in Idaho Falls, Idaho. The workshop was held from May 2nd and 3rd, 2024. This conference featured keynotes, panels, and breakout sessions with around sixty participants covering various aspects of intelligent manufacturing for extreme environments. The workshop convened around 60 world-class experts, researchers, educators, and students to identify gaps and envision solutions in relevant areas of great importance.

The workshop promoted an exchange of ideas and knowledge during the proposed event and catalyzed new collaborations and research directions that will support the growth of carbon-free advanced nuclear energy research in Idaho, Wyoming, as well as other western states. The workshop organizers used the NSF funding for travel grants and recruited people from diverse and underrepresented groups.



*Professor Rajiv S. Mishra, Distinguished Research Professor of Materials Science & Engineering, giving his keynote talk at the IMEE Workshop.*



The outcomes of the conference included an opportunity for researchers and educators to network and form collaborations, leading to preparation of a full report to inform policy makers, industry, and the academic community of various challenges and opportunities of advanced manufacturing, specifically in the nuclear energy sector,

The overarching goal of this workshop proposal was to host a two-day conference on Intelligent Manufacturing for Extreme Environments. The conference identified gaps and envisioned solutions for five inter-related challenges of intelligent manufacturing in extreme environments. These challenges are: (1) printable electronics that can survive extreme environments, (2) in situ manufacturing process monitoring and feedback control, (3) machine learning to optimize process variables in manufacturing and materials composition, (4) extreme temperature qualification and testing, and (5) workforce development and community college engagement. The workshop e-link: [www.imee2024.org](http://www.imee2024.org)

The project team: Indrajit Charit (PI, University of Idaho), John Russell (co-PI, University of Idaho); David Estrada (co-PI, Boise State University); Marco Schoen (co-PI, Idaho State University); Patrick Johnson (co-PI, University of Wyoming, currently at Iowa State University).

# Conference: International Atomic Energy Agency

July 2024

Recently, Dr. Indrajit Charit travelled to Vienna, Austria, to attend the “International Conference on Nuclear Knowledge Management and Human Resources Development: Challenges and Opportunities,” held during July 2-5, 2024. The conference was held at the International Atomic Energy Agency (IAEA) headquarters which is located within the [United Nations Office in Vienna](#).

The conference was organized by IAEA. About 750 participants from 108 countries participated in the conference.

Dr. Charit was invited to give a talk on our Nuclear Technology Management (NTM) program that was endorsed by the International Nuclear Management Academy (INMA)/IAEA last September. His talk title was: “The INMA-endorsed Nuclear Technology Management Program at the University of Idaho – Idaho Falls.” Master’s degree students in Nuclear Engineering (NE) or Technology Management can add the NTM graduate academic certificate to obtain an INMA/IAEA endorsed certificate upon successful completion of their studies. Our program was only the second in then United States and tenth in the world at the time of endorsement.



*Dr. Indrajit Charit presenting at the conference.*





# AFFILIATED FACULTY NEWS

## Ron Kinville Receives the Chipman Outstanding Affiliate Faculty Award

May 2024

Dr. Ron Kinville, professor at BYU, received the Nathan A. Chipman Outstanding Affiliate Faculty Award at this year's commencement in Idaho Falls. This award was established to recognize instructors who have provided excellent service and support for students through teaching, mentoring and other academic efforts.

Dr. Ron Kinville has been teaching Industrial Safety at the University of Idaho for 11 years. He is a Certified Safety Professional and an OSHA Authorized Outreach Instructor in both General Industry Safety and Construction Safety. After dropping out of college at the age of 24, Ron returned 20 years later as a non-traditional student and earned a Bachelor's Degree in Construction Management, followed by a Master's Degree in Safety, Security and Emergency Management, and, on his 55<sup>th</sup> birthday, was awarded his Doctorate Degree in Education.

Ron spent 27 years in the construction industry building roof trusses before becoming a professional educator and university instructor 16 years ago. During his career he and his family have lived in many places including Washington, Utah, Missouri, California, Arizona, Oregon, Hawaii, Kansas and Idaho.

Ron loves to build things! From building furniture, to building houses, to building students, Ron finds satisfaction and happiness in problem solving and trying to add value at every opportunity. Last month Ron and his wife Nancy celebrated their 39th wedding anniversary. They have 5 children and 5 grandchildren.



*President Scott Green (left), Ron Kinville (middle left), Dean Suzie Long (middle right), Provost Torrey Lawrence (right)  
Ron Kinville receiving the award at the Idaho Falls Center Commencement Ceremony  
May 20, 2024*

# STAFF NEWS

## Madeline Sticht Joins as an Administrative Specialist

November 2023

Madeline Sticht joined the NEIM Department at the end of November 2023.

She grew up in Montana and received her bachelor's in Law and Constitutional Studies from Utah State University. In her free time, she likes to read, run after her dog Dutchie, and explore new music and movies.

With a love of academics, she has enjoyed learning about the different programs available and is excited to be part of the team at the University of Idaho – Idaho Falls.



*Madeline Sticht  
Administrative Specialist III  
Department of Nuclear Engineering and  
Industrial Management*

## Dr. Marc Skinner Joins Idaho Falls Center as Executive Officer

January 2024

Marc Skinner returns to Idaho Falls! Skinner began his second tenure as CEO in Idaho Falls in January. He led the campus from 2015 to 2018 and spent the past five years as chair of the communication department at Brigham Young University-Idaho in Rexburg.

"It is an exciting time to serve as executive officer of University of Idaho in Idaho Falls," Skinner said. He continued, "We have a rich 70-year history of offering outstanding educational programs in southeastern Idaho. The Idaho Falls Center plays a significant role in meeting the educational needs of this economically vibrant region. Our long-standing relationship with the Idaho National Laboratory and our sustained affiliation with businesses, non-profits and other educational institutions in southeastern Idaho provide incredible momentum for the future... As a graduate of University of Idaho, I am convinced of the importance of the statewide mission of our great university."



*Dr. Marc Skinner  
Executive Officer  
Idaho Falls Center*



## 2024 Outstanding Senior Award

Christian Roberts began the path to his bachelor's degree 30 years ago with a certificate of applied science in Radiation Protection from Eastern Idaho Technical College.

He has worked in Radiological Controls since that time and is currently employed as a RadCon Supervisor at the Naval Reactors Facility near Idaho Falls.

He took his first course at U of I during the Spring 2017 semester and graduated in Spring 2024 with a bachelor's degree in Industrial Technology.

"It's been quite the journey but well worth it. I look forward to calling myself a University of Idaho alumni."

Christian and his wife Tami have been married for 32 years. They are the proud parents of three daughters, Megan, Abby and Brooklyn, with whom they have shared the joy of learning.

Megan is a graduate student at U of I.

Abby who loves animals, works at a restaurant in Eagle and recently completed an associates degree at College of Western Idaho.

Brooklyn is pursuing a degree in construction management at Boise State University.

When not working or studying, Christian enjoys spending time with family, stand-up paddle boarding, fly fishing, and being an amateur chef. He also is a connoisseur of live entertainment and fine adult beverages.



# CONGRATULATIONS TO OUR GRADUATES!



*Marty Plum, M.S. in Technology Management  
Idaho Falls Center Commencement Ceremony, May 20, 2024*

## **Nuclear Engineering**

### **Spring 2024**

Stefan E. Abbott, M.S.  
Samuel Bynum, M.Engr.  
Douglas A. Corbett, M.Engr.  
Kristen L. Geddes, Ph.D.  
Drew M. Glenna, M.S.  
Sarah A. Khan, M.S.  
Dylan D. Ohrt, M.Engr.  
Samuel J. Root, M.S.

### **Fall 2023**

Arnold Pradhan, M.Engr.  
Jonathon Wheelwright, M.Engr.

## **Technology Management**

### **Spring 2024**

Mosiah J. Castro, M.S.  
Leslie A. Johnson, M.S.  
Bryon Mowlds, M.S.  
Juliana Ocampo Giraldo, M.S.  
Thomas J. Patterson, M.S.  
Martin M. Plum, M.S.

### **Fall 2023**

Isabella M. Casteel, M.S.

## **Engineering Management**

### **Spring 2024**

Mario J. DiCino, M.Engr.  
Clayton J. Housley, M.Engr.  
Cody B. Kelley, M.Engr.  
Robert P. Mariano, M.Engr.  
Shawn St. Germain, M.Engr.  
Jason D. Toomer, M.Engr.

### **Fall 2023**

Kyle E. Carpenter, M.Engr.  
Stafford-Ames Morse, M.Engr.  
Spencer L. Oldemeyer, M.Engr.  
Jarrid L. Thomson, M.Engr.

## **Industrial Technology**

### **Spring 2024**

Coleton M. Danell, B.S. Tech.  
Konnor W. Gilstrap, B.S. Tech.  
Christian Roberts, B.S. Tech  
Jerry L. Robertson, B.S. Tech.



*Christian Roberts, BSTECH, recipient of the INDT Senior Award  
Idaho Falls Center Commencement Ceremony, May 20, 2024*

# New Online Graduate Certificate in Nuclear Materials Engineering Approved

This graduate academic certificate program in nuclear materials engineering aims to provide students with a foundational understanding of the principles and practices of materials engineering in nuclear context. These course offerings will address the following key components:

- Fundamental nuclear science and engineering
- Fundamentals of materials engineering
- Materials degradation and safety in reactor environments
- Waste management

To obtain the certificate, students must complete 15 credits from the following courses, 9 of which must be at the graduate level.

Learning Outcomes:

- Gain knowledge and skills in a wide range of nuclear materials engineering, from nuclear power generation and nuclear materials storage to medical isotope production.
- Develop ability to select, design, and develop materials systems or components for different nuclear engineering applications such as current and advanced nuclear reactors, used fuel storage canisters, and radiation shielding systems using basic materials and nuclear engineering principles while following real-world constraints.
- Develop ability to effectively communicate to clients, engineers, or the general public on topics related to engineering solutions in nuclear engineering, technologies, and/or related fields.

## New Interdisciplinary Undergraduate Sustainability Certificate Available

Sustainability is an interdisciplinary topic that has relevance in nearly every area of work and life. Students in any program can thus enroll in the 12-credit Sustainability Certificate and select from a range of classes from all colleges at the university.

Students who complete the certificate will be better prepared to contribute to an informed citizenry that is creating sustainable solutions for Idaho and beyond, and to cultivate an ecologically sound, economically prosperous, and equitable society for current and future generations.

Students must take at least one core integrative course, one ecological course, one social course, and one economic course totaling at least 12 credits for certificate completion. Foundational courses introduce students to the breadth of sustainability as a concept involving ecological, social, and economic processes. Ecological sustainability courses focus on protecting and restoring the integrity of Earth's ecological systems, with special concern for biological diversity and the natural processes that sustain life. Social sustainability courses focus on meeting the needs of communities without compromising the ability of future generations to meet their own needs. Finally, economic sustainability courses focus on long-term economic prosperity without negative impacts on the environment, society, or culture. Students may work with their advisors to substitute relevant open topics courses (e.g., 106, 204, 404) to fulfill these requirements.





# Association of Technology, Management, and Applied Engineering Visit to University of Idaho, Idaho Falls (UIIF)



A team from the Association of Technology, Management, and Applied Engineering (ATMAE) visited UI-IF in April 2024 to assess the accreditation for the Industrial Technology (INDT) undergraduate program. ATMAE conducted the visit and will be giving their official findings at the 2024 ATMAE Annual Conference in Las Vegas, NV. The INDT program differs from many other degree programs that are accredited by ATMAE, in that our curriculum focuses on academic knowledge and capabilities, rather than on crafts skills such as welding, metalwork and machine operation.

## GIVE TO THE NEIM DEPARTMENT

## IDAHO FALLS STUDENT SUCCESS FUND

[University of Idaho · GiveCampus](#)

- Scholarships
- Research development
- Facility upgrades

**The Idaho Falls Student Success Fund was established to support U of I's Idaho Falls campus. Students from any major can apply.**

[Click here for more info](#)

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