



Established Program to
Stimulate Competitive Research

News & Notes

Providing leadership and coordination to broaden and diversify North Dakota's science, technology, engineering, and mathematics (STEM) workforce pathway and growing statewide STEM research and competitiveness at participating institutions of higher education.

December 2023

From the Executive Director

Hello,

The extended fall weather was appreciated as Jim and I had the pleasure of visiting Mayville State University, Minot State University, Dickinson State University, and Valley City State University. Thank you to everyone for sharing what makes each institution so special.

We have also had the pleasure of touring Bismarck's [Gateway to Science](#) and Minot's [Magic City Discovery Center](#) over the last few weeks. No matter your age, these are wonderful opportunities to explore Science, Technology, Engineering, and Math (STEM) in a fun and interactive way. Kudos for the amazing work to introduce a new generation to STEM and to remind those of who might be a little older of the wonders of STEM.

Check out the Students in Technology Transfer and Research program. Applications will be available starting January 3, 2024. More information will be included in next month's newsletter.

Jolynne



Funding Helps Minot State University Professor Teaching Data Science Students

For Dr. Upul Rupassara, Assistant Professor of Mathematics at Minot State University (MSU), to understand what will happen in the future, one must start with examining what happened in the past.

“To decide what to do and avoid something we don’t want to happen, we can reach the diagnostic part of analytics,” Rupassara said. “That’s data science.”

Data science is a growing field of study all over the world, including at MSU where Computer Science undergraduates can now take the introductory course Data Analysis and Visualization virtually, thanks to Rupassara.

DATA 211 is now available as an in-person and online prerequisite for the data science minor in addition to the data science certificate. It is one of more than 100 education programs at the college, which currently enrolls almost 3,000 students from across the country and world.

According to Rupassara, there are anywhere from seven to 13 Data Science undergraduates at MSU, depending on the semester. He expects enrollment and interest to increase now that DATA 211 is offered online, making it one of the college’s innovative hybrid education programs. Development of the online version of DATA 211 was completed thanks to Rupassara’s efforts and funding from ND EPSCoR in 2022. ND EPSCoR is able to support projects like this because of North Dakota’s commitment to and investments in EPSCoR to support STEM activities and further develop the state’s STEM research and education.

Rupassara used the grant money to pay for course release time to record lectures and transfer some laboratory assignments online, including a data analytics overview, data cleaning, statistical inference, data visualization and storytelling with data, among other topics.

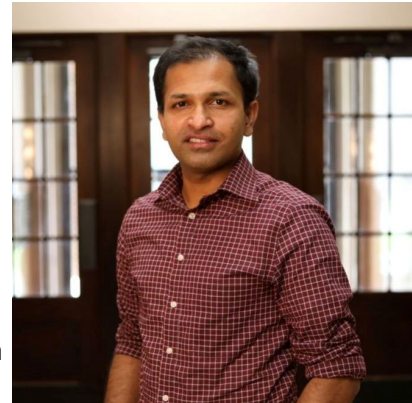
Big benefits of hybrid learning environment

Rupassara sees the biggest benefit of Data Analysis and Visualization is that it accommodates students who prefer online or hybrid classrooms.

“Having recorded lecture videos with digital lab components allows us to enroll more students who are unable to take part in traditional classroom and lab training,” Rupassara said.

Rupassara added that lab work is an essential part of course work, which he was concerned wouldn’t translate as well to a virtual environment due to its hands-on nature.

“I took different types of problems and exercises and recorded them using audio and visual presentations to help students learn data cleaning, visualization, and analyzing techniques,” he said. “The main challenge was designing a course online that offered the same genuine experience students get in person.”



Fortunately, the tools of the trade are increasingly driven by software programs, which means students can perform lab experiments virtually with more confidence than ever.

“Ultimately, building data literacy and critical thinking skills in students will prepare them to succeed in securing a job and fulfill the future demands of the job market,” Rupassara added.

Responding to a growing field

According to the U.S. Bureau of Labor and Statistics, the demand for Data Scientists is projected to grow by 35 percent, making it a desirable field of study for people interested in collecting and examining information to find patterns and trends in order to predict future performance and behaviors.

“There are so many jobs in data science, from data engineering, biostatistics, risk analysis in insurance, and also on the banking side,” Rupassara said. “The field of data analytics is expanding, therefore, students who have expertise working with large data would have an advantage.”

MSU’s program focuses on curriculum supported by Microsoft and Google, giving it a competitive edge with training in spreadsheets, R, and Python, a programming language that helps researchers perform big data analysis.

Rupassara predicts more students will enroll in the program and online course in future semesters now that it’s available virtually. He said he enjoys managing classes in person and online, and looks forward to welcoming more students.

Now in his fourth year as a professor at the college, Rupassara also sees great benefit in the smaller class sizes MSU offers students.

“I know all the students,” he said. “I can do great one-to-one work with them and that kind of attention is really good for learning.”

[Learn more](#) about MSU’s Data science program.



Opportunity Board

1. Nominations for the Joe Danek Award (EPSCoR-focused)

Due January 19, 2024

[Nomination link](#)

2. **Applications for NCGR/NM-INBRE Pangenomics Workshop**

Application due February 5, 2024

Workshop held virtually February 12-16, 2024

[Application link](#)

3. **Centers of Research Excellence in Science and Technology (CREST Centers) in Social, Behavioral and Economic Sciences Research**

[More Information](#)

4. **Inviting Proposals Related to Open-Source Software Security to the Secure and Trustworthy Cyberspace Program**

[Learn More](#)

Science Café Recap

On Monday, Dec. 4, 2023, the NSF ND-ACES project held a Science Café to discuss K-12 STEM Education and ideas to improve the flow of educators into STEM fields in North Dakota. The ND-ACES: New Discoveries in the Advanced Interface of Computation, Engineering, and Science (ND-ACES) project is funded as part of the National Science Foundation's Established Program to Stimulate Competitive Research (EPSCoR) Research Infrastructure Improvement (RII) Program. This RII Track-1 award provides \$20 million over five years to support research-driven improvements in North Dakota related to STEM including cancer related research, education, and outreach. As a part of ND-ACES's communication programming, two science cafés are held during the year. This was the first Science Café for this academic year. Science Cafés are open to everyone and are an opportunity for scientists and the public to discuss current work and interesting scientific issues.



The session featured four panelists: Ryan Summers, associate professor of science education at the University of North Dakota; Denise Jonas, director for career and technical education at Cass County Career and Technical Education Virtual Center; Kristi Leverson, continuing and technical education teacher at West Fargo Public Schools; and Karmen Riley, recruitment specialist at Fargo Public Schools. The two-hour discussion explored the routes to STEM education and the difficulties in hiring STEM teachers. Ricot Aladin, from Professional Lunch, took charge of leading the conversation.

The first discussion topic focused on STEM education pathways, with panelists underscoring the value of real-world experiences to create effective teachers. "Individuals aiming to become classroom teachers traditionally complete a 4-year degree, which concludes with a semester-

long student teaching internship. This multi-week internship pairs student teachers with experienced teachers in authentic classrooms so they learn how to plan and deliver lessons day-to-day," Summers explained.

The conversation acknowledged that individuals are pursuing non-traditional routes into education. The panelists talked about alternative certifications and training options, highlighting the importance of non-traditional pathways in STEM education, and underscoring the potential for a more inclusive approach to preparing individuals for STEM teaching roles. These pathways allow individuals to bring career- and education-related experience into classrooms while helping to address workforce needs.



The second topic of discussion addressed the challenges surrounding STEM teacher recruitment, particularly the obstacle of pay disparities. Emphasis was placed on the wage gap between K-12 STEM teachers and those in traditional STEM roles, making it difficult to attract and retain qualified educators. Starting salaries for teachers align with entry-level positions that may attract individuals with bachelor's degrees in STEM fields. The perceived earning potential for educators can significantly influence people's interest in pursuing a career in teaching.

While the issue of pay can be difficult for school districts and taxpayers, the discussion proposed alternative incentives that education systems can leverage. Suggestions included initiatives such as loan forgiveness and supplementary opportunities, such as coaching positions, to enhance the overall appeal of STEM teaching roles.

This Science Café served as a collaborative space where four expert panelists and the public could engage in a meaningful discussion, contributing to the ongoing efforts to enhance STEM education in North Dakota. As ND-ACES fulfills its communication requirements, it reinforces the commitment to fostering dialogue and innovation in the pursuit of a stronger STEM education landscape. The next Science Café is planned early 2024.

"This Science Café was held as part of the requirements of the NSF EPSCoR Track-1 Cooperative Agreement OIA #1946202.

Any opinions, findings, and conclusions or recommendations expressed as part of the Science Café are those of the panelists and do not necessarily reflect the views of the National Science Foundation."



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<https://www.ndepscor.ndus.edu/programs/sttar/>

Meet the Researcher



**Ryan Summers, Associate Professor of Science Education
University of North Dakota**

What are your primary research and scholarly interests?

I have two primary areas of research: The first area centers on the development of informed views about the nature of science among K-12 students. This is basically an understanding of how the process of science works, including characteristics of the scientific knowledge produced, details about how scientific knowledge is generated, refined by the scientific community, and shaped by the cultural context in which it was created. My second area of research involves understanding K-12 students' attitudes toward science, including their general feeling about the subject and intentions to continue studying science in the future. Fostering positive attitudes

toward science is important because the disposition students develop in K-12 can shape their appreciation of science as adults, and even their willingness to explore science-related careers.

How does this tie into the work you are doing with ND-ACES?

My work on the Education and Workforce Development (EWD) element of PROSPER connects to my second area of research as well as my teaching responsibilities as an Associate Professor of Science Education at UND. My responsibilities in EWD include Rural Teacher Professional Development (RTPD) and coordinating the Rural Student Teacher Experience (RSTE).

Where are you from and where did you pursue your education?

I am originally from southern Illinois, near Mt. Vernon, and I completed my doctoral studies at the University of Illinois at Urbana-Champaign.

What excites you about ND-ACES?

I am particularly excited to be able to support teachers and learners across the continuum: We have worked to support teachers in PreK-12 classrooms, so they to feel empowered to teach STEM topics in engaging ways, ensuring that students have opportunities to learn STEM and develop interest in those areas, and prepare the next generation of teachers to step into classrooms.

What motivates you?

As someone who grew up in a predominantly blue collar area surrounded by agricultural and manufacturing jobs, I am deeply committed to helping teachers in small towns and communities flourish.

If you could time travel, where would you go?

Everywhere. I think it would be amazing to be able to time travel and observe.

If you could have coffee / tea with anyone, who would it be?

I would enjoy having a cup of coffee with Bill Nye and Neil deGrasse Tyson.

What was your first job?

My first regular job was as a cashier at a movie theater.

What does your very best day include?

I enjoy cooking, reading, playing games, and watching TV. Any combination of those activities with family or friends sounds like a great day to me.

What's your favorite quote?

Equipped with his five senses, man explores the universe around him and calls the adventure Science. – Edwin Hubble.

DOE EPSCoR FOA Announced

The DOE's Established Program to Stimulate Competitive Research (EPSCoR) Program hereby announces its interest in receiving applications for **Building EPSCoR-State/DOE-National Laboratory Partnerships**.

These partnerships advance the understanding of the physical world by supporting fundamental, early-stage energy research collaborations with DOE National Laboratories.

Participation by undergrads, grad students, or postdocs is required. Early career faculty from

EPSCoR jurisdictions are encouraged to apply, and utilization of DOE user facilities is encouraged.

Information on the DOE's Office of Science (SC) User Facilities can be found by visiting SC's website and information on the DOE Office of Nuclear Energy user facilities can be found on the Nuclear Science User Facilities website.

DOE EPSCoR follows the NSF's EPSCoR Program eligibility determinations.

[Learn more](#)



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Office of
Science

NSF EPSCoR RII Track-2 Now Open

RII Track-2 FEC builds interjurisdictional collaborative teams of EPSCoR investigators in STEM focus areas consistent with the NSF 2022-2026 Strategic Plan. Projects are investigator-driven and must include researchers from at least two EPSCoR eligible jurisdictions with complementary expertise and resources necessary to address challenges, which neither party could address as well or rapidly independently. RII Track-2 FEC projects have a comprehensive and integrated vision to drive discovery and build sustainable STEM capacity that exemplifies individual, institutional, geographic, and disciplinary diversity. Additionally, the projects' STEM research and education activities seek to broaden participation through the strategic inclusion and integration of diverse individuals, institutions, and sectors.



The integration and inclusion of Minority Serving Institutions, women's colleges, Primarily Undergraduate Institutions, and two-year colleges is a critical component of this sustainable STEM capacity.

For FY 2023/2024, the topical focus area of RII Track-2 FEC is: **"advancing climate change research and resilience capacity to expand opportunities for disproportionately affected communities."** Full proposals due **Jan 23**, 5 pm ET.

[Learn more](#)

NSF Launches EducateAI Initiative

The goal of the initiative is to enable educators to make high-quality, audience-appropriate artificial intelligence educational experiences available nationwide to K-12, community college, four-year college and graduate students, as well as adults interested in formal training in AI.

To ensure that educators are well-equipped to teach AI concepts effectively, the EducateAI initiative will offer professional development opportunities and foster communities of practice that will provide teachers with the knowledge and skills required to integrate AI into their teaching practices. In addition, the program will establish the necessary infrastructure to support AI education across diverse institutions and will include a focus on underrepresented groups in computing.

The program also encourages proposals from institutions in EPSCoR jurisdictions, Minority Serving Institutions and emerging research institutions.

[Learn more](#)



Funding opportunities

DHHS

1. [Cancer Tissue Engineering Collaborative: Enabling Biomimetic Tissue-Engineered Technologies for Cancer Research](#)
2. [R21, R01](#) Basic Research in Cancer Health Disparities
3. [Innovative Research in Cancer Nanotechnology](#)
4. [Cancer Research Education Grants Program - Research Experiences](#)

DOD

1. [Defense Sciences Office \(DSO\) Office-wide BAA \(DARPA\)](#)

DHS

1. [Fiscal Year \(FY\) 2023 Tribal Cybersecurity Grant Program](#)

NSF

1. [Enabling Partnerships to Increase Innovation Capacity](#)
2. [Research on Innovative Technologies for Enhanced Learning](#)
3. [Ideas Lab: Personalized Engineering Learning](#)
4. **National Artificial Intelligence Research Institutes**

Preliminary proposal due January 12, 2024

[Learn more](#)

DOE

1. **Bioimaging Research Approaches for the Bioeconomy & the Environment**

Pre-app due January 9, 2024

[Learn more](#)

28th NSF EPSCoR National Conference

Join us at the 28th NSF EPSCoR National Conference from October 13 to 16, 2024, at the Hilton Omaha. Researchers, students, and staff from all 28 EPSCoR jurisdictions and NSF leaders will come together to collaborate and advance science.

Stay tuned for registration details in 2024.

Connect and Collaborate to Keep Science Flowing

[Learn More](#)



ND EPSCoR wants to hear your news

Given the opportunity to communicate with both the public and internally within our own program, the ND EPSCoR team invites you to provide content that can be used in stories, social media, press releases, and ND EPSCoR News and Notes.

Send us your news, events, accomplishments and most importantly, your BRIGHT SPOTS!

[Submit a story>>](#)

Have questions, ideas, or suggestions for News and Notes?



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Acknowledgement

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