



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.*

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November 2023

### **From the Executive Director**

Hello,

Jim Doolittle, Sheridan McNeil, and I just finished a trip across North Dakota visiting Candeska Cikana Community College, Nueta Hidatsa Sahnish College, Sitting Bull College, and Turtle Mountain Community College. We truly appreciated the opportunity to meet with colleagues and discuss how we can support their activities building STEM awareness and capacity across North Dakota and learn about their successes, challenges, and plans for the future. Next month we will be visiting Dickinson State University, Mayville State University, Minot State University and Valley City State University.



The end of November heralds many things including winter weather and finals week at colleges and universities across North Dakota. Best wishes to all students on their finals and congratulations to everyone graduating this December!!

Jolynne

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## ND EPSCoR Funding Biomedical Breakthroughs in Early Stage Cancer Detection

Mahek Sadiq, a fourth-year Ph.D. student at North Dakota State University (NDSU), is making significant strides in the field of Biomedical Engineering. Sadiq started her research career by working in NDSU associate professor of electrical and computer engineering Danling Wang's lab. Sadiq has worked in Wang's lab for four years, specializing in two-dimensional nanomaterials for biomedical applications. Such nanomaterials have shown to have a high potential due to their unique properties including unusual electrical conductivity, high biocompatibility, large surface area, and extraordinary thermal and mechanical properties.

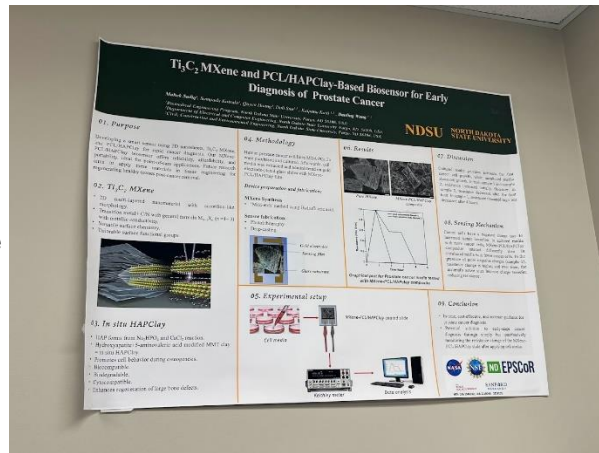


Sadiq's journey into cancer research is deeply rooted in personal experiences. Raised in a family of medical professionals, she was exposed to discussions about various diseases, with a particular emphasis on cancer. "Witnessing patients with advanced-stage cancer that had metastasized to different organs due to late diagnosis, often linked to the absence of early symptoms deeply impacted me, sparking a growing interest in cancer research" said Sadiq.

Sadiq's research focuses on the development of cutting-edge technologies for cancer therapy guidance and tissue regeneration. Her research revolves around the utilization of 2D  $Ti_3C_2$  MXene nanomaterials, functioning as chemiresistive biosensors. These biosensors exhibit exceptional sensitivity and selectivity. "These sensors excel in detecting minute quantities of cancer specimens" Sadiq said. "By comparing their responses to both cancerous and healthy samples, I can readily distinguish between carcinogenic and non-carcinogenic specimens. This is very beneficial to detect cancer that hardly show any symptoms at their early stages for example, pancreatic cancer."

Beyond cancer diagnostics, Sadiq also extends her research into the realm of tissue regeneration. Incorporating sensors into scaffolds for tissue regeneration, she aims to facilitate seamless tissue regrowth while monitoring the emergence or relapse of cancer in the surrounding tissue.

Sadiq earned first prize in the Sixth Annual North Dakota Biomedical Engineering Symposium where she presented her research on 'Ti<sub>3</sub>C<sub>2</sub> MXene and PCL/HAPClay-based biosensor for early diagnosis of prostate cancer. "This event provides an outstanding platform for Biomedical Engineering Graduate students to showcase their research to professionals in industry and academia" Sadiq said.



Sadiq's research group also earned first prize in the graduate track at the North Dakota Innovation Challenge in 2020 for their project on early diagnosis of lung cancer using their nanomaterial sensor.

Looking ahead, Sadiq sees a career path that involves continued research in academia or research institutions. With a passion for teaching and sharing knowledge, she aims to contribute to the growth of the biomedical research sector while actively engaging in educational endeavors.

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## Opportunity Board

- **Fall 2023 Virtual NSF Grants Conference**
  - December 4-7, 2023
  - [Learn More](#)

- **Ethical and Responsible Research Program Office Hours**
    - December 6 and 20
    - [Learn More](#)
  - **Human Networks and Data Science Program Office Hours**
    - December 8, 2023, 10:30 a.m. - 12:00 p.m.
    - [Learn More](#)
  - **Distinguished Lecture with IEEE and ACM Fellow, Laurie Williams, Ph.D.**
    - Join NSF staff for a Distinguished Lecture titled, "How are We Doing with Adopting Tasks to Reduce Software Supply Chain Security Risk?"
    - December 8, 2023. 1-2 p.m.
    - [Learn More](#)
  - **Build and Broaden Program Office Hours**
    - December 12, 2023, 3:00 p.m. - 4:00 p.m.
    - [Learn More](#)
  - **DOE Summer 2024 Internships**
    - Application deadline January 9, at 5 p.m.
    - [Application link](#)
  - **Research on Innovative Technologies for Enhanced Learning (RITEL)**
    - Accepting projects until January 24, 2023
    - [Application link](#)
  - **Centers of Research Excellence in Science and Technology (CREST Centers) in Social, Behavioral and Economic Sciences Research**
    - [More Information](#)
  - **Inviting Proposals Related to Open-Source Software Security to the Secure and Trustworthy Cyberspace Program**
    - [Learn More](#)
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## Julia Zhao's 20 years with Sunday Academy and STEM outreach at the University of North Dakota

Julia Zhao, professor of chemistry at the University of North Dakota (UND), has been an integral part of the Sunday Academy program for nearly two decades. Sunday Academy, part of ND EPSCoR's Nurturing American Tribal Undergraduate Research and Education (NATURE) program, sparks STEM interest in American Indian middle- and high-school students.



Monthly gatherings present real-world STEM challenges in a friendly, informal setting, fostering critical thinking and problem-solving skills. Zhao's involvement with Sunday Academy began in 2005, making her the longest-serving UND faculty member in the program.

Zhao sees Sunday Academy as more than just a professional opportunity. For her, it has been a transformative experience, broadening her perspective on community needs and allowing her to make meaningful contributions to both her career and research. "I really like this program. It has created opportunities for me as a professor, and opened my eyes on ways to broaden participation and community outreach." Zhao said.

As a professor, Zhao recognizes the dual benefits of her involvement. Sunday Academy serves as a catalyst for her research pursuits, playing a crucial role in successful proposal submissions. Sunday Academy also provides a platform for her students to engage in outreach activities that enhance their academic careers and contribute to the broader community.

Since 2011, Zhao has actively involved her students in the program, gradually increasing their responsibilities. "In 2023, we have nine graduate students participating in the program," Zhao said. Students transition from observers to active contributors, helping design and implement projects. Zhao's students have successfully leveraged their Sunday Academy experiences in faculty



position interviews, emphasizing the program's impact on their professional development.

Zhao actively involves graduate students in Sunday Academy, recognizing its potential to shape their careers. The program offers students a unique opportunity to combine research, education, and outreach, instilling a sense of responsibility toward society.

"I feel the students have gained the skills to design outreach projects, leading them to recognize their responsibility to the community and society. They have come to realize that their role goes beyond research. They also have a commitment to support individuals in the STEM field in underrepresented areas." Zhao said.

For the future, Zhao plans to transition into a more supportive role and will assist junior faculty members and graduate students as they take leadership positions in the program. No matter what role she takes, she remains committed to ensuring the program's success. The ongoing collaboration between faculty and students along with Zhao's mentorship promises a future where Sunday Academy continues to thrive and promotes STEM education and community engagement across North Dakota.

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## **Science Café**

On December 4, 2023, from 6-8 p.m. at Wild Terra in Fargo, ND. We will be hosting a science café about the STEM education pathway. All are welcome to join and there is no admission cost.

Our four expert panelists will share insights on how individuals can enter the rewarding field of STEM education, discussing the diverse pathways available. We'll also explore the hurdles that often arise in recruiting STEM teachers and brainstorm potential solutions to overcome these challenges.

Panelist Include:

- Ryan Summers Ph.D.  
Associate Professor of Science Education at the University of North Dakota
- Denise Jonas Ed.D.  
Director for Career and Technical Education at Cass County Career and Technical Education Virtual Center
- Kristi Levenson M.Ed.  
Continuing and Technical Education Teacher at West Fargo Public Schools
- Karmen Riley M.Ed.  
Recruitment Specialist at Fargo Public Schools



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## IDEA National Resource for Quantitative Proteomics

The IDEA National Resource for Quantitative Proteomics, funded by the NGMS, is holding two events – one in February and the other in March. The application deadline

for both is **Dec 15**.

The topic for the [Symposium for Proteomics Core Directors and Staff](#), **Feb 20-21**, this year is the DIA workflow. Whether you are a facility that has never tried Data Independent Acquisition (DIA) or you have years of experience, this workshop will cover the details from experimental design to data processing in a highly interactive format. Preference is given to core directors and their staff in IDeA-eligible states. Travel and lodging are provided to attendees.

The [Fundamentals for Proteomics Workshop](#), **March 13-14**, targets those investigators and their students considering an experiment in global proteomics to enhance their understanding of their biological system. This year the workshop's theme is "Pitfalls of Proteomics" (and how to avoid them). Preference will be given to attendees in IDeA-states. Travel and lodging are provided for selected attendees



**Meet the Researcher**





**Hilde Van Gijssel**

Professor of Science at Valley City University

**What are your primary research and scholarly interests?**

I am a genetic toxicologist by training, so I am interested in anything that can damage or modify DNA. My research focus is on the effects of chlorophenoxy herbicides on human health and how exposure contributes to cancer. I am particularly interested in multigenerational exposure and the role of epigenetics in the process. I use fruit flies as a model as they are easy to work with for students and have a generation time of 2 weeks which makes them well suited for multigenerational studies. And fruit flies are surprisingly genetically similar to humans. I also have a project using synthetic biology to create a biological mercury sensor.

**How does this tie into the work you are doing with ND-ACES? (Please include reference to your primary Pillar/Element.)**

I am involved with the cellular pillar, which for me is going back to my research roots as cancer genetics was the focus of my PhD work. I am using the same techniques as my primary research. It is nice to be able to do cell culture with the students as this is a big part of cancer research.

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

I grew up in the Netherlands and I completed my MS and PhD at Leiden University in Leiden, the Netherlands. I moved to Washington DC for a post-doc position at the

National Cancer Institute. I am now a full Professor of Science at Valley City State University. While at VCSU I completed a Master of Education in Technology Education.

**What excites you about ND-ACES?**

First, the opportunity to do research with students and being able to pay them for their efforts and have a larger budget for supplies. Second, working with researchers from NDSU and UND and create a network. This gives VCSU students more opportunities to explore their interest and provides me with valuable research support and an opportunity to collaborate in future research.

**What motivates you?**

Empowering people to be the best they can be and guide them to where they want to go. That is why I teach and why I am a volunteer to be a board member for organizations in arts, music, and the library.

**If you could time travel, where would you go?**

Not so much time travel, but instant travel. I wish I could apparate like in the Harry Potter novels so I could hop over to join my family for important events without 24 hr travel.

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

Gregory Mendel. He was one of the first scientists who used an experimental approach to understanding the world around him. He was able to discern the patterns of inheritance by observations and counting offspring of specifically designed crosses. He did this without knowing about the existence of DNA, chromosomes, mitosis, and cell proliferation which would have explained his patterns easily. His laws of inheritance stand till today with very few adjustments.

**What was your first job?**

I was a server/bus person/dishwasher/cashier/ice cream lady in the main restaurant of Avonturenpark Hellendoorn (a local amusement park where my parents live).

**What does your very best day include?**

Reading and playing/making music with others

**What's your favorite quote?**

“A day without laughter is a day wasted” attributed to Charlie Chaplin. Laughing simply makes everything at least a little better.

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## 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](#)



# Funding Opportunities

## DHHS

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

## DOD

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

## DHS

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

## NSF

- [Enabling Partnerships to Increase Innovation Capacity](#)
- [Research on Innovative Technologies for Enhanced Learning](#)
- [Ideas Lab: Personalized Engineering Learning](#)
- [Veterans Research Supplement Program](#)
  - NSF invites supplement requests to support research by students and community college faculty who are veterans
- [SBE Centers for Research Excellence in Science and Technology \(CREST Centers\)](#)
  - NSF encourages proposals for centers at minority-serving institutions for social, behavioral and economic sciences research advancing emerging technologies.
- [STEM Access for Persons with Disabilities](#)
  - NSF invites proposals and supplemental funding requests with the aim of increasing engagement of persons with disabilities in science, technology, engineering and mathematics fields across seven directorates.

## Other

- [National Artificial Intelligence Research Institutes](#)  
Supports the development of new AI Institutes that focus on one of the following themes: astronomical sciences, materials research and new methods for strengthening AI.

**Preliminary proposal deadlines**

October 31, 2023 (Group 1 themes) and January 12, 2024 (Group 2 themes).

**Full proposal deadlines**

February 16, 2024 (Group 1 themes) and May 17, 2024 (Group 2 themes).

- [Ethical and Responsible Research \(ER2\)](#)  
Supports research on what constitutes and promotes responsible research conduct and how to instill that knowledge in researchers, practitioners and educators across all career stages.  
**Full proposal deadline**  
January 25, 2024.
- [Dear Colleague Letter: Inviting Proposals Related to Open-Source Software Security to the Secure and Trustworthy Cyberspace Program.](#)  
Supports novel and high impact research that advances knowledge on securing the Open-Source Software ecosystem.
- [FY24 IJJA/IRA Bureau of Land Management Montana/Dakotas \(MT/DAK\) Environmental Quality Protection Program](#)
- [EMERGING FRONTIERS IN RESEARCH AND INNOVATION \(EFRI\): Biocomputing through EnGINeering Organoid Intelligence \(BEGIN OI\)](#)
- [ROSES 2023: F.5 Future Investigators in NASA Earth and Space Science and Technology](#)

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**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>>](#)

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



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*Acknowledgement*

*Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.*