

Through crisis comes creativity

After several months of mitigation strategies, the COVID-19 pandemic continues to impact our daily schedules. The long-term persistence of a crisis can mean a new challenges must be confronted each day, but with crisis comes creativity. Ingenuity brings new ideas for solving problems and increased opportunities for innovation.

This crisis time is an occasion to develop new ways to research, educate, and conduct outreach. In a crisis, routine tasks at work and at home are often insufficient to tackle the new and complex problems that arise. The personal trials we encounter are a part of a more considerable, collective public health challenge facing society.

Confronting these new challenges requires all of our focus and energy. The adversity of the pandemic heightens our levels of determination and persistence as we strive to solve problems with grit and ardor and to continue the important work of North Dakota's INSPIRE-ND (Innovative and Strategic Program Initiatives for Research and Education-North Dakota) and ND-ACES (New Discoveries in the Advanced Interface of Computation, Engineering, and Science) NSF Track-1 cooperative agreements. Rather than waning, our persistence must continue as we pivot to accept a new normal way of teaching, researching, and conducting outreach.

Each contributor makes their work impactful by applying their unique skills and expertise to develop creative and collective solutions. The mere task of sharing our knowledge is of augmented importance during times of great difficulty. We are continually reminded of the advantages of a Team Science approach as we leverage individual expertise to benefit the entire team, allowing each Track-1 cooperative agreement to progress despite COVID-19 disruptions.

Our new normal way of researching, teaching, and learning releases creative energy, allowing for the acceptance of new ways of doing things. This opening of new customs of creative expression encourages us to find and incorporate innovative solutions.

One such example is the new 360° lab and equipment tours now available on the ND EPSCoR YouTube channel. Read more about how these virtual outreach tools allow students to have unique virtual STEM experiences [on page 2](#) of this issue. A second example is the ND EPSCoR Nurturing American Tribal Undergraduate Research and Education (NATURE) program. The programing pivoted to virtual delivery this summer. You can read more about the virtual Sunday Academy program [on page 4](#) of this issue.

ND EPSCoR leaders and researchers have sought meaningful positive change from these unprecedented circumstances. The pandemic's unique trials build even stronger teams as our research and outreach efforts continue across the state. We are proud of the resilience and creative solutions of our researchers, students, mentors, and staff who are working diligently to continue their research and outreach, even when faced with tough new challenges and ambiguity.

As ND EPSCoR continues its research and outreach commitments, the impact of COVID-19 on our researchers affirms the importance of fostering creativity and the significance of our continued efforts to serve the state. We are also reminded of the importance of flexibility in our methods. Our institutions and research centers are instilling critical and creative thinking in our students today that will benefit ND's future.

As the pandemic continues with its disruptions to our work and personal lives, I want to send my support to each of you. COVID-19 has presented new challenges and demonstrated the vital role of fundamental research in our economy. I hope that you are, and will continue to be, well.

Regards,
Kelly A. Rusch, Ph.D., P.E., BCEE
ND EPSCoR Executive Director



ND EPSCoR creates video tours at Dickinson State University



ND EPSCoR thanks INSPIRE-ND Center for Regional Climate Studies (CRCS) and ND-ACES Cellular Systems researcher **Joshua Steffan** and Dickinson State University and for allowing our cameras to capture the impact of the Track-1s at their campus and in their community. In these videos, Steffan talks with ND EPSCoR about his teaching, research, and STEM outreach in western ND.

In the first 360° video, (linked in the picture above) Steffan provides the 360° experience of being in a university lab environment. The 360° video tours allow the viewer to look around the space in any direction, creating a virtual immersive experience.

Take a 360° tour of the LI-COR Biosciences Carbon Dioxide Monitoring System by watching video linked in the picture below. Learn more about how Steffan and his colleagues purchased this new equipment with the help of a 2019 ND EPSCoR grant in our [September News and Notes](#).



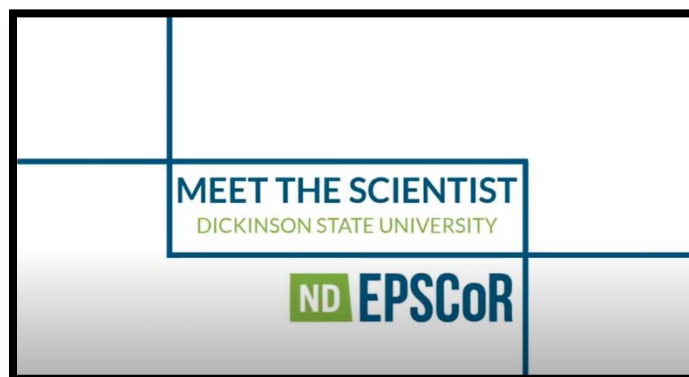
Why are ND EPSCoR grants for equipment an important part of building STEM capacity in ND? Equipment plays a crucial role in preparing students for their careers. Access to modern equipment creates opportunities for students to explore and build their skills. This infrastructure is a vital component of ND EPSCoR's effort to strengthen the STEM pathway at

institutions across North Dakota, like Dickinson State University.

In the next video (linked below), Steffan discusses the importance of his ND EPSCoR funded equipment grant and its impact on students at Dickinson State University.



Get to know more about Steffan's research and his role as a Cellular Systems researcher within the ND-ACES Track-1 cooperative agreement by watching our Meet the Scientist video, linked below.



View all of the videos from our visit to Dickinson State University using the links below:

- [Meet the Scientist – Dr. Joshua Steffan](#)
- [ND EPSCoR Equipment Grants in Action](#)
- [360° Research Lab Tour](#)
- [360° Classroom Lab Tour](#)
- [360° Equipment Tour](#)

You can find more videos like this as we continue to highlight institutions across ND that are partnering with ND EPSCoR to build STEM capacity on the [ND EPSCoR YouTube channel](#).

Graduate Student Research Assistantship recipient reflects on education pathway

The ND EPSCoR Graduate Student Research Assistantship (GSRA) program recruits students with bachelor's degrees from the North Dakota University System institutions and tribal colleges in North Dakota to pursue graduate degrees at North Dakota's two research universities (NDSU and UND) in STEM areas (science, technology, engineering, and mathematics). The program aims to broaden the STEM pathway, particularly for American Indian and rural students, from the bachelor's degree through graduate school. Typically, the GSRA program provides up to two years of funding to increase opportunities for students.

"My advice is to never give up," says former ND EPSCoR Graduate Assistantship recipient **Cherokee Durant** (pictured right). "STEM is not always easy, but it is very rewarding, and participating in STEM can make a big difference in the world."



At first, Durant had not yet decided on an area of study and explored several STEM areas. "I switched majors a couple of times until I chose biology for my undergraduate degree and master of public health as my graduate degree."

During her ND EPSCoR Graduate Assistantship, Durant's interest in continuing her education grew. "What led me to these decisions is the fact that I've always been interested in the sciences, especially medical sciences. As I got older, I wanted to do something to help make a difference in improving the health and well-being of the people. That led me to consider going into the sciences since I have enjoyed it and felt I can achieve my goal in helping other people."

Durant began her post-secondary education at a community college, taking classes to complete her general education requirements. This choice allowed her more time to figure out what she wanted to do. "I moved a few times, which led me to transfer universities until I transferred to Mayville State University. There were times when it was hard in the early years, but I never gave up, and things improved

with my hard work and having mentors who supported me along the way."

Durant says she had several mentors who greatly impacted her education over the past few years and encouraged her to pursue STEM research. "**Dr. Khwaja Hossain** (INSPIRE-ND Center for Sustainable Materials Science [CSMS] and ND-ACES Materials Design researcher), Dr. Joseph Mehus, and Dr. Robert Meiss from Mayville State University had a part in influencing my decision to become a researcher. Dr. Hossain especially encouraged me to advance my education after I got my bachelor's degree. Throughout my time at North Dakota State University (NDSU), my mentor was Dr. Rick Jansen, who helped me through my graduate studies."

Durant is currently pursuing a doctorate of philosophy in Indigenous Health at the University of North Dakota (UND), saying, "I'm hoping to continue to work in research and contribute to the greater good with my work. STEM majors open many opportunities for everyone who wants to study it."

Middle school students learn cyber security

Darren Siefert (pictured right), Instructor of Computer Science at Minot State University, provided middle school students opportunities to learn about cybersecurity through a 2019 ND EPSCoR STEM Research and Education grant. Siefert conducted group training, practices, and competitions to help students engage in STEM.



"In total, we had 14 different students in 6th through 8th grade participate in the program. Eight of those students attended at least 12 of the 16 two-hour-long weekend events," noted Siefert. Throughout the program, students were exposed to basic system administration concepts for Linux, Windows 10, and Windows Server 2019.

Some of the topics covered included managing user accounts, using file permissions to secure data, how to start and stop services, removing unwanted software, firewall configuration, and how to spot viruses, malware, and other unwanted files.

To increase engagement levels, students were given insecure or compromised virtual machines and had to apply their knowledge to clean and reconfigure these

machines back to a precise specification. The program's final session explored how malicious users detect and exploit remote systems.

ND EPSCoR presents at annual National Indian Education Association conference

Cultivating STEM Interest Among Tribal Youth in North Dakota

Scott Hanson, Tribal Colleges Liaison Manager, ND EPSCoR

Jean Ostrom-Blonigen, Project Administrator, ND EPSCoR

Shireen Alemadi, STEM Manager, ND EPSCoR

Kelly A. Rusch, Executive Director, ND EPSCoR
Professor, Civil and Environmental Engineering, NDSU



Scott Hanson, ND EPSCoR Tribal Colleges and Universities Liaison Manager and NATURE Coordinator, presented at the National Indian Education Association (NIEA) conference in October. In the presentation titled, "Cultivating STEM Interest Among Tribal Youth in North Dakota," Hanson spoke about the STEM pathway in Native communities in North Dakota. The presentation highlighted the positive outcomes of the ND EPSCoR NATURE program, which is designed to cultivate interest in STEM among American Indian youth. The conference was conducted virtually and Hanson addressed attendee questions at the end of the presentation.

COVID-19 rebudgeting

By **Janelle Smith**, ND EPSCoR Business Manager (right)

As the COVID-19 pandemic continues, the impacts on higher education and research are being felt in many ways. Students were sent home, and not all of them are back on campus. The number of individuals allowed in a laboratory has been reduced, and some labs were closed for a time. Conferences have moved to virtual formats, and other travel has been



curtailed. Equipment and supply purchases have been impacted as supply chains are interrupted. Outreach activities were significantly changed in scope, or canceled entirely. In addition to the challenges faculty are experiencing with their grant activities; they are also experiencing unique challenges in the classroom with virtual or hybrid models and students isolating or quarantining. It has been a challenging year for everyone, and I continue to be impressed with the resilience and determination of the faculty, staff, and students ND EPSCoR works with every day.

These challenges have a clear impact on the use of funding in research awards. Travel that was included in proposed budgets is not happening. Student funding needs may no longer match the proposed budgets if students are not on campus. A shift between supplies and operating fees may be required as researchers navigate these challenges.

We understand budgets may need to change and encourage ND-ACES researchers to contact their Pillar Leads and INSPIRE-ND researchers to contact the [ND EPSCoR Business Manager](#) as quickly as possible if they require a change to their budget. ND EPSCoR understands the challenges you face and wants to help you be successful in conducting your proposed activities.

NATURE Sunday Academy goes virtual because of COVID-19

By **Scott Hanson**, ND EPSCoR Tribal Colleges and Universities Liaison Manager and NATURE Coordinator (right)



In the spring of 2020, ND EPSCoR, as has been done each year since 1998, recruited faculty to develop the usual in-person NATURE Sunday Academy STEM modules, hoping that the pandemic would subside enough by fall to allow for the traditional face-to-face Sunday Academy program to occur during the 2020/21 academic year at the TCUs with middle school and high school students. Unfortunately, the pandemic is worse now in North Dakota than it was in the spring, thus compelling ND EPSCoR to switch to a virtual format.

Julia Bowsher and **Britt Heidinger** (both NDSU), the NATURE Sunday Academy program's co-directors, communicated with the faculty who recently designed new modules and determined that none of those

modules could be converted to a virtual format. So that meant that several new virtual STEM modules had to be found or developed in less than two months. Bowsher and Heidinger searched through the list of past modules and found one, "Math & Science Behind Advertising" from 2015/16, that could be converted easily to a virtual module. They then found two other modules, "Lemon Circuits and Flashlights" developed by Microsoft and "Candy Engineering" developed by the American Ceramics Society.

Scott Hanson, ND EPSCoR Tribal Colleges and Universities Liaison and NATURE Manager, developed a microbiology-based module, "Small things can be a big deal." The final addition to the list was "Protein Denaturation," a module developed by three University of North Dakota faculty members: **Julia Zhao, Tao Yu,** and **Xusheng Wang**. Zhao and Yu are both members of the ND-ACES Track-1 cooperative agreement. Wang is a 2020 undergraduate research awardee.

The Sunday Academy participants will begin doing these five asynchronous STEM activities in late December or January.

Events and trainings

ND EPSCoR State Conference



Save the date for the ND EPSCoR Annual Conference on Wednesday, April 14, 2021. This conference will be a virtual event. Visit the [ND EPSCoR News and Events page](#) for future updates.

Responsible Conduct of Research (RCR)

RCR training with STEM Manager Shireen Alemadi is available upon request to augment our campus RCR requirements. Please [contact Shireen Alemadi](#) to schedule.

Activities of note

Former INSPIRE-ND researcher to lead the Mesoscale & Microscale Meteorology Laboratory at the National Center for Atmospheric Research

Gretchen Mullendore, former Center for Regional Climate Studies researcher, NATURE Sunday Academy faculty, and current chair of the Atmospheric Sciences Department in the John D. Odegard School of Aerospace Sciences at UND, will start her new position in January. Her research will aim to help meteorologists generate improved weather forecasts for public use. Congratulations Gretchen!

ND-ACES researcher earns ASCE Fellow status

Dinesh Katti (NDSU), an ND-ACES Computational Approaches Research Pillar Lead, has been named a Fellow by the American Society of Civil Engineers. Congratulations Dinesh!

Funding opportunities

Graduate Student Cyberinfrastructure (CI) Assistantship – NDSU only

NDSU-only: ND EPSCoR's Graduate Student CI Assistantship program is designed to (1) increase student understanding of advanced research computing in hardware and software as it applies to their discipline; (2) provide additional support to faculty in the Center for Cellular Biointerfaces in Science and Engineering (CCBSE); and (3) provide student/faculty training at all ND EPSCoR-participating institutions on potential CI uses/benefits. Support will be available for one semester (Spring 2021 [January 16, 2021 – May 15, 2021]) for a one-half time assistantship in the NDSU Center for Computationally Assisted Science and Technology (CCAST). For more information, see the [Request for Student Applications](#).

- Due to ND EPSCoR: noon, November 23, 2020.

Distributed Research Experience for Undergraduates (dREU)

This program gives undergraduate students – from the nine ND EPSCoR ND-ACES RII Track-1 participating campuses - three Primarily Undergraduate Institutions (PUIs), one Master's College/University (MCU), three Tribal Colleges/Universities (TCUs) located in ND, or the two Research Universities (RUs) – the opportunity to work in the Center for Cellular Biointerfaces in Science and Engineering (CCBSE) alongside NSF Track-1 faculty

researchers on their cutting-edge research projects. For more information, see the [Request for Applications](#).

- Due to ND EPSCoR: noon, November 25, 2020

Undergraduate Research Assistantship (URA)

This program gives junior and senior undergraduate students - from the 10 ND EPSCoR ND-ACES RII Track-1 participating campuses - three Primarily Undergraduate Institutions (PUIs), one Master's College/University (MCU), four Tribal Colleges/Universities (TCUs) located in ND, or the two Research Universities (RUs) - the opportunity to complete a STEM bachelor's degree while working in the ND-ACES Center for Cellular Biointerfaces in Science and Engineering (CCBSE) alongside NSF Track-1 faculty researchers on cutting-edge research projects. For more information, see the [Request for Applications](#).

- Due to ND EPSCoR: noon, November 30, 2020

NCUR Registration Fee Grant

Each year, the Council of Undergraduate Research (CUR) hosts the National Conference on Undergraduate Research (NCUR) to highlight all the great research conducted by undergraduate students across the country. Recently, CUR announced the 2021 NCUR conference will be a virtual event.

ND EPSCoR is excited to support student professional development in STEM and will fund the registration fee of 15 students (from ND EPSCoR participating institutions) who have their abstracts accepted by NCUR. Contact: shireen.alemadi@ndus.edu if you have questions about this opportunity.

Eligibility requirements for this grant:

1. Students need to email ndepscor@ndus.edu, using the subject [NCUR Student Registration], and stating their interest in this opportunity.
 2. Students must submit their abstracts to NCUR by November 1 (for Early Decision) or December 1 (the final deadline).
 3. Students must register for NCUR by January 31, 2021 (if their abstract is accepted).
- Conference grants will be awarded by priority. Priority for this grant:
- 1st priority to students who have not had the privilege of previously presenting their research in any other venue.
 - 2nd priority to ND-ACES and INSPIRE-ND students.
 - 3rd priority goes to all other students.

Established Program to Stimulate Competitive Research (DOE EPSCoR) Implementation Grants

The DOE Established Program to Stimulate Competitive Research (DOE EPSCoR) hereby announces its interest in receiving new and renewal applications from eligible jurisdictions for Implementation Grants. Grants awarded under this program are intended to improve research capability through the support of a group of scientists and engineers, including graduate students and post-doctoral fellows, working on a common scientific theme in one or more EPSCoR jurisdictions. For more information, [please see the RFP](#).

- Pre-application (required) deadline: 5:00 pm Eastern Time on December 15, 2020
- Full application deadline: 11:59 pm Eastern Time on March 2, 2021.

NSF RII Track-2 Request for Proposal

EPSCoR Research Infrastructure Improvement Program: Track-2 Focused EPSCoR Collaborations (RII Track-2 FEC): There is a limit of a single proposal from each submitting organization. Each proposal must have at least one collaborator from an academic institution or organization in a different RII-eligible EPSCoR jurisdiction as a co-Principal Investigator (co-PI). For more information, [please see the program solicitation](#).

- Letter of intent (required) deadline: by 5:00 pm submitter's local time December 18, 2020
- Full proposal deadline: by 5:00 pm submitter's local time January 25, 2021

DEPSCoR Regional DoD Day

The Department of Defense (DoD) has asked the University of South Dakota to host a regional DEPSCoR DoD Day, where DoD program managers will provide information about the DEPSCoR program and general information about working with the DoD. The regional DEPSCoR Day will be held **on a date to be determined** in Vermillion, SD. For more information, please see: [DEPSCoR Regional DoD Day](#)

EPSCoR Workshop Opportunities

EPSCoR is designed to fulfill NSF's mandate to promote scientific progress nationwide, and NSF EPSCoR welcomes proposals for workshops in **Solicitation NSF 19-588**. These workshops focus on multi-jurisdictional efforts of regional to national importance related to EPSCoR's goals and NSF's mission. For more information, please see the RFP: [EPSCoR Workshop Opportunities](#)

Participating campus acronyms

- Master's College/University (MCU)
 - Minot State – Minot State University
- Primarily Undergraduate Institutions (PUIs)
 - DSU – Dickinson State University
 - Mayville State – Mayville State University
 - VCSU – Valley City State University
- Research Universities (RUs)
 - NDSU – North Dakota State University
 - UND – University of North Dakota
- Tribal Colleges/Universities (TCUs)
 - CCCC - Cankdeska Cikana Community College
 - NHSC – Nueta Hidatsa Sahnish College
 - SBC – Sitting Bull College
 - TMCC - Turtle Mountain Community College
 - UTTC – United Tribes Technical College

Stay in touch

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- Prior newsletters, http://bit.ly/EPSCoR_Newsletters
- Submit stories to: <https://bit.ly/epscorsubmitnews>
- To be added to the newsletter mailing list, please email ndepscor@ndus.edu, subject line: newsletter.

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