Celebrating successes

The spring semester is a time to celebrate the successes of the academic year. It is also a time when faculty and students prepare to share their research at our annual conference. Things will be a little different this year, due to the ongoing pandemic, our typically in-person conference will be a virtual experience. This adaptation to an online space allows for a variety of concurrent sessions and unique ways for attendees to engage with faculty and student researchers.

The annual conference is a celebration of research and outreach. The ND EPSCoR Conference is an annual event that brings together faculty, students, and the community to celebrate the STEM endeavors taking place within ND EPSCoR’s participating institutions. This year’s event will feature both student and faculty live sessions and asynchronous presentations.

Also new this year, we will be putting a virtual spin on the traditional poster session. Virtual posters will be accessible via pre-recorded video presentations. Each poster will have its own dedicated webpage and message board to allow conference attendees to engage in in-depth conversations with researchers and students ahead of the conference date. This new method will allow for broader connections and more meaningful engagement with a wide and varied audience.

The conference tracks feature planned concurrent sessions, permitting more choice for attendees to engage in sessions of their choosing, with a variety of STEM areas being covered. Topics will include NSF RII Track-1 presentations for both ND-ACES and INSPIRE-ND, Team Science, a STEM-based Indigenous Knowledge panel, and the ABCs of Patents and Commercialization. The goal this year is to celebrate the collaborative research within the Center for Regional Climate Studies (CRCS), the Center Sustainable Materials Science (CSMS), as well as the Center for Cellular BioInterfaces in Science and Engineering (CCBSE) within the New Discoveries in the Advanced Interface of Computation, Engineering, and Science (ND-ACES), ND EPSCoR’s most recent NSF cooperative agreement. Speakers will communicate the impact of their research and extensive outreach efforts and highlight the importance of this statewide collaborative effort on the state’s economy and STEM workforce development.

The annual conference is a showcase for many EPSCoR-funded participants to talk about their work and provides opportunities for collaborative conversations and insights. STEM students from these institutions, not in EPSCoR roles, are also invited to present virtual posters on their research efforts. Each faculty member and student participating in the CCBSE, the CRCS, or the CSMS helped to contribute toward the goals set for each research center.

After seven years of study, activity, and outreach, it will be an impressive snapshot of the work completed by INSPIRE-ND students and faculty and an exciting look at the beginning of ND-ACES, as it completes year one on June 30, 2021.

The research conducted through the NSF RII Track-1 is just one avenue of ND EPSCoR's programming, which illustrates the crucial collaborative work done across the state at each of the participating campuses. The 2021 ND EPSCoR Annual Conference will showcase ND EPSCoR’s faculty and student researchers' achievements and allow us to celebrate their excellent work.

Please join us for the virtual 2021 ND EPSCoR Annual Conference on April 14, 2021. Visit our state conference information page for details. You can read more about this year’s state conference on page 8 of this issue.

I encourage you to connect with us virtually and celebrate each of these successes at our annual conference. 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 Meet the Scientist video series

ND EPSCoR thanks ND-ACES Materials Design at Biointerfaces Pillar researcher and NATURE site coordinator Austin Allard (TMCC) for allowing our cameras to capture his research and outreach efforts. Allard talks with ND EPSCoR about teaching, ND-ACES research, and STEM outreach across ND in these videos.

In the first video (linked in the picture above), Allard, a Pre-engineering Instructor at Turtle Mountain Community College, discusses the importance of the ND-ACES research and its impact on students in his Meet the Scientist video. Allard is also a member of the INSPIRE-ND CSMS team.

Meet the Students: new video series

Students across North Dakota participate in ND EPSCoR events, programs, outreach, and research. ND EPSCoR encompasses programs that reach across the state, seeking to fulfill our mission of increasing North Dakota’s competitiveness for merit-based grants in support of STEM research. In addition to research efforts, ND EPSCoR supports efforts to broaden the STEM pathway as a means to increase the STEM workforce in the state.

ND EPSCoR thanks Khwaja Hossain (Mayville State) and Julia Zhao (UND), both ND-ACES researchers, for allowing our cameras to capture the impact of their research on their students. You can learn more about the Materials Design at Biointerfaces pillar, of which Zhao is a co-lead and Hossain is a researcher, in our August 2020 issue of News & Notes.

Hossain’s biology lab at Mayville State University has several ND-ACES student researchers. An undergraduate research experience can make all the difference to a student and help them reach their academic and career goals.

Meet Brooke Roeges (Mayville State), one of Hossain’s students, in the video linked below.
Roeges, a student-athlete majoring in biology with a health specialization and a chemistry minor, is an undergraduate researcher in Hossain’s CCBSE lab at Mayville State University.

In the video linked below, Hayle Boechler (Mayville State), a current ND EPSCoR ND-ACES Distributed Research Experience for Undergraduates (dREU) awardee, discusses the importance of research experiences for undergraduate students and reflects on the positive impacts of working closely with faculty researchers. Boechler is a biology major and a student researcher in Hossain’s lab.

The dREU program gives undergraduates from PUIs, TCUs, the MCU, and RUs the opportunity to work in the CCBSE, CRCS, or the CSMS alongside faculty on their cutting-edge research projects. The dREU program is coordinated by Shireen Alemadi, ND EPSCoR STEM Manager. You can learn more about how this program impacts the workforce in ND on page 6 of this issue.

In the video linked below, listen to Lexi Carpenter (Mayville State) discuss the importance of a lab experience for undergraduate students to prepare for a STEM career. Carpenter is a biology major and a chemistry minor. She is also pursuing a certificate in business.

In the video linked below, meet Sarah Reagen (UND), a graduate student in Julia Zhao’s chemistry lab at the University of North Dakota. Zhao is a CCBSE Materials Design at Biointerfaces Pillar Co-lead. Zhao is leading the Materials Design team’s effort to create nanomaterials for cellular imaging with several essential features. Reagen has participated in multiple outreach events for the ND EPSCoR State Office sponsored NATURE program that involved traveling to the TCUs for chemistry demonstration events as well as making instructional videos for chemistry activities.

In the video linked below, chemistry graduate student Di Sun (UND) shares about his work in Zhao’s CCBSE chemistry lab designing and synthesizing new types of fluorescent nanoparticles.

Watch Taylor Stegman (Mayville State) explain the benefits of her area of study in the video linked below. Stegman is a biology major and a student researcher working with Hossain and, along with Boechler, is a current ND EPSCoR ND-ACES dREU awardee.
In the video linked below, graduate student Yingfen Wu (UND) talks about conducting research for making silicon quantum dots and applying them to cell imaging. Like Reagen and Sun, Wu is also a graduate student researcher in Zhao’s CCBSE chemistry lab.

You can find more information about how the ND EPSCoR State Office seeks to help improve STEM education and to build a pathway for students in North Dakota who are interested in pursuing careers in STEM disciplines on our Education page. Subscribe to our channel on YouTube as we continue to feature the voices of ND-ACES students across North Dakota.

**ND-ACES builds on existing collaborations and partnerships to strive for success**

By Jean Ostrom-Blonigen, ND EPSCoR Project Administrator (right)

As the ND EPSCoR NSF EPSCoR RII Track-1 ND-ACES team began its work on July 1, 2020, ND EPSCoR asked each participant to identify their existing research relationships with each other and their research collaborations and partnerships.

A baseline participant survey indicated that only 24.6% of the ND-ACES team members had worked with each other in an effort that produced a product/output prior to July 1, 2020. NSF EPSCoR defines outputs as patents; proposals, grants, or contracts, published papers or presentations, hiring of new faculty; involvement of postdoctoral personnel; and the number of students who graduated from their academic discipline. The ND-ACES metrics negotiated with NSF during the team’s strategic planning process are located on the ND-ACES website and are updated at least monthly.

Following the National Science Foundation’s (NSF) guidelines, the ND-ACES proposal defined collaborations and partnerships as follows:

- **Collaborations** are research relationships between ND-ACES participants and other not-for-profit, academic institutions or national laboratories. Throughout the five-year cooperative agreement, ND-ACES team members will participate in structured and informal programs designed to enhance internal (within the state) and external (outside of the state) collaborations.

- **Partnerships** are research relationships between ND-ACES participants and industry, economic development entities, or regional bioscience or health research organizations. ND-ACES team members intend to target organizations interested in supporting cellular systems, materials design, or advanced computation R&D and commercialization.

As the team began its work, each member was asked to identify their existing research collaborations and partnerships, which could be leveraged within the ND-ACES project. Twenty-nine (29) collaborations (13 internal to the state and 16 external) with 24 institutions (23 domestic and one international) and five partnerships with two Fargo-based entities were identified. Both surveys will be conducted annually to measure the team’s progress in working together and in collaborating and partnering with others.
Year in Review: Reflecting on 2020

Accomplishments of 2020

Serving our State

Outreach

The Nurturing American Tribal Undergraduate Research and Education (NATURE) program is an ND EPSCoR State Office-sponsored education project, making 3,264 American Indian student connections during the INSPIRE-ND cooperative agreement.

Building STEM Capacity and Competitiveness

ND-ACES: New Discoveries in the Advanced Interface of Computation, Engineering, and Science (ND-ACES), ND EPSCoR’s most recent $20 million NSF cooperative agreement, is a five-year cooperative agreement that carries an 80/20% federal/state match.

Impact on Workforce

The ND EPSCoR State Office funds faculty and students for STEM research and education activities, and supports the STEM pathway at 11 higher education institutions within the ND University System (NDUS) and the ND Association of Tribal Colleges (NDATC).

Partnerships to Build STEM Capacity

The ND EPSCoR State Office is proud to partner with Gateway to Science. The mission of Gateway to Science is to inspire the discovery of science through hands-on experiences. Gateway to Science fulfills its mission by operating an interactive exhibit gallery in Bismarck and developing and delivering mobile educational outreach programs across the state through the Gateway to Science on the Go van.
Spring dREU begins

By Shireen Alemadi, ND EPSCoR STEM Manager and dREU Coordinator (right)

As the Spring ND-ACES dREU begins, applications are being accepted for Summer 2021 dREU.

As a new calendar year begins, so do new opportunities for students. The first cohort of the ND-ACES RII Track-1 distributed Research Experience for Undergraduates (dREU) is officially underway. On January 27th, the group had its first dREU weekly professional development meeting. Each week the group will meet to cover various topics, including: responsible conduct of research, how to write a resume, applying to graduate school, and science communication.

The dREU allows students to conduct research with a ND-ACES Track-1 researcher and gain valuable research experience in the lab, while also building experience and skills, through professional development activities, that will continue to benefit their academic and career pursuits. When asked about the dREU, student participant, Taylor Stegman, Mayville State University said, “The benefits are numerous. Undergraduates conducting research get firsthand experience as researchers, and being a part of the dREU allows each of us to share our experiences and learn from one another.”

As the semester continues, ND EPSCoR looks forward to working with these students each week and watching them learn and grow as researchers and STEM professionals. ND EPSCoR is currently accepting applications for the Summer 2021 dREU cohort – apply today!

For more information on the dREU, see the dREU application information for Summer 2021, or review the request for applications. If you have any questions about the dREU, connect with me by email at shireen.alemadi@ndus.edu.

Partnership with Gateway to Science brings STEM workshops to classrooms

ND EPSCoR State Office partner, Gateway to Science, are again working together to bring a hands-on STEM workshop to each classroom at Solheim Elementary School in Bismarck. That’s a total of 25 workshops for 534 students!

The workshops result from modifications made to the science center’s popular outreach programs due to COVID to address students' and partners' health and safety. STEM workshops delivered to schools allow students to engage in hands-on, high-energy learning experiences in science, technology, engineering, and math (STEM) while maintaining a safe environment for everyone.

A student uses a ball of clay and seeds to create a Chia pet in one of the How Does It Grow? workshop activities.

dREU awardees participate in virtual weekly meetings.
“Many classrooms that have field trips to the Gateway to Science interactive gallery also take part in a STEM workshop while at the science center,” said Janet Rosario, Programs Director. “The pandemic has made it difficult for schools to participate in field trips, so we decided to bring the workshops to them.”

Gateway to Science workshops are offered for grades K-12 with expectations and degree of difficulty appropriate for the participants’ age/grade. Workshop descriptions are available on the Gateway to Science website. Recognizing that delivering education during these extraordinary times is an ever-changing process, Gateway to Science has the ability to be flexible and works with each school to work to meet their specific needs.

Under this ND EPSCoR State Office funded project, each Solheim Elementary teacher chose which STEM workshop Gateway to Science would bring to their classroom. Some grade levels chose the same workshop (all kindergarten classrooms chose How Does It Grow?) while other grade levels selected a variety of workshops (two 4th grade classrooms chose Forensics, one chose Bucket Towers, and another selected the Marble Ziplines workshop).

Six Fridays are designated for these STEM workshops. All kindergarten, first grade, and fifth grade classrooms had their workshops in January, with the remaining grades scheduled for February and March. A Gateway to Science STEM Educator spends the day at the school and delivers the workshops to one classroom at a time. Workshops are 45 or 60 minutes in length, and all materials are supplied. In the photo below, a student uses the engineering design process to create strong enough structures to withstand a simulated earthquake.

Workshops, like these are made possible through the partnership between the ND EPSCoR State Office and Gateway to Science to deliver quality STEM programming throughout North Dakota.

Gateway to Science is North Dakota’s science center. Its mission is to inspire the discovery of science through hands-on experiences. Gateway to Science fulfills its mission by operating an interactive exhibit gallery in Bismarck and by developing and delivering mobile educational outreach programs across the state through the Gateway to Science on the Go van, featured on page 5 of this issue.

In addition to on- and off-site programming, Gateway to Science offers a STEM at Home section as well as a Resource Center for families and educators on its website. Students, parents, and teachers will find hands-on STEM activities to do at home or in the classroom, a list of recommended STEM books, and a wide variety of STEM-related websites.

Learn more by visiting our Gateway to Science partnership page.

### STTAR business applications open

The Students in Technology Transfer and Research (STTAR) program, an ND EPSCoR State Office-sponsored program, offers ND-based businesses the opportunity to cost-share student internship salaries during the summer of 2021. The applications for 2021 are now open.

ND companies and organizations hire great students who use their academic training and expertise to help find solutions to technical challenges while sharing in the salary costs with the ND EPSCoR State Office. The State Office cost-share provides $5 per hour toward the student intern’s summer salary.

For student interns, it is an opportunity to gain valuable work experience within the ND industry. A number of the 2020 STTAR employers noted that they often look to past interns when they have a full-time job opening in their companies. Funding is limited for 2021, and applications are accepted on a first-come, first-served basis. The qualifying criteria include:

- The business must be an ND company or have an ND-based office;
- The work/project must have a science, technology, engineering, or math (STEM) focus for the internship; and
The internship must be a minimum of eight weeks and a maximum of 12 weeks.

The ND EPSCoR contribution for the internship is up to $2,400 per individual student. For more information or to obtain a business partner application, please visit the STTAR program webpage or email Shireen Alemadi.

Events and trainings

ND EPSCoR State Conference

Save the Date
Annual Conference
April 14, 2021

Save the date for the ND EPSCoR Annual Conference on Wednesday, April 14, 2021. This conference will be a virtual event. Pips Veazey, Ph.D., Project Director, Alaska EPSCoR, will give a keynote address on Team Science.

Also included in the conference will be synchronous presentations and panels. Topics include NSF RII Track-1 ND-ACES and INSPIRE-ND presentations, Team Science, STEM-based Indigenous Knowledge, and the ABCs of Patents and Commercialization.

Visit the 2021 ND EPSCoR Annual Conference webpage to pre-register for this event, review poster submission guidelines, and to view the full agenda. Pre-registration is required for all attendees planning to submit a virtual poster.

Pre-registration must be submitted by noon on March 1, 2021. The deadline to submit a virtual poster is noon on March 12, 2021.

ND-ACES Science Café

Welcome to Science Café!
A place for scientists and the public to discuss current work and interesting scientific issues.

Please join us for the first event in the ND EPSCoR ND-ACES Science Café series on Friday, February 19, 2021, from 12:00 (noon) – 1:00 pm CST. Science Cafés are a place for scientists and the public to discuss current work and interesting scientific issues, learn more on our Science Café page.

Responsible Conduct of Research (RCR)

RCR training with STEM Manager Shireen Alemadi is available upon request to augment initial campus or Collaborative Institutional Training Initiative (CITI) RCR trainings. Please contact Shireen Alemadi to schedule.

Activities of note

ND-ACES participants publish

Congratulations to the following ND-ACES faculty, student participants, and External Advisory Board members on their recent and upcoming publications:

- Targeted Polymeric Nanoparticles for Drug Delivery to Hypoxic, Triple-Negative Breast Tumors
  Mamnoon, Babak; Loganathan, Jagadish; Confeld, Matthew I.; De Fonseka, Nimesha; Feng, Li; Froberg, Jamie; Choi, Yongki; Tuvin, Daniel M.; Sathish, Venkatachalam; Mallik, Sanku (December 2020, ACS Applied Bio Materials)

- Dynamic modes of inflow jet in brain aneurysms
  Le, Trung Bao. (February 2021, Journal of Biomechanics)

- Graphene/gold nanoparticle composites for ultrasensitive and versatile biomarker assay using single-particle inductively-coupled plasma/mass spectrometry
  Xing, Yuqian; Han, Juan; Wu, Xu; Pierce, David; and Zhao, Julia. (December, 2020, Analyst)
Links to these publications can be found in the National Science Foundation’s (NSF) Public Access Repository (PAR) or on the ND EPSCoR website.

**Funding opportunities**

**Equipment/Equipment Repair Only – STEM Research and Education**

The ND EPSCoR State Office’s mission is to support efforts of participating institutions of higher education across the state that result in increased STEM faculty capacity and competitiveness; a stronger STEM pathway that produces our next-generation workforce, educators, and researchers; and an informed citizenry that values the STEM ecosystem and economy. Thus, the ND EPSCoR State Office is now accepting proposals to fund equipment/equipment repair only STEM activities at EPSCoR participating institutions: research universities (RUs; NDSU and UND), master’s college/university (MCU; Minot State University), primarily undergraduate institutions (PUIs; Dickinson, Mayville, and Valley City State Universities), and the tribal colleges/universities (TCUs; Cankdeska Cikana Community College, Nueta Hidatsa Sahnish College, Sitting Bull College, Turtle Mountain Community College, and United Tribes Technical College). For more information, please see the Request for Proposals. Due to ND EPSCoR by noon on February 18, 2021.

**Doctoral STEM Teaching Assistantship ND-ACES (NDSU/UND only)**

ND EPSCoR ND-ACES Doctoral STEM Teaching Assistantship program is designed to increase NDSU/UND doctoral students’ understanding of and experience in STEM teaching and research involving undergraduate students. These semester-long placements (Fall 2021 or Spring 2022) at a Tribal College/University (TCU), Primarily Undergraduate Institution (PUI), or Master’s College/University (MCU) in North Dakota involve teaching and research duties under the direction of faculty research participants in ND EPSCoR’s National Science Foundation (NSF)-funded New Discoveries at the Advanced Interface of Computation, Engineering, and Science (ND-ACES) project in the areas of materials design, cellular systems, or computational approaches. Click here for more information about ND EPSCoR’s ND-ACES project. Click here for a list of ND-ACES faculty researchers at the TCUs, PUIs, and MCU. For more information, see the Request For Applications. Due to ND EPSCoR by noon on March 11, 2021.

**Distributed Research Experience for Undergraduates (dREU)**

This ND EPSCoR ND-ACES program gives undergraduate students – from the nine 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 CCBSE alongside NSF Track-1 faculty researchers on their cutting-edge research projects. For more information, see the Request for Applications. Open until filled.

**North Dakota NASA EPSCoR call for Pre-proposals – NASA CAN**

North Dakota NASA EPSCoR Established Program to Simulate Competitive Research is soliciting research pre-proposals from faculty at affiliate institutions. These pre-proposals are in response to the recent NASA EPSCoR CAN (Cooperative Agreement Notice), Announcement Number: NNH21ZHA004C. See the RFP for details. Pre-proposals due via online submission form to ND NASA EPSCoR: Noon, 02/17/2021. Pre-proposals will be evaluated in a down-select. Full proposal due in NSPIRES: 04/19/2021.

For more information, please visit the ND NASA EPSCoR Announcement Page.

**NSF Track-4 Research Fellows Solicitation NSF 21-557**

The Established Program to Stimulate Competitive Research (EPSCoR) is designed to fulfill the mandate of the National Science Foundation (NSF) to promote scientific progress nationwide. EPSCoR jurisdictions that are eligible for RII competitions are listed in the RII Eligibility table, which can be found here. This program provides support to further develop the individual research potential of Principal Investigators (PIs) through extended collaborative visits to the nation’s premier private, governmental, or academic research centers of their choice. See Program Solicitation for details. Due April 26, 2021.

**NSF Track-4-FAST Solicitation NSF 21-557 (For PUI and TCU campuses only)**

The Established Program to Stimulate Competitive Research (EPSCoR) is designed to fulfill the mandate of the National Science Foundation (NSF) to promote scientific progress nationwide. EPSCoR jurisdictions that are eligible for RII competitions are listed in the RII Eligibility table, which can be found here. Under the same solicitation, NSF is offering a second program that provides opportunities for PIs from specific institutions.
of higher education with high enrollments of trainees from underrepresented populations in STEM (See Section "IV. Eligibility Information" for more details). The aim of this opportunity is to further develop their individual research potential through extended collaborative visits to National Aeronautics and Space Administration (NASA) research facilities located at NASA Centers throughout the United States. See Program Solicitation for details. Also, due April 26, 2021.

NASA is sponsoring several informational webinars related to the joint NSF/NASA RII Track-4-FAST program. Please see the attached flyer with the dates, times, and registration links. Many of you may already have seen this invitation from your state directors. Please disseminate widely within your jurisdictions. NSF will also be hosting office hours and posting a recorded webinar to address any questions. See the FAST outreach schedule for details.

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 postdoctoral 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.

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 Sahnihs College
  - SBC – Sitting Bull College
  - TMCC - Turtle Mountain Community College
  - UTTC – United Tribes Technical College

Stay in touch

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- 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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