Restoration

It is not always easy to take time for ourselves. Heavy workloads from a busy fall semester and the personal challenges brought on by the pandemic can make taking time off to enjoy the semester break seem like a difficult choice to make.

It may appear arduous at times to get away from the office, but rather than lost time, this semester break is instead a chance for needed restoration – a time for renewal after a challenging yet productive semester. The stress of the global pandemic makes it even more imperative to take care of yourself, and also to take care of those around you.

There are many benefits to a restful break after an extended period of productive and intricate work. Some notable benefits include increased productivity, improved concentration, and lower levels of stress. In this way, a period of respite contributes to building an enhanced work-life balance. A semester break is a natural time for us to reflect on our own personal sense of balance and look ahead to what is in store for our lives in 2021.

Resting and restoring after an extended time of complex work is an essential component of stress reduction. Taking a break allows for a significant reduction in stress and an improvement in our sense of holistic wellbeing.

Working continuously without proper rest can have the opposite of the desired effect. While it may seem like a chance to check a few more projects off of our long to-do lists, a period of restoration reaps far greater rewards. After returning from a long break, our minds are refreshed and ready to begin a new season of increased productivity.

Going through a process of restoration requires idle time, allowing for more calm to flow into daily life. A calmer, slower pace reduces stress levels and will enable us to reflect on the past year with mindfulness. Dedicated time away helps you to be more creative upon return.

A restoration period enables us to arrive at a new semester feeling rehabilitated and ready to dive into research, education, and outreach. Spring semester begins the second half of year one of ND-ACES (New Discoveries in the Advanced Interface of Computation, Engineering, and Science), ND EPSCoR's most recent Track-1. Some of the programs beginning this spring include the Distributed Research Experience for Undergraduates, Research Training Groups for students, and the Undergraduate Research Assistantship, to name a few of the opportunities available to students engaged in ND-ACES research. Occasions like these provide students across the state with valuable professional development and research training experiences that they will carry with them as they further their education and enter the workforce.

The adversity of the pandemic heightens our need to restore ourselves during this time. With January comes a new semester where we will continue to solve problems creatively and carry on the important work of ND EPSCoR's broad spectrum of programs.

Taking the time to rest may seem a simple task, but it is of augmented importance during times of great difficulty. As ND EPSCoR continues its research and outreach commitments, the impact of COVID-19 on our researchers affirms the importance of rejuvenation after so much change, ambiguity, and a great many new challenges and opportunities.

During this pause, as the pandemic wears on, I want to send my support to each of you. I hope that you enjoy the semester break and 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

ND EPSCoR thanks ND-ACES Center for Cellular Biointerfaces in Science and Engineering (CCBSE) Co-lead **Kalpana Katti** (NDSU) and Materials Design Co-lead **Julia Zhao** (UND) for allowing our cameras to capture their research and outreach efforts. In these videos, Katti and Zhao talk with ND EPSCoR about teaching, ND-ACES research, and STEM outreach across ND.

In the first 360° video (linked in the picture above), Katti, a university distinguished Professor in Civil and Environmental Engineering at NDSU, provides the 360° experience of being in a university lab environment. The 360° video tours allow the viewer to look around the Advanced Materials Lab in any direction, creating an immersive virtual experience.

Learn more about how Katti and her colleagues purchased new equipment with the help of an ND EPSCoR grant in the video linked below.

Why are ND EPSCoR grants for equipment a vital 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 develop their skills. This infrastructure is a vital component of ND EPSCoR's effort to strengthen the STEM pathway at institutions across the state.

In the next video (linked below), Zhao, a professor in the Department of Chemistry at UND, discusses the importance of the ND-ACES research and its impact on students in her Meet the Scientist video.
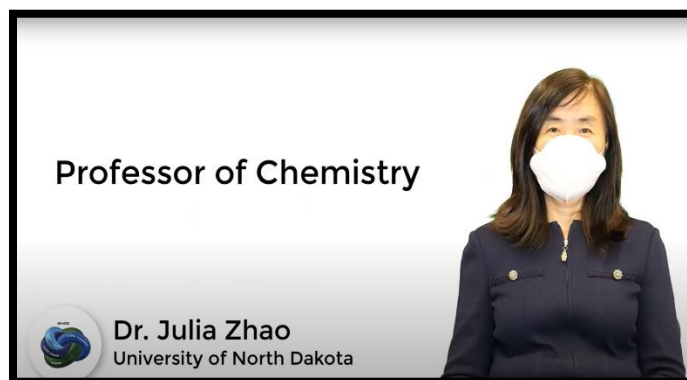
Get to know more about Katti's research within the ND-ACES Track-1 cooperative agreement by watching her Meet the Scientist video, linked below.

View all of the videos from our visits by using the links below:

- [Meet the Scientist – Dr. Julia Zhao](#)
- [ND EPSCoR Equipment Grants in Action](#)
- [360° Research Lab Tour](#)
- [Meet the Scientist – Dr. Kalpana Katti](#)

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](#). You can find details and videos of our earlier visit to Dickinson State Univerity in the [November issue of News & Notes](#).

ND-ACES hires new HPC facilitator

The ND-ACES project provided for the hiring of two one-half time High Performance Computing (HPC) Facilitators. One at UND's Computational Research Center (CRC) and one at NDSU's Center for Computationally Assisted Science and Technology (CCAST).

The intent of this funding is to have the two HPC's assist with the onboarding of ND-ACES participants across the state, ensure that each participant has the appropriate computational resources, and function as a training liaison between the ND-ACES research and the HPC centers.

Welcome to the CRC's new facilitator, **David Apostal**; he will be working under the direction of **Aaron Bergstrom** (UND) as a Senior Advance Cyberinfrastructure Research Education Facilitator at the University of North Dakota, a position which receives partial funding support from the ND-ACES project. Apostal's responsibilities include helping scholars become comfortable using High Performance Computing and Artificial Intelligence resources, developing training material, and helping to create outreach programs for K-12, Primarily Undergraduate Institutions, and Tribal Colleges and Universities in North Dakota.

Through this position, Apostal also serves as an instructor at UND's School of Electrical Engineering and Computer Science in the College of Engineering and Mines. He teaches undergraduate and graduate courses in distributed computing, modeling and simulation, and high performance computing.

Previously, Apostal worked in private industry as a computer scientist and member of the engineering staff, primarily in the cybersecurity and defense industries. He has been a Certified Information Systems Security Professional (CISSP) since 2006.

Apostal holds BA and MS degrees in Computer Science from UND. He is also pursuing a Ph.D. in Scientific Computing with an emphasis in high performance computing from UND.

CIRCLES Alliance

By **Shireen Alemadi**, ND EPSCoR STEM Manager (right)

This year ND EPSCoR has joined with five other states (Idaho, Montana, New Mexico, South Dakota, and Wyoming) to connect with tribal community members in our states to gain a better understanding regarding each community's definition and perspective of STEM (science, technology, engineering, and mathematics). Initially, we were planning to visit each community in person, but with COVID-19 continuing, we have decided to connect virtually. Using a common set of questions across the six-state CIRCLES (Cultivating Indigenous Research Communities for Leadership in Education and STEM) Alliance, virtual interviews over Zoom or an online survey will be conducted with tribal community stakeholders to gain their perspective on how indigenous based STEM education is currently being incorporated or might be incorporated in the future, to support student STEM learning. To participate, you must be 18 years or older.

Here is a link to a 90-second video that tells you more about these efforts. The anonymous online survey is available at this link. Additionally, ND EPSCoR is conducting individual virtual interviews. If you would prefer to participate in an individual interview, please email Scott Hanson, ND EPSCoR Tribal Colleges/Universities Liaison Manager, or call 701-231-8606.

This effort aims to foster better connections with tribal communities and support STEM educational programming. Working toward that goal, ND EPSCoR humbly requests your assistance in completing this survey or contacting us to set up a virtual interview. The CIRCLES Alliance believes this is a particularly poignant time to reflect on observations regarding indigenous based STEM education that have come more into focus during the COVID-19 pandemic.

ND-ACES makes awards to participating institutions

Several awards tied to the RII Track-1 ND-ACES project were made this month to students and faculty across the state.

Student awards are designed to build ND's STEM capacity; particularly within underrepresented and underserved groups:

- Cyberinfrastructure Assistantships (CIAs)
  - Zakaria El Mrabet, Doctoral Student, Computer Science, UND (Academic Advisor: Prakash Ranganathan and CRC Advisor: **Aaron Bergstrom**)
  - Jingyan Fu, Doctoral Student, Electrical and Computer Engineering, NDSU (Academic Advisor: Danling Wang and CCAST Advisor: Khang Hoang)
- Distributed Research Experiences for Undergraduates (dREUs):
  - Hayle Boechler, Mayville State (ND-ACES CCBSE Materials Design Advisors: **Khwaja Hossain** [Biology, Mayville State] and Mohiuddin Quadir [Coatings and Polymeric Materials, NDSU])
  - Megan Heeren, NDSU (ND-ACES CCBSE Computational Approaches Advisor: **Lu Liu**, Computer Science)
  - Madison Koppelman, NDSU (ND-ACES CCBSE Materials Design Advisor: **Sanku Mallik**, Pharmaceutical Sciences)
  - Ansley Schug, NDSU (ND-ACES CCBSE Computational Approaches Advisor: **Lu Liu**, Computer Science)
  - Taylor Stegman, Mayville State (ND-ACES CCBSE Materials Design Advisor: **Khwaja Hossain**, Biology)
  - Ethan Wells, NHSC (ND-ACES CCBSE Computational Approaches Advisor: **Trung B. Lee**, Civil and Environmental Engineering, NDSU)
- Undergraduate Research Assistantships (URAs):
  - Carson Herbert, Biology, UND (ND-ACES CCBSE Cellular Approaches Advisor: **Archana Dhasarathy**, Biomedical Sciences)
  - Claire Zumbach, Biology, DSU (ND-ACES CCBSE Cellular Systems Advisor: Joshua Steffan, Natural Sciences)

Faculty awards:

- ND-ACES CCBSE Emerging Area/Seed Awards:
  - Innovation Pilot Funding and Translational Seed Research that Fit the CCBSE Mission
    - Yongki Choi, Associate Professor, Physics, NDSU
  - New and Efficient Computational Techniques for Evaluation of Cancer Progression and Biology
    - Motoki Takaku, Assistant Professor, Biomedical Sciences, UND
    - Ravi Yellavajjala, Assistant Professor, Civil and Environmental Engineering, NDSU
  - New Biomaterials in Tissue Engineering and Advanced Manufacturing of Biomaterials
    - Michael Kjelland, Assistant Professor, Biology, Mayville State

Pathways to successful Team Science – Part 2: developing a collaboration plan

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

At the NSF's request, the ND-ACES team set time aside in May and June, before the July 1 start of ND EPSCoR's new RII Track-1 cooperative agreement, to develop a SWOT Analysis, a Risk Management Plan, and a Collaboration Plan. My October article described a SWOT Analysis and a Risk Management Plan. This article describes a relatively new tool in NSF's project management box, the Collaboration Plan. No one will tell you that team science is easy; indeed, the running commentary among my project administrator peers across the 28 EPSCoR jurisdictions is that "team science is not for the faint-hearted."

In 2018, the National Cancer Institute under the National Institutes of Health (NIH) developed a Collaboration/Team Science Field Guide. Contained within that 139-page guidebook (NIH publication #18-7660) are 10 top takeaways relative to team science: 1)

trust, 2) vision, 3) self-awareness and emotional intelligence, 4) leadership, 5) mentoring, 6) team evolution and dynamics, 7) communication, 8) recognition and sharing success, 9) conflict and disagreement, and 10) navigating and leveraging networks and systems.

The ND-ACES team consists of 42 senior personnel across ten institutions. Before writing this proposal, only 24.6% of them had previously collaborated with one another professionally. In March 2020, ND EPSCoR hired a team science facilitator to assist with this effort. (Spoiler alert: ND EPSCoR's team science facilitator will give the keynote address at ND EPSCoR's 2021 Annual State Conference). The collaboration planning process began with the development of a visual representation of the ND-ACES configuration and communication channels. This exercise established a living document that underscored the complexity of the ND-ACES project. Over the next seven months, the ND-ACES senior personnel participated in several asynchronous meetings (using NDSU's Group Decision Center) and met virtually over Zoom four times to produce a 10-component Collaborative Agreement for ND-ACES: 1) rationale for team approach and configuration; 2) collaboration readiness; 3) technological readiness; 4) team functioning; 5) communication and coordination; 6) leadership, management, and administration; 7) conflict prevention and management; 8) training; 9) quality improvement activities; and 10) budget/resource allocation.

As part of this exercise, the ND-ACES team made decisions related to its communication platforms, criteria leading to authorship, and conflict resolution protocols. Each of these important tools (SWOT Analysis, Risk Management Plan, and Collaboration Plan) informed the basis for the ND-ACES strategic plan and provided this complex team with several platforms to better facilitate its communication early in this NSF cooperative agreement.

NATURE Sunday Academy sessions

2020-2021 Sunday Academy virtual sessions begin this month. For information about NATURE program, please contact Scott Hanson, the ND EPSCoR Tribal Colleges/Universities Liaison and NATURE Manager. This year's Sunday Academy topics will include:
- Breaking Proteins (Protein Denaturation) by **Tao Yu, Xusheng Wang, Julia Zhao** (UND)

- Candy Engineering by American Ceramics Society with adaptations by **Britt Heidinger** and **Julia Bowsher** (both NDSU)
- Lemon Circuits and Flashlights by Microsoft Corporation with adaptations by **Britt Heidinger** and **Julia Bowsher** (both NDSU)
- The Math and Science of Advertising by Miles Pfahl (former TMCC faculty)
- Small Things Can Be A Big Deal (Microbiology) by **Scott Hanson** (ND EPSCoR)

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. **Dr. Pips Veazey,** 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 presentations, NSF II Track-1 INSPIRE-ND, 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.

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

Researcher purchases a respiratory gas analyzer and ergometer bicycle with a 2019 ND EPSCoR equipment grant

Tristan Darland, Associate Professor in the Department of Biology at UND, purchased a respiratory gas analyzer and ergometer bicycle with the $31,256 award. The equipment analyzes human respiratory gas exchange and metabolic rates. Darland made the first measurements using the new equipment during the summer of 2020.

"Heat production from consuming nutrients is stoichiometric to the amount of oxygen gas consumed, and carbon dioxide gas generated. Measuring the two gases allows an investigator to infer how many calories the test subject is burning and, therefore, the number of calories needed for daily maintenance," noted Darland.

Researchers complete 2019 ND EPSCoR STEM grant project studying expanding soil salinity in ND

Samiran Banerjee, Assistant Professor in the Department of Microbiological Sciences and **Amitava Chatterjee**, Associate Professor in the School of Natural Resource Sciences (both NDSU), completed their project titled, "Employing keystone mycorrhizal fungi to improve salinity tolerance in crops." The project examined the abundance of arbuscular mycorrhizal fungi (AMF) in saline and non-saline environments and isolated native salt-tolerant AMF that can be utilized for applying to crops in saline agroecosystems.

Funding opportunities

ND EPSCoR Rural Student Teaching Experience

The ND EPSCoR Rural Student Teaching Experience (RSTE) program provides unique learning experiences for up to two teacher candidates 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 goal of the RSTE program is to provide an exceptional learning experience for teacher candidates in a rural school and community while they complete the requirements of their undergraduate programs. See the PDF download: Request for Applications for details. Due to ND EPSCoR by noon on January 21, 2021.

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 CCBSE alongside NSF Track-1 faculty researchers on their cutting-edge research projects. For more information, see the Request for Applications. Open until filled.

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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