

A new year of opportunity

When the calendar flips to a new year, there is often a sense of renewal, resolve, and revitalization. At ND EPSCoR, we share the optimism for the coming 12 months and look forward to communicating the news of the opportunities explored and developed.

We want to offer sincere congratulations to the many December graduates who have benefited, either as an undergraduate or graduate student, from the funding provided by ND EPSCoR to support their training. From field research to lab experiments and classroom studies, students have been mentored and encouraged, and their prospects amplified through various experiences. For example, our distributed Research Experience for Undergraduates (REU) allows students to remain at their home campus while benefiting from the mentoring of experienced research faculty; the Graduate Student Research Assistantship (GSRA) and Doctoral Dissertation Assistantship (DDA) programs have supported students who are conducting research while obtaining an advanced STEM degree. We are confident that their training, funded in part through ND EPSCoR, will be useful in their future work or other educational opportunities.

New students have joined the teams of both the Center for Regional Climate Studies (CRCS) and the Center for Sustainable Materials Science (CSMS), and we welcome their fresh perspectives and wish them well in their new roles. ND EPSCoR appreciates the part we share in having a positive impact on their training.

Opportunities to learn

Looking forward, there are several important opportunities for growth and development available through ND EPSCoR programs. Three key workshops are planned in the next few months:

- **CSMS Translational Summit**, February 25-26, is designed to showcase the translation of bio-based materials research to industry. The many innovations by the CSMS group may have far-reaching impacts on industry and the economy of our state.

- **ND EPSCoR Annual Conference**, March 27, will highlight the cumulative efforts of both the CRCS and CSMS researchers over the course of the NSF EPSCoR Research Infrastructure Improvement (RII) Track-1 cooperative agreement. Both faculty and students will be presenting their work, and it's a great opportunity to catch a glimpse of the effort and results of the research.
- **CRCS Stakeholder Workshop**, March 28, will provide stakeholders throughout the state with research information from the CRCS team's work over several years. It will also be an opportunity for stakeholders to provide feedback about their interest in future research and needed resources.

As we enter the last half of Year 5 of the jurisdiction's Track-1 award, we applaud the work done by the faculty and researchers at all 11 EPSCoR participating institutions, the growth of and impact to the students who are participating in world-class research, and the ongoing benefit to the economic vitality of our state. ND EPSCoR-affiliated institutions include: Cankdeska Cikana Community College (CCCC), Dickinson State University (DSU), Mayville State University (Mayville State), Minot State University (Minot State), North Dakota State University (NDSU), Nueta Hidatsa Sahnish College (NHSC), Sitting Bull College (SBC), Turtle Mountain Community College (TMCC), United Tribes Technical College (UTTC), University of North Dakota (UND), and Valley City State University (VCSU).

Beginning a new year is an exciting time to assess new opportunities for growth and influence, and ND EPSCoR will continue to seek prospects for collaborative efforts with researchers and students across the entire state.

With best wishes for a productive and curiosity-filled year of discovery.

Regards,

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



Learning new technology

Two students and a faculty member took time over the holiday break to learn more about 3D printing from **Patrick Simpson**, Mechanical Engineering graduate student working in **Chad Ulven's** CSMS group at NDSU. Simpson worked with the trio to help them learn about different materials that can be used in 3D printing and to get acclimated to the various programs that are used in creating 3D objects.

Both pre-engineering students, **Isnala Roan Eagle** from CCCC and **Dale Walter** from TMCC, are planning to use the 3D printing in their college work, and perhaps in future careers. **Austin Allard**, pre-engineering instructor at TMCC, was also eager to gain hands-on experience and insight that will be useful for his students.



Simpson, far left, illustrates how to remove structural supports on a 3D prototype (l to r) to Roan Eagle, Allard, and Walter.

Simpson discussed the different materials now used in 3D printing, including bio-based products that have been developed through CSMS research. "We're attempting to develop better materials," Simpson said. "The material properties aren't where they need to be—some are too brittle, while others don't have the strength needed for industrial applications."

He noted that 3D printing is an ideal format for creating model parts and prototypes because they can be easily developed and tested. He said Ulven's lab has tested several prototypes for a local manufacturer, and samples that withstood initial testing would be used to create life-size prototypes for certification at national labs.

Simpson said that the benefit of 3D printing to industry is reduced development time, increased efficiency in the testing cycle, and reduced cost since the prototypes have already passed initial material and stress tests.

CRCS plans workshop

CRCS formed a stakeholder group about two years ago to further engage partners from across North Dakota who would benefit from the research initiatives and data produced by the CRCS group. To enhance statewide relationships and collaborations, the CRCS Stakeholder group decided in their December meeting to host the **Northern Plains Weather/Climate Product, Service, and User Engagement Workshop**, March 28, 2019, in Fargo. CRCS co-lead and workshop organizer, **Aaron Kennedy**, assistant professor in Atmospheric Sciences at UND, noted that the workshop is designed for data providers, researchers, and end users to:

- Present data and resources compiled by various partners, including some CRCS stakeholders, which will focus on the ND agricultural community
- Review results of ongoing CRCS research
- Explore and learn end-user needs/wants for future collaborations and research ideas.

Registration will open in February, on the ND EPSCoR and CRCS websites at <https://und-cracs.org/>.

CSMS translational summit

CSMS is hosting a **Summit for Translating Bio-based Materials Research to Industry**, February 25-26, 2019, at NDSU's Harry D. McGovern Alumni Center.

Faculty, staff, and members of the public who are interested in translating bio-based research to industry are invited to register. The deadline to register is **February 5, 2019**. Although the event is geared toward CSMS, anyone interested is invited to attend.

Individuals involved in CSMS or CRCS research (this includes participants of Emerging Areas Seed, DDA, GRSA, and REU involved in CSMS/CRCS) or the related CSMS/CRCS programmatic elements (Diversity, Education and Workforce Development, Partnerships, Collaborations, Communications) do not need to pay the registration fee.

Register here:

https://epayment.ndus.nodak.edu/C22800_ustores/web/classic/store_main.jsp?STOREID=38&SINGLESTORE=true

In addition, those participants involved in CSMS and/or CRCS research, who are not from NDSU or UND, may apply for a travel stipend for the event.

Apply for the travel stipend:

<https://www.ndepscor.ndus.edu/funding-opportunities/resind/translational-summit-travel/> or at <https://www.ndepscor.ndus.edu/funding/students/>

Questions? Please contact **Kathy Wahlberg** at kathleen.wahlberg@ndus.edu or 701-231-8618.

Activities of note

Guodong Du, CSMS researcher and associate professor in Chemistry at UND, gave a presentation at the 53rd Midwest Regional Meeting of the American Chemical Society in October on *Degradable and Bio-derivable Polysilylethers via Manganese Catalyzed Hydrosilylation and Dehydrogenative Coupling*.

Improving Devils Lake Outlet Management to Reduce Environmental Impacts on the Sheyenne River, was a poster presentation by **Afshin Shabani**, doctoral student in Earth System Science and Policy, along with **Xiaodong Zhang** (both UND CRCS participants), at the American Geophysical Union November 2018 meeting.

Two student mentors for the Nurturing American Tribal Undergraduate Research and Education (NATURE) University Summer Camp graduated from NDSU in December. Shown below with NATURE and



Darrin Frederick (left), who received a bachelor's degree in Agriculture and Biosystems Engineering, and **Cole Frederick** (right), who received a bachelor's degree in Civil and Environmental Engineering.

Assessing Printability of Alginate-carboxymethyl Cellulose Hydrogels received the Best Track Paper Award in November 2018 by the Institute of Industrial and Systems Engineers (IISE). **Bashir Khoda**, CSMS researcher and assistant professor in Industrial & Manufacturing Engineering, and **MD Ahasan Habib**, doctoral graduate research assistant (both NDSU), were the authors of the paper.

Minou Rabiei, new faculty start-up awardee and assistant professor, along with Co-PI Hadi Jabbari, assistant professor (both in UND's Petroleum Engineering), received a one-year \$110,000 award in September from the American Chemical Society for a *New Approach to Quantifying Adsorption/Diffusion Characteristics of Shale Formations through 3D Printing Technology*.

Long Jiang, CRCS emerging seed awardee and associate professor in Mechanical Engineering and

Mohiuddin Quadir, CSMS researcher and assistant professor in Coatings and Polymeric Materials (both NDSU), were awarded \$32,732 from the ND Soybean Council for their research titled *Soy Protein Derived Thermoset Resins for Traditional Molding and 3D Printing*.



Guodong Du (left) presented *Career Options for Chemists* to UND students on November 28, 2018. The session included an overview of the job market for chemistry graduate students, Du said, with focus on different academic settings. Alternative career options and career planning were also presented.

Water quality study



Afshin Shabani (left) Ph.D. graduate student in Earth System Science and Policy at UND and CRCS researcher, defended his dissertation on *Mitigating Environmental Impacts of Terminal Lake Flooding: A Case Study of Devils Lake, North Dakota*.

His advisor, **Xiaodong Zhang**, CRCS researcher and professor in Earth System Science and Policy, noted that Shabani's work focused on four key questions:

- How has the current wet climate cycle impacted water level and distribution of sulfate concentrations in Devils Lake?
- What are the impacts of current outlets management on the Sheyenne River water quantity and quality?
- Does the current outlet management increase the risk of flood and/or water quality degradation in the Sheyenne River?
- What is the optimal outlets strategy that controls Devils Lake water level and Sheyenne River water quantity and quality?

Zhang said that this study provides a useful evaluation of the water quality and quantity of both Devils Lake and Sheyenne River in North Dakota.

Center for Regional Climate Studies (CRCS)-related publications

Soils, Climate, and Ancient Civilizations book chapter by **Eric Brevik** (DSU) along with Jeffrey Homburg and Jonathan Sandor, in *Climate Change Impacts on Soil*

Processes and Ecosystem Properties, 2018, 1-28. doi: 10.1016/B978-0-444-63865-6.00001-6

Anomalous Light Scattering by Pure Seawater by **Xiaodong Zhang** (UND) along with Lianbo Hu in *Applied Sciences* 2018, (8) 2679. doi: 10.3390/app8122679

Non-Point Source Pollution and Environmental Assessment was a special issue of the *International Journal of Environmental Research and Public Health*, with **Xuefeng Chu** (NDSU), as the guest editor. The special 2018 issue focused on all aspects related to non-point source (NPS) pollution, monitoring, modeling, and assessment. See

www.mdpi.com/journal/ijerph/special_issues/NPS

Center for Sustainable Materials Science (CSMS)-related publications

Cyclic and Linear Polyhydroxybutyrates by Ring Opening Polymerization of β -Butyrolactone with Amido-Oxazolinat Zinc Catalysts by **Muneer Shaik** and **Guodong Du** (both UND), along with Jhaiquashia Peterson, in *Macromolecules*, 2019, 52 (1), 157–166. doi: 10.1021/acs.macromol.8b02096

Effect of Dihalides on the Polymer Linkages in the Cs_2CO_3 -promoted Polycondensation of 1 Atm Carbon Dioxide and Diols by **Shi Bian**, **Anastasia Andrianova**, **Alena Kubátová**, and **Guodong Du** (all UND), in *Materials Today Communications*, 2018, (18) 100-109. doi: 10.1016/j.mtcomm.2018.11.007

Doctoral Dissertation Assistantship (DDA)-related publications

Indium-Mediated Stereoselective Allylation by **Gregory Cook**, professor and chair of Chemistry and Biochemistry, and **Sandeep Reddy Vemula**, DDA recipient and Ph.D. graduate in Chemistry (both NDSU), along with Dinesh Kumar and Narayanaganesh Balasubramanian, in *Accounts of Chemical Research*, 2018, (48) 2169-2178. doi: 10.1021/acs.accounts.6b00362

Upcoming events

- **CCAST interns**, NDSU, presenting on high performance computing at noon, January 18, 2019, at UTTC.
- **CRCS and CSMS monthly meetings**: Hosted via IVN to all campuses. Dates are posted for each on their respective websites.

- **CSMS Translational Summit**, February 25-26, 2019, NDSU Alumni Center, Fargo. (See article on page 2.)
- **ND EPSCoR Annual State Conference**, March 27, 2019, FargoDome, Fargo (Registration closes February 1).
- **CRCS Northern Plains Weather/Climate Product, Service, and User Engagement Workshop**, March 28, 2019, Fargo.

ND EPSCoR's state conference registration closes soon!



Conference registration closes February 1!

Mark your calendars for **Wednesday, March 27, 2019**, FargoDome, Fargo. Breakfast begins at 7:30 a.m.; event closes at 4:30 p.m.

Register here:

https://ndstate.co1.qualtrics.com/jfe/form/SV_dbOd2C329vaquNL

Students and faculty who have been supported through the Track-1 funding are required to present at the conference. This includes GSRA, DDA, REU, emerging seed awardees, and new faculty participants.

This year, **CRCS/CSMS/EWD Faculty** will also have an opportunity to present posters. In addition, students and faculty will provide oral talks on the results of their work over the past five years.

Committee meetings will be Tuesday, March 26. If you're involved with the **External Advisory Board**, **State Steering Committee**, or a **R1I Track-1 participant** you'll want to mark March 26 on your calendar as well. The **EMPOWERED ND Corps** meeting will be held during breakfast on the 27th.

Funding and RFPs

ND EPSCoR will showcase EPSCoR-related funding opportunities as they become available. **Please work with your own campus-sponsored program staff to ensure that you're meeting internal deadlines and crafting appropriate budgets.**

Travel Stipends for ND EPSCoR CSMS Translational Summit

Issued: November 15, 2018

Deadline: Extended through February 12, 2019, or until funding is exhausted

Who can apply: CRCS and CSMS Faculty and Students from CCCC, DSU, Mayville State, Minot State, NHSC, SBC, TMCC, UTTC, or VCSU who plan to attend the CSMS Translational Summit

From: ND EPSCoR State Office

For more information, see

<https://www.ndepscor.ndus.edu/funding-opportunities/opportunities-researchers-and-nd-industry/> or at <https://www.ndepscor.ndus.edu/funding/students/>.

ND NASA FY18 CAN R3 Solicitation

Issued: December 20, 2018

Deadline for Pre-proposal: Noon, February 1, 2019.

Who can apply: ND Faculty in STEM fields

From: ND NASA EPSCoR Office

For more information, please see

<https://www.ndepscor.ndus.edu/funding-opportunities/opportunities-researchers-and-nd-industry/>

NSF EPSCoR RII Track-4 Awards

Issued: December 14, 2018

Deadline: 5 p.m., March 12, 2019. **Please note:** Any campus is allowed to submit three RII Track-4 proposals to NSF in response to this solicitation, so a campus may have early limited submission dates. For example, NDSU has a Limited Submission Notification Deadline of January 9, 2019; 5 p.m.

Who can apply: Non-tenured faculty. The RII Track-4 Fellows program provides an opportunity for non-tenured faculty to spend extended periods of time at the nation's premier research facilities. Please see:

<https://www.ndepscor.ndus.edu/funding-opportunities/opportunities-researchers-and-nd-industry/>

Make an impact this summer

Each summer about 25 Native American high school graduates and tribal college students spend two weeks on the NDSU and UND campuses to explore STEM careers as part of the ND EPSCoR-sponsored NATURE University Summer Camp.

Faculty at NDSU and UND have the opportunity to initially meet the students and present information (20-30 minutes) about what's important/exciting/enjoyable about their research. Faculty can choose to present in their lab or other campus venue.

To help these students get a better grasp of the research, faculty members can then work with 1 or 2 students in the faculty's lab during the two weeks of camp, **June 3-14, 2019**. It's an opportunity for students to learn basic skills in the research approach to solving scientific questions, as well as get a flavor of the STEM-based research in which a faculty member is involved.

Interested in making an impact on students? Willing to work with them in your lab? Please contact **Scott Hanson**, ND EPSCoR Tribal Colleges Liaison Manager at scott.martin.hanson@ndsu.edu or 701-231-0806.

ND EPSCoR Track-1 team updates

Please welcome new teammates or those with changing roles to the Track-1 effort:



John Mihelich, ND EPSCoR Co-PI and Track-1 Associate Project Director, began serving as UND's Interim Vice President for Research & Economic Development on January 1, 2019. Mihelich has been serving as Associate Vice President for Research & Economic Development.



Paula Comeau joined the ND EPSCoR State Office as the STEM Manager. She is an interdisciplinary researcher and outreach professional, with a Ph.D. in Natural Resources Management. She has taught NATURE classes for ND EPSCoR, as well as been adjunct faculty for area higher education institutions. In her new role, she will be helping with Track-1 STEM support, providing professional development for K-12 teachers and post-secondary students engaged with the Track-1, and overseeing ND EPSCoR's Students in Technology Transfer and Research (STTAR) internship program. Paula can be reached at paula.comeau@ndus.edu or 701-231-8264.

Stay in touch

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- For a link to ND EPSCoR's prior newsletters, <https://www.ndepscor.ndus.edu/news/newsletters/>
- To submit a story or idea by the end of the month to joyce.eisenbraun@ndus.edu, please complete: https://www.ndepscor.ndus.edu/fileadmin/ndus/ndepscor/documents/NewsTemplateFillable_2018-10.pdf
- To be added to, or removed from, the newsletter mailing list, please email ndepscor@ndus.edu, subject line: newsletter.

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