

Striding Forward in ND

In the decades since North Dakota joined the list of jurisdictions that are National Science Foundation (NSF) EPSCoR-eligible, there have been significant structural changes, both nationally and within our state. But undergirding each decision is the conviction that there is important research being done in North Dakota that makes a difference to citizens within our state, as well as across our region, country, and internationally.

State Steering Committee

Recently, the State Steering Committee (ND EPSCoR's advisory body) assembled for their fall meeting in Grand Forks. This 15-member committee 1) provides direction to ND EPSCoR regarding research in focal areas that are based on the strengths of our research universities, 2) contributes to our Science and Technology Plan (S&T Plan), and 3) ensures that ND's NSF EPSCoR Research Infrastructure Improvement (RII) Track-1 efforts are meeting the needs of the state by reflecting the priorities laid out in the S&T Plan. The meeting was chaired by **Casey Ryan, M.D.**, a member of the State Board of Higher Education, the oversight body of the North Dakota University System.

State and federal partnership

It is an increasingly competitive world in which research is conducted. According to NSF, the overall success for all states that submit proposals is 23%, but the success rate for all EPSCoR-eligible states is only 20.6% (for all NSF proposal submissions). So it's important to recognize the value of the NSF EPSCoR federal/state partnership that has been so beneficial to North Dakota over the past 32 years in building research capacity and competitiveness.

The state's first NSF Research Infrastructure and Improvement (RII) Track-1 award, which ran from 1986 to 1992 (including a 1-year extension), brought in \$3.1 million in federal funding for research efforts.

ND's most recent RII award is for \$18.7 million and focuses its research and outreach efforts in the areas of regional climate studies and sustainable materials science.

Over the past three decades, NSF EPSCoR has awarded a total of \$63.5 million in RII Track-1 awards to ND EPSCoR. The state, via the ND University System, continues to provide the NSF-required matching funds for these awards, which have helped improve our state's research infrastructure and enhance the capabilities and competitiveness of researchers in obtaining additional federal funding.

The result? For every \$1 of state investment, ND EPSCoR-funded researchers have generated approximately \$6.80 in external research awards from federal and other sources. That's a sound investment strategy, and one that has benefited North Dakota by helping students, supporting quality faculty, and assisting with innovative research that positively impacts the state's economy and population.

Another way of viewing ND EPSCoR's impact is to consider the 550% increase in federal funds for science and engineering coming into ND since 1986. Both research universities and other campuses across the state have experienced a significant upturn in research activities since the late 80's, in part because of the research emphasis—and funding—available through ND EPSCoR's NSF RII Track-1 awards and state match.

Serving more efficiently

As we forge new opportunities for North Dakota, we want to continue our efforts to provide better services to all participating institutions. The consolidated state office is one step in that direction, improving efficiency with a small but centralized administration that serves faculty and students across the state. We look forward to building on this foundation to better serve and support the research, education, and outreach activities throughout North Dakota.

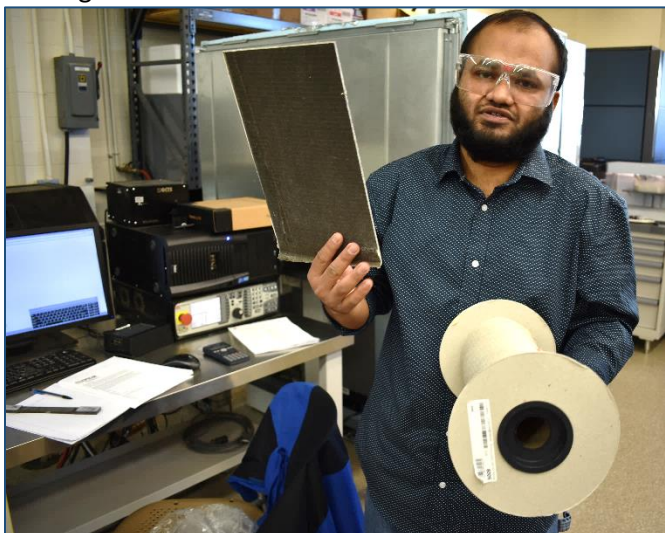
Regards,
Kelly A. Rusch, Ph.D., P.E., BCEE
ND EPSCoR Executive Director



New use for flax fibers

One of the benefits of research is filling in gaps in knowledge. Two North Dakota State University (NDSU) researchers, **Chad Ulven**, researcher and professor in mechanical engineering and his graduate advisee, **MD Zahirul Islam**, are assessing the strengths and weaknesses of a flax fiber-reinforced biocomposite. Biocomposites are materials created from combining a natural fiber (in this case flax) with a matrix or resin. In traditional composites, non-degradable fiberglass, carbon fibers, or a petrochemical base is paired with the resin. The work being done through the Center for Sustainable Materials Science (CSMS) is developing a better understanding of biocomposites and their potential application as replacements for traditional composites.

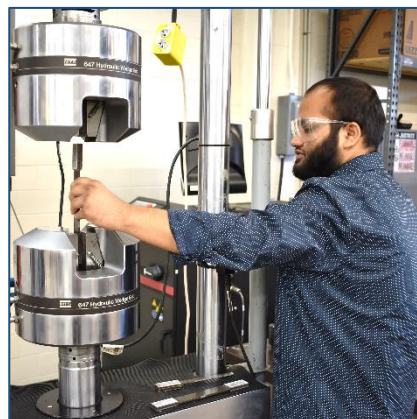
Biocomposites are used in a variety of industries, including automotive, aerospace, sports, and leisure, because of their environmentally friendly, biodegradable properties and lower cost. According to Ulven, researchers have discovered how to effectively and efficiently use biocomposites in a variety of applications, but the long-term durability has not been widely researched. That's where Ulven and Islam are seeking more information.



(Islam, above, showing the flax fibers and a biocomposite sample made from those fibers.)

In the lab, Islam is observing when composites are stressed with varying loads to assess the difference in fatigue response. Islam noted that industry needs to know the life cycle of a biocomposite, especially if they are seeking to replace traditional materials. He said, "Biocomposites have less weight and can be very strong as well as environmentally friendly, but we need to know how they will respond under stress conditions."

He explained that traditional metals, carbons, or glass all have well-defined properties, but that the information is lacking with some of the newer biocomposite materials.



(Islam prepares a sample for testing.)

Ulven noted the characterization of the fatigue behavior of flax-reinforced composites fills a current literature and knowledge gap. This current research may help expand the market for biocomposites by providing a better understanding of the long-term durability characteristics.

Broken foot kicks off career

He broke his foot while playing freshman football, recalled **Creighton Pfau**, (right) now a junior at Mayville State University. "I got to see what a podiatrist could do, and he (Timothy Uglem, DPM at Sanford Health) made the whole experience really easy," Pfau said. That experience stimulated Pfau's interest in medicine and the idea of someday having his own practice, prompting his double major in biology and business.



Last summer, Pfau took another career step, exploring the research side of medicine, thanks to ND EPSCoR's Distributed Research Experience for Undergraduates (REU) program. He participated in a joint research project between Mayville and the University of North Dakota (UND), exploring ways that a diabetic medicine could be absorbed into a bio-based material such as chickpeas to create a more readily absorbable form within a human body.

"It was interesting to work on an alternative way to help people who have diabetes," Pfau said. Because medicines can be so expensive, this early-stage research may offer a more affordable alternative in the future.

"I'd only had two chemistry classes prior to the REU," he said, "so it helped a lot with my understanding of chemistry and what's involved in research." He gave kudos to some of his mentors on the journey, including

Brett Nespor, a chemistry graduate student at UND, who introduced Pfau to high-tech lab analyses; **Alena Kubátová**, Chester Fritz Distinguished Professor in chemistry at UND, who taught him that research needs to be repeatable, organized, and easily communicated to others, including those without a background in that field; and **Khwaja Hossain**, professor of biology at Mayville, who helped Pfau explore career options and develop teamwork skills. "I learned a lot about chemistry and biology, and was able to make connections," Pfau said. "Having this background will help me as I continue to study medicine."

"The research was important because it could potentially make a difference to people who need more affordable alternatives. If the research expands to using soybeans, that will also have an impact on farmers in ND," Pfau said. "For Mayville, it shows they're doing their part in research and the advancement of science. They're a little school, but doing big things."

CRCS impact across state

Individuals from across the state have become part of a core stakeholder advisory group for the Center for Regional Climate Studies (CRCS) to help provide input on research that would make an impact within the state. The 10-member group, known as the CRCS Stakeholder Group, met last month to discuss current research and to solicit input related to future projects.



Above, attendees from left to right, **Greg Gust**, stakeholder and warning coordination meteorologist, National Weather Service; **Frank Bowman**, CRCS researcher, associate professor, and chair of Chemical Engineering, UND; **Jon Starr**, CRCS graduate student in Atmospheric Sciences, UND; **Carla Kellner**, administrative staff for UND EPSCoR; **Shawn Jaker**, CRCS research associate in Atmospheric Sciences, UND; **JiangLong Zhang**, CRCS co-lead and professor in Atmospheric Sciences, UND; **Aaron Kennedy**, CRCS co-lead and assistant professor in Atmospheric Sciences, UND; **John Mihelich**, associate vice president for research and faculty fellow, UND; and **Dillon Dall**, student with UND's high performance computing

center. Five stakeholders joined the meeting from offsite locations: **Wade Bott**, state soil scientist, ND Natural Resources Conservation Service, USDA; **Sarah Lovas**, farmer and ag consultant, Lovas Farms/Consulting; **Grant Mehling**, wheat production management at Monsanto; **Darin Langerud**, division director, ND State Water Commission; and **Mark Watne**, president, North Dakota Farmers Union. The remaining four stakeholders are from the Northern Canola Growers Association; City of Grand Forks, ND; Sitting Bull College; and the United States Durum Growers Association (USDGA).

In addition to providing feedback on research presentations by CRCS participants, the stakeholders provide input about their research needs, many of which relate to the needs of ND's agricultural community. As one participant noted, awareness of weather patterns can impact which crops are planted in particular areas. At this same meeting, **Adnan Akyuz** (CRCS researcher, state climatologist, and professor of climatological practice at NDSU) updated the stakeholders on the 2018 state weather conditions.

Future plans of the group include hosting a stakeholder forum early in 2019 to provide added information to stakeholders across the state, noted Kennedy. The event will also solicit information about how CRCS research might be disseminated for greater utility to various audiences.

In a recent issue of *The Atmospheric Resource*, published by the North Dakota Atmospheric Resource Board (NDARB), author Mark Schneider, chief meteorologist at NDARB, noted the value of bringing researchers and resources together in collaborative efforts like this one.

http://www.swc.nd.gov/arb/news/atmospheric_reserve/pdfs/2018_09%20-%20Staking%20A%20Research%20Claim.pdf

Finding a new path

Meeting identified needs

In the most recent ND EPSCoR White Paper, one of the primary STEM needs identified by four of the five tribal colleges in North Dakota was to have more research opportunities for STEM faculty. One avenue that ND EPSCoR is exploring is the re-invention of an idea from a sister agency, to create a pathway for STEM graduate students to teach at tribal colleges.

In 2002, UND and NDSU were awarded a National Institutes of Health (NIH) Bridges grant that, among other things, provided funding to UND and NDSU STEM graduate students so they could teach for a semester at

a tribal college in ND. Instructors at the tribal colleges often carry a very heavy teaching load of five or six classes each semester, explains **Scott Hanson**, ND EPSCoR tribal college liaison manager, which often prevents them from having much time to conduct their own research during the academic year. In this initial grant, three graduate students—**Jeremy Guinn**, **Mafany Ndiva Mongoh** and **Heather Marxen**—accepted the challenge, and have remained in North Dakota to become important contributors to ND EPSCoR's success. Guinn is now at United Tribes Technical College (UTTC) and chairs the Environmental Science and Research Program as well as serving as the campus PI for ND EPSCoR, while Ndiva Mongoh is at SBC as an Ag/Science instructor, working with CRCS as the campus PI.

Marxen: Making a change

In the summer of 2002, Heather Marxen was a graduate student in the UND Chemistry department when she saw a poster advertising the opportunity. She had been thinking about making some type of change in her life, and she immediately decided that this opportunity was the shift she needed. The program was a good fit for her, since she had a bachelor's degree in education and had taught for a number of years, albeit in an elementary school. As a graduate student, she had taught chemistry labs. She had also substituted as an occasional chemistry lecturer for professors, teaching college classes with up to 200 students. She knew Cankdeska Cikana Community College (CCCC) was smaller than UND, and that she would have to make teaching adjustments. But once she started, she definitely enjoyed the fact that everyone knew everyone else.



(Marxen, left, chose CCCC in Fort Totten, ND.)

With fewer students per class, Marxen found that her students responded best to active learning, so she incorporated more activities into the classes. In chemistry, that meant building molecules out of toothpicks and marshmallows and using

Legos® to balance equations. The smaller classes and more interactive format also meant she had increased flexibility in teaching methods and content. One important addition that she had not experienced before was the emphasis by CCCC to incorporate the Dakota American Indian culture into all the classes. When

teaching chemistry, for example, Marxen discussed native plants that were traditionally used by local tribes for medicine.

Looking back over the 16 years Marxen has spent at CCCC, she notes that it has been a time of change: her role has changed, CCCC has changed, and she has changed, too. During her first year, she taught one class, was a student services advisor, and worked with the ND EPSCoR Nurturing American Tribal Undergraduate Research and Education (NATURE) program. After that, she became full-time faculty for a few years, teaching physical science, geology, geography, chemistry, math, and English. Currently, she is a full-time tutor, helping students with math, sciences, and English.

"This experience at CCCC has made me a better person," Marxen notes, "more willing to be kind and accepting and meeting people where they are." She summed it up with, "I just love it here."

Entrepreneurial workshop

When is an idea worth taking beyond the laboratory? A *Workshop on Entrepreneurship*, sponsored by ND EPSCoR for CSMS students and faculty, helped answer that question.



The morning kicked off with a welcome by CSMS co-lead **Mukund Sibi**, distinguished professor in Chemistry and Biochemistry, who emphasized the need to look beyond the laboratory to bring discoveries into real life applications.

John Cosgriff, manager at the NDSU Incubator in the Research and Technology Park, provided insights on companies that were started as a result of research innovations or a collaborative effort between academia and industry. He discussed resources available to entrepreneurs and encouraged students to participate in the upcoming NDSU *Innovation Challenge*.

Paul Brown, senior lecturer in Management and Marketing and MBA program coordinator at NDSU, provided an overview of a typical business plan, from executive summary to financial plans.

Dean Webster, right, CSMS lead and professor and chair of NDSU Coatings and Polymeric Materials, introduced the topic of patents. He stressed the importance of novelty, and that when one discloses information in publications



and presentations, the ability to patent may be affected. He also presented the patent pathway from concept to patent approval.



Janine Elliott, (left, with Sibi, right) senior program officer with VentureWell, provided the keynote talk. She discussed the creative mindset and the process to take

an academic discovery public.

Attendees worked through a creative exercise to identify potential applications and market segments and then applied those principles to current projects.



(**Eric Krall**, (left) and **Alison Rohly** (right) listen as **Ruvi Wright**, (second from left), shares an idea during the workshop. All are NDSU CSMS graduate students.)

Moving from an interesting idea in a lab setting to developing a start-up company around that idea is a long process, but, as these attendees learned, it is a possibility that can become a reality.

High Performance Computing on the road

Students from NDSU's Center for Computationally Assisted Science and Technology (CCAST) made recent presentations to faculty and staff at Sitting Bull College (SBC) and Mayville, focusing on the benefits of high performance computing (HPC) and advanced scientific analysis. In late October they also presented to the ND EPSCoR EMPOWERED-ND Corps, which has representation from all 11 ND EPSCoR participating campuses as well as co-leads from Education and Workforce Development and Diversity. (See link to recording in the next column.)

SBC Academic Dean **Shawn Holz** invited CCAST interns **Jonathon Edstrom**, Electrical Engineering and Computer Science and **Russell Hofmann**, Chemistry, to present during a faculty development meeting. With about 25 in attendance, several expressed an interest in learning more about the capabilities, and noted that the

availability of HPC at NDSU and UND would be helpful with some of their research.



(NDSU CCAST interns **Edstrom**, left, and **Hofmann**, right, review a software example after the workshop with **Bob Miess**, Mayville chair of Science and Mathematics.)

At Mayville, a faculty member asked about the possibility of transferring quantities of data to either NDSU or UND, and doing their calculations remotely, which, according to CCAST Research Computing Facilitator **Khang Hoang**, is one of the many uses and benefits of HPC.

During the ND EPSCoR EMPOWERED-ND meeting, the presenters, which also included CCAST intern **Jingyan Fu**, Electrical and Computer Engineering, informed attendees that the many types of software now available, along with HPC's speed, could be helpful to researchers. The link to the EMPOWERED-ND presentation is available here:

<https://youtu.be/wr8FIH-y2TA>

For information on UND's HPC capabilities, please contact **Aaron Bergstrom**, Advanced CyberInfrastructure Manager at 701-777-2075 or aaron.bergstrom@und.edu.

For information on NDSU's HPC capabilities, contact **Dane Skow**, Executive Director of CCAST at 701-231-7509 or dane.skow@ndsu.edu; please contact CCAST staff at support@ccast.ndsu.edu.

Helping the food-packaging industry

About Emerging Areas Seed awards

The goal of these awards is to provide a researcher who was not associated with the original ND EPSCoR NSF Track-1 proposal with an opportunity to pursue a potentially "high impact" area of research related to CSMS and/or CRCS. The collaboration would also include a current Track-1 participant from a tribal college (TC), primarily undergraduate institution (PUI) or master's college/university (MCU). This particular award illustrates the collaboration between CSMS-related research and CRCS broader impacts supporting TC education and STEM development.

A new way to package

Bio-based materials are important to many industries, and one common usage can be found in food packaging. Recent efforts have resulted in food packaging being developed from bio-based polymers, with one of the most promising known as polylactic acid (PLA). Rather than synthetic polymers, biodegradable polymers have become a preference, according to CSMS researcher **Dilpreet Bajwa**, NDSU mechanical engineering professor and CRCS collaborator **Kerry Hartman**, Nueta Hidatsa Sahnish College (NHSC) environmental science faculty and academic dean. The challenge with the PLA-based films is that some of its characteristics, including barrier and anti-microbial properties, are not sufficient for food packaging applications.



Thanks to a ND EPSCoR RII Track-1 Emerging Areas Seed Award, this past year, Hartman (left) and Bajwa have been collaborating on ways to enhance PLA film characteristics. As part of the process, students from NHSC came to NDSU to learn about research techniques and the

benefits of bio-based materials on the environment, expanding their education and workforce development options.

"PLA is a strong, stiff polymer, but it cracks easily and has a narrow processing temperature range," Bajwa said. "Our goal for the research was to improve the properties while keeping it 100% bio-based." They began by adding cellulose nanocrystals (tiny particles from trees and plants with higher strength than glass or Kevlar fibers) that increased the polymer's strength, cracking resistance, and thermal stability. The biggest challenge? "The nanocrystals only work when they're dispersed evenly throughout the PLA," Bajwa said, "and we had to identify a different method of incorporating them into the PLA since the cellulose nanocrystals naturally clump together."



(Bajwa, left, and NDSU graduate student **Jamileh Shojaeiarani**, agricultural and biosystems engineering, review results from a test sample.)

Industry applications

After several attempts with limited success, Bajwa and Hartman, along with NDSU and NHSC students, found a method of treating the nanocrystals to achieve even dispersion. "I came from industry, so I'm always interested in the commercial applications for research," Bajwa said. "This work provides a simpler method for industry to improve properties of PLA." Not only are packaging companies interested in this research but so is the U.S. Forest Products Laboratory in Madison, WI, which supplied the cellulose nanocrystals. If successful, this research would open industry doors for added renewable forest products.

What's next? "We're working with two polymer packaging companies to test the cellulose nanocrystals-enhanced PLA," Bajwa said. "We hope to pursue a patent that would make the technology available to the food packaging industry. Beyond that, we will test nanocrystals in other polymers besides PLA. There are many high-end applications in other industries that may use this research."

Seeding a better habitat

Yari Villanueva, fisheries and wildlife major at Valley City State University (VCSU), has been researching grasses for the past two summers. Rather than making assumptions about which grass varieties are best for creating healthy habitat in North Dakota, it became a research topic for Villanueva and **Lauren Dennhardt**, CRCS researcher and assistant professor in Wildlife and Fisheries, and Villanueva's Distributed REU mentor. The two have been studying which grasses create a more natural habitat, which ones help an ecosystem grow with more diversity, and which support wildlife.



"Much of the state's natural habitat has been invaded by noxious plants or less desirable grasses," Villanueva (pictured here)

said. "We looked at cool- and warm-season grasses, collecting information on leaf and plant growth. Our research objective addressed the fitness of three cool-season grasses from four different ecological regions," Villanueva, explained. "Essentially, understanding the

basis of their response to climate change is one of our main goals. We want to identify the performance of local ecotypes compared to southern ecotypes within a common garden, and based on our results, it may result in key implications for ecological restorations in the Great Plains.” Both mono-culture (individual variety plots) and multicultural plots with several grasses were planted and studied as a part of the project. Grasses were studied in greenhouses with controlled moisture levels, as well as in natural outdoor plots.

“When I started as a fisheries and wildlife major, I didn’t know what I wanted to do,” she said. “I graduated from Minto, ND, and liked the small campus feel of VCSU.” Although she said she didn’t know “anything” about grasses when she started working on the project, her experience has opened her eyes to what’s involved in a resilient habitat; not only grasses, but how to identify healthy growth, how to see if climate changes are affecting the habitat or the role of insects in the plant ecosystem.

“Dr. Dennhardt was a great help. We started this project together and when I didn’t know what to do, I’d just ask and we’d figure it out together. My advisor, former CRCS researcher **Dr. Casey William**, has encouraged me from the first day. With the REU, I was afraid to apply because I didn’t know anything about research. But I talked with him and I’m glad I did! He wants to help people succeed.”

As a December-graduating senior, Villanueva has many dreams for her future. Her VCSU experience as a residence assistant and now hall director, as well as her ND EPSCoR-sponsored research experience, has helped boost her confidence and helped broaden her prospects. “I had the opportunity to work by myself and handle things, to be independent and make decisions. It’s something valuable I learned,” she said.

Partners across the globe

What do a scientist from the Hungarian Academy of Sciences and a scientist from Dickinson State University (DSU) have in common? A passion for soils and their impact on human health.

Last summer, **Csongor Gedeon**, researcher from the Institute for Soil Sciences and Agricultural Chemistry in Budapest, Hungary, obtained a fellowship from the Organization for Economic Cooperation and Development that allowed him the opportunity to do international research studying the impacts of soil health on human health. The topic is also a key interest of **Eric Brevik**, CRCS researcher and professor of Geology and Soils in the Departments of Natural

Sciences and Agriculture and Technical Studies at DSU, who has done related research and been published on the topic. The connection to North Dakota was made since Brevik had also organized seminar sessions at international meetings with Gedeon’s supervisor.

“Gedeon’s specialty is studying soil organisms on the meso and macro levels—the soil organisms you can see without a microscope,” explained Brevik. “We were doing CRCS-related research with micro-organisms, but didn’t have the meso and macro aspects in our research. Thanks in part to funding from ND EPSCoR, which helped support adding some of Gedeon’s work to our project, the expanded research added to the knowledge base available for the state and region about prairie soil health.”



(Gedeon, left, and CRCS REU student **Karissa Bohn**, environmental science major at DSU, collecting samples of prairie soils.)

At this point, the soil and organism samples have been shipped back to Hungary for analysis, classification and cataloguing. “Since Hungary also has a prairie environment (like ND), it will be interesting to see the results,” Brevik noted. “It was a great opportunity to work with another scientist whose work is complementary to my research.” In addition, the collaboration helped expand knowledge of various techniques, and to share information that will be useful to both institutions. “For example, Gedeon gave us a good idea from a project they’re doing in Europe,” Brevik said. “They use unmanned aerial vehicles (UAVs) to count European ground squirrels, and North Dakota also does a prairie dog count every few years. There may be ways to use UAVs here to accomplish the task, gaining better information while being less invasive to the colony.”



(Soil samples, left, ready for analysis.)

“There are several areas where we would like to collaborate in the future,” Brevik said. Both scientists hope to continue the cooperative effort and are working to find added research funds,

expanding both Hungary’s and North Dakota’s research efforts while adding insight into better soil management for farmers and ranchers in prairie regions.

Activities of note

Marisol T. Berti, CSMS researcher and professor in Plant Sciences at NDSU, will be a keynote speaker at the Biorefineries Conference in Chile in January 2019, presenting *Environmental Impact of Crops and Agricultural Residues as Feedstocks for Bio-based Product Development*. The material is a collaborative effort with Berti’s graduate student **Dulan Samarappuli**, and **Ghasideh Pourhashem**, CSMS researcher and assistant professor in Coatings & Polymeric Materials, NDSU.

CRCS researcher and associate professor in Earth System Science and Policy at UND **Xiaodong Zhang** is the co-principal investigator on an NSF Earth Sciences award for research instrumentation (#1828710), along with principal investigator Yeo Howe Lim, and other co-principal investigators Philip Gerla, Gregory Vandenberg and Taufique Mahmood (all at UND). The award is for *MRI: Acquisition of an Acoustic Doppler Current Profiler (ADCP) System for Profiling Open Channels*. This \$105,520 grant will support acquisition of a modular Acoustic Doppler Current Profiler instrument system that will enable UND’s research on streams, rivers, lakes, canals and culverts in North Dakota and the Upper Midwest to provide more accurate water measurements for forecasting flood events.

Britt Heidinger, NATURE Sunday Academy co-lead and assistant professor in Biological Sciences at NDSU, is the principal investigator (PI) on a NSF meeting award (#1840903). She, along with co-PI, Haruka Wada, (Auburn University) will be presenting *Stress Phenotype: Linking Molecular, Cellular and Physiological Stress* at the Society of Integrative and Comparative Biology Symposium in January 2019.

Chad Ulven, CSMS researcher and professor in Mechanical Engineering at NDSU, presented a plenary talk at the Third International Conference on Composites, Biocomposites and Nanocomposites, November 7-9, 2018 at the Nelson Mandela Bay Stadium, Port Elizabeth, South Africa. The conference presented current research and innovation from national and international experts, professionals and academics. This year ICCBN forms part of the African Advanced Manufacturing and Composites Show which offers comprehensive and dynamic trading and networking platforms for technology, products and services in advanced manufacturing.

Bakhtiyor Rasulev, CSMS researcher and assistant professor in Coatings & Polymeric Materials at NDSU has established collaborations with scientists from Croatia, Slovenia, Ukraine and Poland. Last year, Oleksii Antypenko from Zaporozhe Medical University (Ukraine) worked for three months as a visiting scholar in Rasulev’s group, in modeling of amphiphilic invertible polymeric nanomaterials by quantum chemical and molecular dynamics (MD) methods. Graduate student Matija Cvetnic from University of Zagreb (Croatia) visited the group in 2017, and in 2018, brought his advisor, Hrvoje Kusic, to work on modeling of wastewater pollutants degradation. Afterward, Natalja Fjodorova from National Institute of Chemistry (Ljubljana, Slovenia) visited the group in 2017 to establish a collaboration in nanomaterials toxicity research area, a new bilateral US-Slovenia proposal for funding has been submitted to support further collaboration. Another visiting scholar, Alicja Mikolajczyk from University of Gdansk (Poland) visited the group last year to discuss a new project in the area of structure-property relationship methodology development for various polymeric materials.

Center for Regional Climate Studies (CRCS)-related publications

North American Supercell Environments in Atmospheric Reanalyses and RUC-2, by **Austin King** and **Aaron Kennedy** (both UND) in *Journal of Applied Meteorology and Climatology*, Oct. 2018, DOI: 10.1175/JAMC-D-18-0015.1.

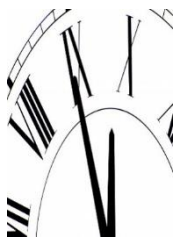
Doctoral Dissertation Assistantship (DDA) publications

Model Systems for Analysis of Dopamine Transporter Function and Regulation, by **Moriah Hovde** and **James Foster** (both UND), along with Roxanne

Vaughan and Garret Larson in Neurochemistry International, Sept. 2018.

DOI: 10.1016/j.neuint.2018.08.015

ND EPSCoR's annual state conference is March 27, 2019



Registration is now open at the ND EPSCoR website! Please register early as poster space is limited. Mark your calendars for **Wednesday, March 27, 2019**, FargoDome, Fargo. Breakfast begins at 7:30 a.m.; **event closes at 4:30 p.m.**

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 **RII 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.

Upcoming events

- **CSMS Translational Summit**, February 25-26, 2019, NDSU Alumni Center, Fargo. (Registration to open soon.)
- **CCAST interns**, presenting on HPC at your campus (upon request)
- **CRCS and CSMS monthly meetings**: Hosted via IVN to all campuses. Dates are posted for each on their respective websites.
- **ND EPSCoR Annual State Conference**, March 27, 2019, FargoDome, Fargo (see article above).

Funding and RFPs

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

DOE EPSCoR Implementation Grants

Department of Energy will provide \$20 million in EPSCoR grants for energy-related research. Please see below for added information on the grant:

<https://science.energy.gov/news/featured-articles/2018/11-14-18/?desktop=true>

Key areas of interest:

Fossil Energy Topic 1: Multi-functional Catalyst Research and Development – Methane Upcycling for Sustainable Domestic Oil Production through Reduction of Flaring

Fossil Energy Topic 2: Selenium Reclamation from Amine Solvents

Funding opportunity announcement (FOA) number: DE-FOA-0002023, CFDA Number: 81.049

Issued: 11/13/2018

Submission Deadline for Pre-Applications:

Pre-Application due: 12/20/2018 at 5 PM Eastern Time

Pre-Application Response Date: 1/25/2019

Submission Deadline: 3/27/2019 at 5 PM Eastern Time

Travel Stipends for ND EPSCoR CSMS Translational Summit

Issued: November 15, 2018

Deadline: December 6, 2018 or until funding is exhausted

Who can apply: ND EPSCoR MCU, PUI, and TC RII Track-1 CRCS and CSMS Faculty and Students

From: ND EPSCoR State Office

Limited funding available so early applications are encouraged

The application will open soon, and be posted on the ND EPSCoR website at

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

<https://www.ndepscor.ndus.edu/funding/students/>.

Travel Awards for ND EPSCoR RII Track-1 CRCS and CSMS Participants

Issued: November 15, 2018

Deadline: December 6, 2018 or until funding is exhausted

Who can apply: ND EPSCoR RII Track-1 Faculty

From: ND EPSCoR State Office

Limited funding available so early proposals are encouraged

Proposals will open soon, and be posted on the ND EPSCoR website at

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

<https://www.ndepscor.ndus.edu/funding/students/>.

NSF EPSCoR: RII Program: Track-2 Focused EPSCoR Collaborations (RII Track-2 FEC) - Limited Submission Program

Please note! Only a few days remain:
Letter of Intent Deadline: November 26, 2018;
Full Proposal Deadline: January 25, 2019

The NSF EPSCoR Research Infrastructure Improvement Program: Track-2 Focused EPSCoR Collaborations (RII Track-2 FEC) program builds interjurisdictional collaborative teams of EPSCoR investigators in scientific focus areas consistent with NSF priorities. For FY 2019, RII Track-2 FEC proposals are invited on a single topic: "Harnessing the Data Revolution to solve problems of national importance." Projects are investigator-driven and must include **researchers from at least two RII-eligible jurisdictions** with complementary expertise and resources necessary to tackle those projects, which neither party could address as well or rapidly alone.

For more details, please consult the October newsletter.

ND EPSCoR Track-1 team updates

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



- **Mike Parker**, (CCCC) has switched from CRCS to CSMS to work with Voels on 3D printing projects. He is a math instructor.

- **Brent Voels**, (CCCC) has joined the CSMS team to work on 3D printing projects. He is a science instructor and CCCC's ND EPSCoR PI.



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 the newsletter mailing list, please email ndepscor@ndus.edu, subject line: newsletter.

Questions/comments: please contact Joyce Eisenbraun joyce.eisenbraun@ndus.edu

Our sympathy



ND EPSCoR extends its deepest sympathy to the family of David Givers, who passed away November 4, 2018. Givers was the former ND EPSCoR Director.

Dr. Phil Boudjouk, NDSU Chemistry and Biochemistry professor and former Vice President

for Research and Creative Activity, recalled hiring Givers for the role at ND EPSCoR. "David had been involved with ND EPSCoR for three-four years before he became the director, helping both NDSU and UND EPSCoR offices. He was a leader by example," Boudjouk said. "He had a real passion for EPSCoR, especially helping expand the programs that built connections with tribal colleges and supported new faculty."

During Givers' tenure, Boudjouk noted that the programs Givers managed helped play a significant role in moving North Dakota forward in obtaining federal awards. "He was very effective in helping prepare winning proposals for North Dakota research." Boudjouk recalled one evening when they were working on a proposal. "There was a tornado warning, so we moved to a safe area," he said, "but we kept working to finish the proposal on time."

"He was such a good person," Boudjouk said. "I was lucky to have worked with him—it was a privilege."

Link to obituary:

https://www.ndepscor.ndus.edu/fileadmin/ndus/ndepscor/News/David_Givers_obituary_11-18.pdf

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