

EPSCoR in North Dakota

As the ND EPSCoR staff traveled around the state recently, the impact on the future of North Dakota's economy was apparent: Important research is being done across the state, and the students who are learning and building skills will help create the future in which we live. Some of the research will form the foundation of life-impacting technologies in decades ahead; some research efforts will be the focus of important headlines in coming months.

The faculty, students and staff involved in the Center for Regional Climate Studies (CRCS) and Center for Sustainable Materials Science (CSMS) have worked diligently over the past four years, exploring and developing new knowledge and practical information that relate to North Dakota's agriculture base. CRCS has developed models about changes in land use, illustrated field hydrology and biomass production as well as provided insights on the influences of global climate on regional weather, extreme weather events and agricultural productivity. CSMS has created numerous bio-based monomers, polymers and composites, materials that are derived from plant sources. Some of the researchers have developed higher performance applications where durability is needed. In addition they have focused on specialty applications such as composites for vehicles and infrastructure.

What does this mean for North Dakota?

- The impact of a well-trained STEM workforce in our state cannot be underestimated. Over half of the students who graduate from the 11 ND EPSCoR-participating institutions will stay in the state, contributing their expertise and knowledge to our communities and industries [ND EPSCoR participants include three primarily undergraduate institutions (PUI) at Dickinson State, Mayville State and Valley City State Universities; one master's college/university (MCU) at Minot State University; five tribal colleges (TC) at Cankdeska Cikana Community College, Nueta Hidatsa Sahnish College, Sitting Bull College, Turtle Mountain Community College and United Tribes Technical College;

and two research universities (RU) at North Dakota State University and the University of North Dakota].

- Both Centers have developed contacts and relationships with industry partners and stakeholders across the state and region that will help sustain these important efforts to translate the research into useable technologies and practices in North Dakota.
- New institutional partnerships have been encouraged through many avenues, including the updating of a Partnerships White Paper. By having a sound understanding of the capabilities of sister institutions, North Dakota can make better use of resources and available talent across the entire state.

Statewide impact:

Perhaps most importantly, the collaborative efforts from both CSMS and CRCS have strengthened the research infrastructure within North Dakota, which fulfills part of the ND EPSCoR goal of increasing the state's competitiveness for federally funded, merit-based grants and contracts to support research in science, technology, engineering and mathematics (STEM).

ND EPSCoR has a tremendous impact on the state and STEM pathways. Over the past four years, over 500 undergraduate and graduate students, (in addition to over 400 students from middle and high school each year), plus over 200 faculty members and staff have participated in one or more aspects of the current NSF EPSCoR Research Infrastructure Improvement Track-1 cooperative agreement. The future is bright, and we continue to strengthen our state's research capacity, increase our competitiveness and cultivate and nurture partnerships that help the entire STEM ecosystem.

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



Impacts across the state

A statewide role

ND EPSCoR has a vital role in many communities. Here's a quick review:

- The state office coordinates many programs that reach across the state, including programs that support students and faculty as well as enhance educational outreach.
- Eleven participating institutions across the state (see p. 1) receive funding from the NSF RII Track-1 award, with the amounts and activities differing by campus.
- Each campus chooses how they spend their funds within the research emphasis areas: supporting students, hiring faculty, conducting research or doing outreach to enhance the STEM pathway in North Dakota.
- ND EPSCoR benefits North Dakota by bringing a research focus to challenges faced by the citizens, and by expanding the STEM workforce in our state.

A Partnership to Build STEM Research and Education Capacity

A few years ago, a document was developed that became a powerful tool for researchers around the state: *Broader Impacts White Paper*. This document planted the seeds for dialogue, collaborations and partnerships between all 11 EPSCoR-participating campuses. The white paper is a living document and has been updated several times since the initial 2016 version. But more importantly, there's been a significant expansion and evolution in the collaborations, and the original title no longer fits the organic growth of partnerships. We have re-titled the document to better reflect this evolution - **A Partnership to Build STEM Research and Education Capacity**.

Thanks to the efforts of **Scott Hanson**, ND EPSCoR Tribal Colleges Liaison Manager, along with the ND EPSCoR EMPOWERED-ND Corps, the new edition serves an important purpose for all faculty across the state who are seeking to broaden their scope of research and education impact in North Dakota.

What does it offer?

- It contains a great deal of basic demographic information about each tribal college (TC), primarily undergraduate institutions (PUI) and master's college/university (MCU) in ND, providing a convenient

snapshot of each institution all in one place. As Hanson notes, much of this information does not exist anywhere else on the internet.

- It lists the STEM researchers, as well as their research interests, at each institution.
- It lists the prioritized STEM needs at each institution.

Why is the white paper important to you and to your campus?

- It provides a source of information and contacts that can help spur new dialogues with a greater number of faculty interested in the common goal of advancing a diverse and inclusive STEM research and education ecosystem within the state.

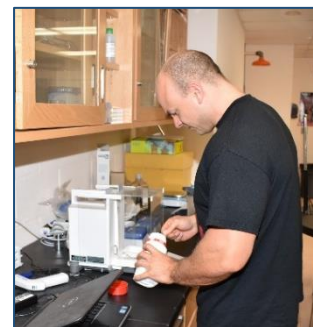
Thus, this document is contributing to the success of everyone's research and to the STEM educational pipeline in ND. Although all the updates are not yet complete, the latest iteration is at the bottom of:

<https://www.ndepscor.ndus.edu/centers-programs-websites/>.

Faculty impact students' success

Across the state, dedicated faculty are helping new generations of students learn, adapt, develop and grow. Whether students are going to school in their hometown, or traveling from across the globe to attend a ND EPSCoR institution, the impact of dedicated faculty is amazing, not only in the research but in the legacy of their students. Every institution is having an important impact on their students and on the economic future of our state. (We will present the "rest of the story" about many of these students in coming issues!)

One faculty member, **(Brent Voels, Cankdeska Cikana Community College [CCCC] principal investigator for the campus, right)** allowed a young mom, whose child care had fallen through, to bring the baby to class. Baby slept, faculty taught the biology lesson, mom learned, mission accomplished.



Two sisters who were undecided about their educational focus discovered their research interests, thanks to the encouragement of a CSMS researcher and faculty member (**Khwaja Hossain, Mayville**). Both have completed their bachelor's degrees and are now in graduate school at NDSU.

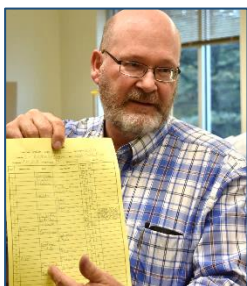
Faculty impact success, con't.

The enthusiastic support of one CSMS researcher and chemistry faculty (**Mikhail Bobylev**, Minot) encouraged several students to consider advanced career options: from medical school to graduate school.

Young high school students became so enthused about science it led the former Nurturing American Tribal Undergraduate Research and Education (NATURE) coordinator, **Gary Thomas**, at Turtle Mountain Community College (TMCC) to add additional summer camps to accommodate their interests.

Thanks in part to what he learned as a member of the CRCS team studying Northern Plains blizzards during his University of North Dakota (UND) graduate program with his advisor (**Aaron Kennedy**), a student was able to obtain a position with the National Weather Service.

A nontraditional student, who had enrolled in a NATURE-Plus experience, was encouraged by Native American Success in Science and Engineering (NASSE) mentor **Tyson Jeannotte**, (UND) and her CRCS advisor **Kerry Hartman**, Nueta Hidatsa Sahnish College (NHSC) to enroll in a double major in Environmental Science and Sustainable Energy.



One student found his niche doing research, thanks to CRCS researcher and faculty member (**Andre DeLorme**, Valley City State University [VCSU], left), who encouraged him analyze water samples from local streams and lakes.

Thanks to the efforts of CRCS researchers and faculty members **Eric Brevik** and **Josh Steffan** (Dickinson State University), a nontraditional student discovered her passion for research and has now been accepted into a Ph.D. program.

When one avenue of CSMS research proved unproductive for a North Dakota State University (NDSU) graduate student, his advisor, **Andriy Voronov**, helped him connect with another path that is proving to be both interesting and useful.

A student who was interested in Sitting Bull College's Master of Environmental Science program not only was able to complete the program with the assistance of his

advisor and past NATURE coordinator (**Gary Halvorson**, below left, with advisee and NATURE mentor **Clayton Lupe**), but had a job waiting for him at completion.



Introducing HPC

Many individuals or departments may wonder how to handle or transfer the large datasets they've collected on water quality, soil samples, weather patterns, native plant species, various plant or animal traits and populations and a host of other useful and important data.

The solution to data capture as well as data storage, analysis and visualization may lie in the capabilities of high performance computing (HPC).

At the beginning of 2018, three NDSU graduate student interns, **Jonathon Edstrom**, **Jingyan Fu** (Electrical and Computer Engineering majors) and **Russell Hofmann** (Chemistry major) received assistantships. They began to explore the world of HPC at the Center for Computationally Assisted Science and Technology (CCAST) to develop information about topics that would not only help their own research, but be useful for other researchers who might want to "try out" the capabilities of using HPC to more effectively and efficiently handle their data.

(L to R, Edstrom, CCAST Executive Director **Dane Skow**, Hofmann, Fu, taken at 2018 ND EPSCoR conference)



Introducing HPC, con't.

Informational sessions are now available for any ND EPSCoR institution! It's a great introduction to HPC capabilities for faculty and students, but especially for researchers who want to know how to apply HPC to their own research. From animated films to data mining, blizzard prediction to designing new materials for electronic devices, HPC's usefulness is applicable across many disciplines, noted **Khang Hoang** (NDSU) Research Computing Facilitator at CCAST. The sessions will answer basic questions including, what HPC is and what it can do, why it is useful and who might use it. Both NDSU and UND have HPC capabilities that are available for use by others in the state.



(Fu, left, by one of the CCAST computer clusters.)

"Although laptops and desktops have a great deal of computing power," Hoang said, "HPC can offer much more, since it operates on state-of-the-art hardware and

software. For example, a problem might take you hours or days to run on your laptop; but by using HPC, it could be handled in minutes." The benefits of using HPC lie in solving problems faster, solving much bigger and more complex problems and having the ability to tackle much larger data sets than a typical workstation can handle.

The sessions, which are available to all the EPSCoR entities in the state, can be scheduled by calling Scott Hanson, ND EPSCoR Tribal Liaison Manager at 701-231-8606 or emailing at scott.martin.hanson@ndus.edu.

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.

Ordinary to innovation

Sitting on the lab bench is a bottle of ordinary grocery-grade soybean oil, one of the most abundant and inexpensive renewable plant substances that CSMS graduate student researchers **Kyle Kingsley** and **Zoriana Demchuk** (NDSU) in **Andriy Voronov's** lab (NDSU) are manipulating to create new bio-based polymeric

materials. The goal, said Kingsley, is not only to partially substitute fossil or petroleum-based compounds with new sustainable and renewable ingredients, but also to improve properties of commercially viable products such as paints, coatings, surfactants, adhesives, binders, glues, etc. by using those novel plant oil-based ingredients.



(Demchuk, left; Kingsley, right comparing their latest data in research notes.)

The plant-based research currently uses eight different oils that, in addition to soybean, also include sunflower, olive, canola, linseed and modified soybean oils as a main resource for making plant oil-based polymers and polymeric materials. Being combined with commercially important petroleum-based intermediates, plant oil-based constituents provide important thermomechanical, chemical and surface characteristics to latexes.



(Voronov, center, inspects a coating sample with Demchuk and Kingsley)

The latexes are widely used in manufacturing coatings, paints and adhesive polymeric materials. Because the synthesized latex coatings can possess advanced properties and extended performance, said Demchuk, they can be water-repellent or have improved hardness and durability. The novel materials may be useful for many industrial applications, and advantageously replace an essential portion of petroleum-based counterparts at the same time.

As part of the Center for Sustainable Materials Science (CSMS), this team is working to find uses for some of North Dakota's agricultural products, such as the plant/vegetable oils. This research supports the agricultural base of the state and is creating a new potential environmentally friendly revenue stream. Their combined efforts have resulted in new discoveries as well as publications (two of which are listed below).

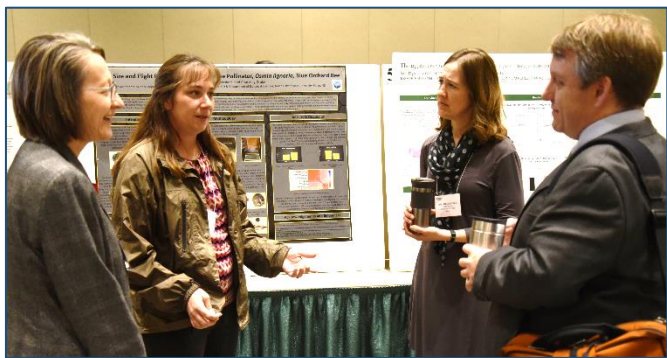
Courage and confidence

She wanted to make an impact, but said she didn't find her calling until she went back to school at DSU, where her advisor, **Corinne Brevik**, along with **Eric Brevik** and **Josh Steffan** (researchers and faculty with CSMS) encouraged her to give research a try.

"I quickly fell in love with what I was doing—there was always something new to learn," said **Billi Jean Petermann**, (right) about her experience at Dickinson State. That opportunity for research changed Petermann's major and "opened the doors to a world I didn't know was possible," she enthused.



Part of her research experience at DSU was supported through ND EPSCoR's Distributed REU (Research Experience for Undergraduates) program. Funded as part of the current NSF Track-1 cooperative agreement, the REU provides funds for undergraduates to stay in their home communities while conducting research in collaboration with an EPSCoR-funded professor. "I was able to present posters at the EPSCoR annual conferences, and even had the nerve-wracking opportunity to do a poster presentation for NSF personnel," she recalled. But the experience paid off in additional opportunities: other conference presentations, partnering with a USDA researcher to run texturing and pH analysis in the Dickinson lab, being a lab coordinator and role model for other students.



(L to R, ND EPSCoR Executive Director **Kelly Rusch**, Petermann, NDSU assistant professor **Britt Heidinger** and NSF Program Director **Tim VanReken** at ND EPSCoR 2018 annual conference).



(DSU mentor Brevik, (left) with Petermann at graduation)

Next steps:

After graduating last spring from DSU, Petermann

was offered an opportunity to take the next career step: a graduate assistantship at Texas Tech University in Lubbock, TX, working on her Ph.D. in soil and microbial interactions.

Petermann asserts an exciting world is that of soil microbes. "If you keep your soil healthy, your crops are healthy and then humans are healthy, too," she said. "It all fits together. What drives my research is that farmers put such time and effort into their work, that if I can help them with better information, that's my goal."

Thanks to mentors at DSU and funding by ND EPSCoR, Petermann is continuing her journey, following her passion with confidence and courage. Read more at https://www.ndepscor.ndus.edu/fileadmin/ndus/ndepscor/News/PetermannCourageAndConfidence_2018-October.pdf

Professional Development K-12

One of the core concepts within ND EPSCoR is to support the STEM pathway throughout North Dakota. Throughout the year, several activities have been conducted that focus attention on encouraging and supporting STEM development, primarily with post-secondary students, but also looking at the K-12 spectrum.

In September, the Turtle Mountain High School Science Department participated in a professional development seminar provided by ND EPSCoR.

Enhancing engagement: Eight teachers were given several avenues to help strengthen their teaching methods and expand student engagement:

- Integrating STEM strategies in every class,
- Discussing key progress indicators such as teacher assessments, ACT scores, timely secondary completion and the need to integrate STEM at all levels. Team work and team learning is a vital part of the learning strategy.
- Introducing concepts to make a successful transition from traditional teaching to transdisciplinary teaching (using a common theme, teachers collaborate and work with all students in all subjects).



Follow-up discussions with teachers, including, (L to R) **Jason Laducer, Ashley Parisien, Jason Davis**

and **Kylie Keplin**, outlined how the instructors could seamlessly integrate STEM into existing curricula while providing needed student support.

Teacher growth: Another important topic covered was teacher growth. **Denver LaRocque** (left), a Belcourt practicum student, heard a number of ways for teachers to continue STEM skill development: co-teaching with a teacher from a different discipline, presenting on a topic of their expertise at a state conference,



applying for teaching awards such as the Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST), or assisting fellow teachers to prepare concepts for other teachers.

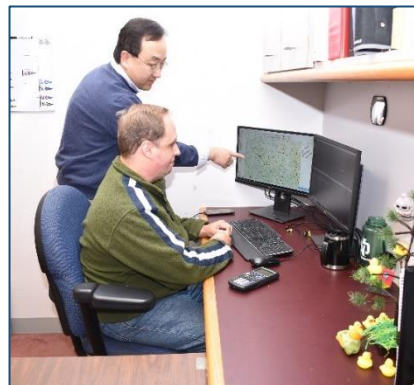
The final segment of the day included discussions on “Learning Progressions” to develop a better understanding of the value in mapping out specific steps with appropriate amounts of rigor for students to gain knowledge and skills from pre-k through grade 12.

Starr to present at AGU

One of **Jianglong Zhang’s** graduate advisees, **Jon Starr** (UND), submitted an abstract for his CRCS research efforts and was selected for an oral presentation at the upcoming American Geophysical Union (AGU) fall meeting (the largest earth and space science conference in the world).

Starr said his research presentation, *Measuring the Impact of Human Decision Making through Utilization of a Coupled Crop Simulation and Economic Land-Use Model*, is the result of a multi-year collaboration between the Atmospheric Science department and the Earth Systems Science and Policy department that focuses on linking two discrete models (a crop simulation model and an economic model) to study the social-economic factors (e.g. market, policy and management) on crop simulations and agricultural practices.

“My research focuses on integration of models/observations from multiple scientific disciplines to improve predictions and replications of agricultural scenarios and simulations,” Starr said. Along with other CRCS researchers who are linking agricultural and economic models to improve the understanding of social-economic factors on agricultural land use and land change as well as agricultural activities, Starr is working on incorporating remotely sensed atmospheric and surface data for agricultural applications as well as applying agricultural related data for remote sensing applications.



(Zhang, left, with Starr)

Working on his Master’s degree in Atmospheric Science, Starr notes that the results of this research can open doors for exploring impacts

of economic changes to land owners and the surrounding landscape at a very fine-scale resolution. Quantifying these impacts has particular potential value for North Dakota due to the importance of agriculture throughout the state. Additionally, while this research has been mainly focused on North Dakota, the models are configured so they can be utilized over any agricultural area within the nation with minimal changes.

Plans for the future: The coupled model can be used to investigate a wide variety of changes in prices, policies and practices, Starr said, allowing researchers to examine the impacts to the landscape with a myriad of scenarios. In addition, modelers in other fields have expressed an interest in joining CRCS efforts, so they hope to further increase the depth and accuracy of the simulations in the future. Finally, since the coupled system uses standardized data formats from atmospheric science’s research weather models as inputs, there can be a seamless link to both past and future weather scenarios. Incorporating these changes into both historic recreations and future scenarios will increase the knowledge and understanding of past events as well as improving the impact estimates of future events.

Accomplishments



What's new

ND EPSCoR research continues to provide the foundation for publications summarizing new discoveries and advances. Congratulations to the faculty and students who provide this important information for the benefit of the state, region and nation.

Center for Regional Climate Studies (CRCS)-related publications

Shelter, Clothing, and Fuel: Often Overlooked Links between Soils, Ecosystem Services, and Human Health, by **Eric Brevik** and **Joshua Steffan** (DSU) with Lily Pereg, Paulo Pereira, Lynn C. Burgess, Csongor I. Gedeon in *Science of the Total Environment*, 2018, Vol. 651, p. 134-142. DOI: 10.1016/j.scitotenv.2018.09.158.

Center for Sustainable Materials Science (CSMS)-related publications

Plasticizing and Hydrophobizing Effect of Plant Oil-Based Acrylic Monomers in Latex Copolymers with Styrene and Methyl Methacrylate, by **Zoriana Demchuk**, **Kyle Kingsley**, **Andriy Voronov** (NDSU) with Vasylyna Kirianchuk and Stanislav Voronov in *International Journal of Theoretical and Applied Nanotechnology*, Vol. 2018, p. 29-37, DOI: 10.11159/ijtan.2018.005.

Dual Role of Methyl-beta-Cyclodextrin in the Emulsion Polymerization of Highly Hydrophobic Plant Oil-Based Monomers with Various Unsaturation, by **Zoriana Demchuk**, **Kyle Kingsley**, **Andriy Voronov** (NDSU) with Ananly Kohut and Stanislav Voronov in *European Polymer Journal*, Nov. 2018, Vol. 108, p. 322-328. DOI: 10.1016/j.eurpolymj.2018.09.010.

Doctoral Dissertation Assistantship (DDA) publications

Quantum vortex melting and superconductor insulator transition in a 2D Josephson junction array in a perpendicular magnetic field via diffusion Monte Carlo, by **Pragalv Karki** and **Yen Lee Loh** (UND) in *Journal of Physics*, Sep 26, 2018, Vol. 30, 385901, DOI: 10.1088/1361-648X/aadafb.

Activities and recognition

CSMS research **Bashir Khoda's** advisee and graduate student **AMM Nazmul Ahsan** (NDSU) was awarded a registration waiver to attend the Austin, TX 29th Annual International Solid Freeform Fabrication Symposium - An Additive Manufacturing Conference to present a paper for his CSMS work titled *Adaptive Shape Conforming Honeycomb Lattice Infill for 3D Printing of Thin Wall Objects* in August 2018.



Kate Gates, a student at United Tribes Technical College (UTTC), has been selected to travel to NASA's Glenn Research Center this fall to participate in the NASA Community College Aerospace Scholars (NCAS) onsite experience.

She is one of 319 community college students from across the U.S. who were selected. After five weeks of online activity, she will participate in a four-day on-site event at a NASA Center, where she will have the opportunity to interact with NASA engineers and learn more about careers in science and engineering.

Gates was a participant in ND EPSCoR's NATURE camp in June 2017. More about the story at <http://uttc.edu/united-tribes-technical-college-student-selected-to-visit-nasa-in-october/>

Frank Bowman and graduate student **Humphrey Chukwuto** (UND) presented a paper related to their CRCS activity, titled *CCN Activity and Particle Growth of Aging Diesel Exhaust Particles*, at the 10th International Aerosol Conference in St Louis, MO. Their work underscores the importance of studying the impact of diesel exhaust particles since particles can change both their physical and chemical properties as they age.

Austin King (UND) graduated in May, 2018 with a Master's degree in atmospheric science. His thesis topic, *An Investigation of Severe Weather Environments in Atmospheric Reanalyses*, was based on his CRCS research focused on collecting and analyzing severe weather data, including information on blizzards. During his time in graduate school at UND, he and friends developed the pieces to start their own company called WxByte. The company focuses on making weather data more user friendly for the public. Their two main projects include a webpage/mobile app called *SatSquatch*, which is a software tool to quickly plot and analyze real-time weather satellite data. They also have

a project called *gSHARP* which can rapidly process atmospheric data in weather models and historical datasets to quickly determine environments that may be favorable for severe weather. In addition to starting a new business, King has also accepted a job as a Research Associate at the Atmospheric Radiation Measurement (ARM) Data Quality Office, a division of the U.S. Department of Energy in Norman, OK.

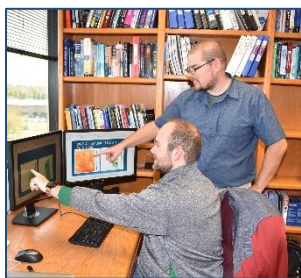
Mayville State University recognized the research of CSMS participant **Khwaja Hossain** for his



groundbreaking work. *"...Dr. Hossain and his team determined that wheat bran is an important and very inexpensive agricultural by-product. They prepared thermoplastic using wheat bran as a reinforcement and found it to have industrial uses, as it was an appropriate reinforcement in the polymers. The team is*

continuing to analyze the biodegradability of the prepared thermoplastic. Stay tuned for more exciting findings from this team!"

Graduate student **Farwan Alghamdi** (UND) presented a paper, *Small-scale Characterization of Additively Manufactured Aluminum Alloys through Depth-sensing Indentation*, with ND EPSCoR new faculty start-up awardee, **Meysam Haghshenas** (UND) as his advisor. The conference was the 29th Annual International Solid Freeform Fabrication Symposium - An Additive Manufacturing Conference in Austin, TX.



Aaron Kennedy (UND, standing), the co-lead on the ND EPSCoR CRCS project with advisee **Aaron Scott**, recently received notice of a Department of Energy award for his proposal on *Detection and Characteristics of*

Blowing Snow at ARM Sites. The three-year project was funded for \$428,000. His abstract notes that high-latitude regions of the globe are subject to adverse conditions including snowfall and high winds which can have significant societal and economic impacts. Besides these immediate impacts, blowing snow also plays an important role in the climate system, from large hydrological mass balance changes in Antarctica, to

impacting the surface radiation budget. The lofting of snow may also alter temperatures within the lowest layer of the atmosphere, impacting weather systems. The process of blowing snow is not widely considered within either weather or climate models, leading to uncertainty within these simulations.

Jeremy Guinn (UTTC principal investigator on the current Track-1) is also the principal investigator on an NSF grant of \$2.6 million to aid in the sustainability of tribal agricultural resources and land management. The grant is part of the NSF Tribal College and University Program Centers for Research Excellence in Science and Technology (TCUP). Guinn noted the grant will allow for additional studies relating to water, agriculture and energy.

ND EPSCoR was invited by Montana EPSCoR to participate in an important workshop to further explore STEM education in Indigenous communities. EPSCoR staff, K-12 educators, tribal college faculty and higher education faculty from select jurisdictions were invited to come together in late September to discuss challenges, present best practices and co-create potential solutions in engaging Indigenous students in STEM disciplines and preparing them to enter the STEM workforce.

Attendees included **Austin Allard**, faculty member at TMCC and an ND EPSCoR Native American STEM mentor; **Becky Giles**, instructor from Circle of Nations school and Education and Workforce Development participant; **Julia Bowsher**, NDSU associate professor and NATURE Sunday Academy co-coordinator; and **Kelly Rusch**, representing ND EPSCoR.

The goal of the event was to work to create pathways in collectively impacting the broader participation challenge of Indigenous STEM education and seek ways to be involved in the National Science Foundation's INCLUDES initiative. Dr. Aaron Thomas, director of Indigenous Research and STEM Education at the University of Montana, led the workshop.

Two faculty, **Andriy Voronov** and **Dean Webster** (NDSU), will be organizing a symposium on a topic related to CSMS work sponsored by ND EPSCoR: *Polymer Materials from Renewable Ingredients*. The symposium will be held at the International Chemical Congress of Pacific Basin Societies (Pacifichem), which is held every five years. Voronov noted that NDSU's proposal was selected along with other co-organizers Sergiy Minko, (University of Georgia); Jason Locklin, (University of Georgia); Ren Liu, (Jiangnan University,

China); and Kazuhiro Shikinaka, (National Institute of Advanced Industrial Science and Technology, Japan).

Qianli 'Rick' Chu (UND) gave a presentation at the 256th American Chemical Society National Meeting in Boston on his faculty research with CSMS titled *Construction of Cyclobutane-containing Polymer (CBP) by Using [2+2] Photocycloaddition*.

Aaron Bergstrom, UND Advanced CyberInfrastructure Manager, attended a recent cyberinfrastructure (CI) conference in Oklahoma, and was a panelist or presenter for several CI topics including Leadership: Strategic Thinking & Visioning; CI Expertise/Communication: Cloud vs On-Premise: Explaining Pros & Cons; CI Leadership: Teams of CI Professionals: Recruitment & Retention, Management, Team-building and Motivation; and CI Budgeting/Communication: Internal Budget Justification.

Minot State University has announced a new logo, taglines and graphics for the university at <https://www.minotstateu.edu/pio/insides/2018/09-04-2018.shtml>. Please note that ND EPSCoR also has the Minot State logo on our website for easy reference.

Graduate student **Aaron Scott** (UND) was selected to give an oral presentation on *Initial Development for Simulating Land Surface Change Impacts on Climate in the Northern Great Plains*, a collaborative effort with UND advisor and CRCS faculty member **Aaron Kennedy** and graduate student **Jon Starr**. **Aaron Kennedy** was also selected to give an oral presentation at the 2019 American Meteorological Society annual meeting in Phoenix, AZ, on the topic of *Identifying Northern Great Plains Blizzards in the Past, Present, and Future*, a collaborative effort with former graduate student **Alexander Trellinger** (UND).

Tyson Jeannotte (UND) has been traveling to UTTC, NHSC, TMCC and CCCC to discuss possible pathways to STEM programs. Jeannotte is the NASSE mentor, helping Native American students develop their interest in STEM careers.

Cyberinfrastructure outreach leads for the current Track-1 cooperative agreement have received an NSF award in CyberInfrastructure: *CC* Networking Infrastructure: North Dakota Internet Leadership Level Infrastructure*. **Dane Skow** (NDSU) is the principal investigator and **Aaron Bergstrom** (UND) is the co-

principal investigator for the three-year \$495,524 grant, which began August, 2018.



Chad Ulven (NDSU, left) presented at NDSU's Science Café in late September on his CSMS research, *Impact of Plastics on Our Environment: What's Next?* With over 380 million tons

of plastic produced each year and environmental concerns related to plastic waste, he discussed potential solutions and the need to engage in a dialogue about appropriate action steps.

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



Mark your calendars! It's Year 5 of our NSF RII Track-1 Cooperative Award, and the progress has been amazing. You won't want to miss this wrap-up event!

Please note changes to this year's conference!

This year, both **FACULTY** and **STUDENTS** will have an opportunity to present posters and provide oral talks throughout the day on 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 part of **Center for Sustainable Materials Science** (CSMS) or the **Center for Regional Climate Studies** (CRCS), you'll want to mark March 26 on your calendar as well. The **EMPOWERED ND** meeting will be held during breakfast on the 27th.

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

Upcoming events

- **CCAST interns**, presenting on HPC at your campus (upon request)
- **CRCS Stakeholder meeting**, October 18, UND Education 104, 4 p.m.



- **CSMS Entrepreneur Workshop**, October 26, Memorial Union, Fargo, 10 a.m. (Registration closed.)
- **Rachel Navarro** (UND), Education and Workforce Development co-lead on the current Track-1, will present at UND's STEM Café on November 14 "Drafting Women and Minorities in Engineering: Broadening Participation." Half Brothers Brewing, Grand Forks, 7 p.m.
- **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. (Registration opening soon.)

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.***

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



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.

The Science, Technology, Engineering and Mathematics (STEM) research and education activities should seek to broaden participation through the strategic inclusion and integration of different types of individuals, institutions and sectors throughout the project. Proposals must describe a comprehensive and

integrated vision to drive discovery and build sustainable STEM capacity that exemplifies diversity of all types (individual, institutional, geographic and disciplinary). The development of diverse early-career faculty is a critical component of this sustainable STEM capacity. A single proposal is submitted for a project. Support for non-lead collaborating institutions should be requested as subawards. Separately submitted collaborative proposals are not allowed. Each participating EPSCoR jurisdiction must have at least one co-PI on the project. Proposals that do not comply with these requirements will be considered not responsive, and will be returned without review.

Letter of Intent Deadline: November 26, 2018; Full Proposal Deadline: January 25, 2019

Please note: Limited submission grant programs are those that indicate a limit on the number of proposals that may be submitted **by an institution** for a particular deadline. What does that mean for you? A selection process becomes necessary if more applicants express interest in applying than a single institution is allowed to submit to the grant program. Please contact your campus research office for your campus requirements.

ND EPSCoR STTAR program returns

The Students in Technology Transfer And Research (STTAR) program provides upper-division students (juniors through graduate students) in science, technology, engineering and mathematics (STEM) with an opportunity to use their academic training and experience to address the most challenging science and technology-based problems faced by North Dakota companies. The primary emphasis of STTAR is on research and development rather than sales and marketing. ND EPSCoR cost-shares the student salary.

ND EPSCoR established the STTAR program in 1994 in response to recognized state and national needs for increased technology transfer from universities to industry. Over 100 North Dakota companies across the state have participated in this successful program.

Student Eligibility:

North Dakota University System students at Dickinson State University, Mayville State University, Minot State University, North Dakota State University, University of North Dakota and Valley City State University are eligible to work with ND companies for a minimum of eight (8) and up to 12 weeks during the 2019 summer months. Students must be U.S. citizens or

possess an immigration work permit. Beginning October 17, students wishing to participate should contact their respective career office. Additionally, students must have completed their sophomore year.

For more information, check the ND EPSCoR website at <https://www.ndepscor.ndus.edu/ndep/sttar/program-information/>.

Questions? Contact Project Administrator Jean Ostrom-Blonigen, at 701-231-7516 or Jean.ostrom@ndus.edu.

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, https://www.ndepscor.ndus.edu/fileadmin/ndus/ndepscor/documents/NewsTemplateFillable_2018-10.pdf

If you would like 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

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