



Established Program to
Stimulate Competitive Research

News & Notes

February 2020

Building workforce talent in ND

Research is a central core of ND EPSCoR efforts within the 11 participating institutions in North Dakota. Building research capacity and expertise is a primary mission, but one that may overshadow an important long-term impact of the EPSCoR programs.

Through research, student support, and specialized programs like the Students in Technology Transfer and Research (STTAR) internship program, ND EPSCoR has a strong focus on the broader issue of talent and workforce development within the state.

Each year, hundreds of students participate in various ND EPSCoR programs that highlight science, technology, engineering, and math (STEM) disciplines. From those explorations, students have the opportunity to discover and connect with potential new avenues for expanded academic study or future careers.

Research indicates that early exposure to STEM often encourages further academic and career exploration. By underwriting K-12 programs for rural and American Indian students, ND EPSCoR is helping to build a STEM pathway across ND for students who may not otherwise be introduced to these disciplines. As one researcher commented, "...with these programs, our students are included, encouraged, and trained."

Over the past few years, hundreds of students at the undergraduate and graduate level have been supported in some way through ND EPSCoR. It may be helping with tuition or paying the expenses to share their research at a conference. One student noted that his presentation at a conference was the first time he had ever presented in public—both a terrifying and significant growth experience for that individual. Yet he said he felt more confident of his abilities because he had succeeded in taking this important next step.

For many students—and potential employers—an internship is a positive factor on a resume. ND EPSCoR has cost-shared a number of internships through the STTAR program. ND EPSCoR cost shares the interns' salaries with ND-based businesses, helping make the

experience possible for students who would like the practical workplace option of using their academic skills in real-world settings.

The STTAR program encourages businesses to hire interns for 8-12 weeks during the summer and provides upper-division students (i.e., juniors through graduate students) in STEM with an opportunity to use their academic training and experience to address challenging science and technology-based problems faced by North Dakota companies. Employers in 2019 noted they were delighted to have the interns work on projects that their organization needed, but may not have had the time to complete. It's a benefit to both the employer and the intern.

The STTAR program is open to any ND-based company. There are up to 20 internships available. ND EPSCoR provides up to \$2,400 per student for the 12 weeks and is currently seeking businesses who would like to participate in the program. Students can work through their local campus career services office to register and interview for the internships. For more information about the program and how to access, please see p. 2 or:

<https://www.ndepscor.ndus.edu/programs/sttar/>.

The STTAR program is just one avenue ND EPSCoR uses to help invest in home-grown talent and expand the workforce development options in North Dakota. North Dakota has a long history of talented students entering the workforce and changing the economy of the state, the region, and the nation. ND EPSCoR is proud to play a part in that economic progress.

Regards,

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



STTAR business applications open

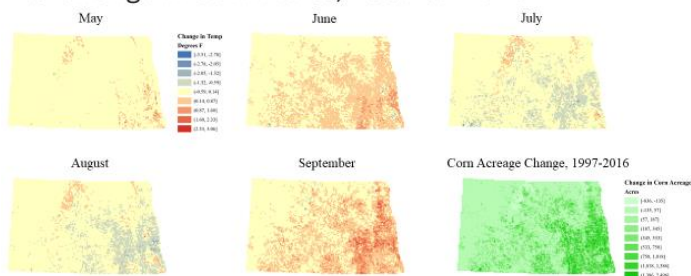
The Students in Technology Transfer and Research (STTAR) program is now accepting applications from ND-based businesses interested in hiring summer 2020 interns and having ND EPSCoR cost-share their salary.

Please download the business application at: <https://www.ndepscor.ndus.edu/programs/sttar-program/>. Businesses can send the completed application to **Shireen Alemadi**, ND EPSCoR STEM Manager at shireen.alemadi@ndus.edu.

CRCS Stakeholders meeting update

CRCS Stakeholders gathered on January 24, 2020, to discuss the plans for dissemination of results and continued plans for collaboration. The CRCS co-leads, **Aaron Kennedy**, associate professor, and **Jianglong Zhang**, professor, both in UND's Atmospheric Sciences, and **David Roberts**, associate professor in NDSU's Agribusiness & Applied Economics, discussed plans for future collaborations. New proposals for future funding have been submitted with various partners from USDA, NSF, and the Weather Service.

Estimated Temperature Changes Attributable to Change in Corn Acres, 1997 to 2016



Key: Temperatures—blue = 2 degrees cooler, yellow = static, red = 2 degrees warmer; Acreage—light green = 500 fewer acres, dark green 1-2K more acres

Roberts also presented an update on his CRCS research (above) involving statistical analysis of the feedback relationship between regional climate and agricultural intensity. In his research, he noted that the increased corn and soybean acreage has an impact on both temperature and precipitation in localized areas.

Several of the Stakeholders also provided input for research components that could be added to the economic model. With data from other CRCS members, there may be options for expanded models, he said.

Plans for future dissemination of the CRCS information includes regional workshops later in the spring of 2020. When dates/locations are finalized, they will be added to the ND EPSCoR calendar.

Register for Annual Conference

Registration is now open!

ND EPSCoR

Annual State Conference

Tuesday, April 21, 2020

Alerus Center, Grand Forks, ND

Register here!

bit.ly/2020nd

Don't miss this opportunity!

Featuring: Center for Regional Climate Change (CRCS) and the Center for Sustainable Materials Science (CSMS)

Confirmed speakers for this year's event include **Jose Colom-Ustariz**, NSF program officer, and **Pips Veazey**, project director for Alaska EPSCoR. In addition, students and faculty will have the opportunity to present their research in two poster sessions.

Participants can use the above portal to submit both their registration for the conference and the abstract information for their posters, with preference given to CRCS and CSMS students. Detailed guidance on the poster presentations are also outlined on the website.

Expanding research options

Part of ND EPSCoR's mission is to support and grow statewide STEM research efforts, and a recent purchase for Valley City State University (VCSU) illustrates the value of this support to researchers and students.

"With the grant from the ND EPSCoR State Office, the VCSU Science department was able to purchase the UVP ChemStudio which is used in gel analysis and blotting," said **Hilde van Gijssel**, professor of Science and head of the toxicology laboratory at VCSU. She explained that during the renovation of the Rhoades Science building on campus, the Science department lost its darkroom which had been used to develop film. That meant the Science students could no longer use

research techniques such as western blotting and gel analysis.



“Western blotting and gel analysis are used in a variety of research projects performed at VCSU,” van Gijssel said (at left, unpacking the new lab equipment). She gave examples from a group student project that is developing a biological lead

and mercury sensor using synthetic biology and biological engineering. The students take a gene that makes a protein that can detect lead or mercury, combine it with a gene from a firefly that produces a light signal, and place the spliced gene in *E. coli* bacteria. In practice, these *E. coli* will produce a light signal in water samples containing either lead or mercury. The amount of light is proportional to the amount of the metals found in the water sample. Van Gijssel said this research is important since it creates a more sensitive and more specific method to measure lead or mercury in the water samples than existing chemical methods.

In a second project, van Gijssel’s students are studying the effects of herbicide and pesticide exposures on human health. For this project, they use a fruit fly model since fruit flies have a two-week life span, and they want to investigate the impact of multigenerational exposure. “We are interested in genes that are involved in epigenetic changes (how genes are influenced by outside factors) and this means looking at gene expression,” she said. “Western blotting can show us the amount of proteins present in fruit flies so the imager opens up a whole new set of techniques to do measurements and explore the mechanism of toxic effects of herbicides.”

For undergraduates working in the VCSU lab, the new equipment means they now can run the tests themselves rather than traveling to NDSU. “The new equipment makes other research options available to our students,” van Gijssel said. “It’s a great help to our lab.”

Tackling oil spills with mushrooms

In 2013, North Dakota farmer Steve Jenkins discovered a massive oil spill in his wheat field. The spill took over five years and \$93 million to clean up. In late October 2019, there were reports of another oil spill near Edinburg.

While estimates to clean up the Edinburg spill have not yet been published, clean-up crews might take pointers from **Mike Parker** (below) about how to lower costs. Parker, an instructor at Cankdeska Cikana Community College (CCCC) and a researcher who has worked on both CRCS and CSMS projects, says oyster mushrooms could be used to help clean petroleum-based spills at just “a fraction of the cost.”



Oyster mushrooms are able to break down oil using the same process they use to ‘eat’: by secreting enzymes that break down substances outside their bodies and then absorbing the decomposed material. Oyster mushrooms usually grow on and eat wood, and wood has hydrogen-carbon bonds similar in structure to the bonds in oil.

Previous research has shown that oyster mushrooms are effective at cleaning up oil, but Parker wanted to test if he had the techniques and tools to replicate such research at CCCC for potential use in ND. After contaminating soil with Bakken crude oil in the lab, Parker and his students added a medium to the soil for the mushrooms to grow. After six weeks, the crude oil content in the soil decreased from 20,000 parts per million (ppm) to 8,000 ppm. Now that he has the techniques down, he is “interested in taking this to a larger scale for large clean ups,” Parker said.

The environmental benefits of this research are obvious, but Parker thinks that the most important part of his research is its educational benefit for students. “It’s hands-on, you see the results, it’s visual research,” he explained. Students respond well to this hands-on learning, he said, and they’ll be able to take the research tools they learned at CCCC into their future careers. (Article written by Megan Even, ND EPSCoR.)

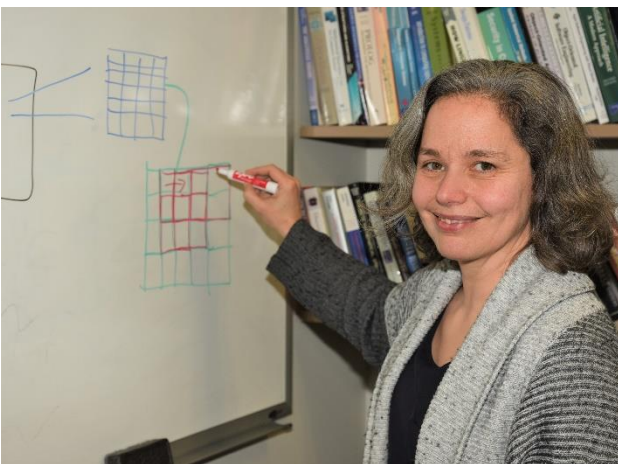
Making big data practical

People involved with agriculture and hydrology know their decisions need to be data-driven. But when dealing with climate-induced changes to soil and water, the data sets are often huge and unwieldy, making them difficult to use and without the detail that is helpful for decision making.

Anne Denton, CRCS researcher and professor in Computer Science at NDSU, has developed new methods for assessing the remotely sensed data (such as from satellites) and created models that can analyze the data at the level of 1 meter (about 3.3 feet) or 5 meters, rather than the traditional 30-meter grids. “We can use the high resolution of modern imagery for extracting information that involves many pixels of those images,” she said, “and we can do the analysis without losing any of the resolution.”

Using the tools of big data, her research can now provide more accurate, detailed information about topographical features; for example, the slope of a hill, which will help a farmer or hydrologist better plan for handling surface water runoff. Thanks to the various imaging sources and using big data techniques, Denton can distinguish things on the ground from ground cover to detailed topography of the site.

“Doing geospatial computer analysis used to be only in the geoscience arena,” she said. Denton (below) was the recipient in 2011 of one of the first NSF grants in the country that focused on big data uses in agriculture: *PFI: Data-driven Support for the Smart Farm*. “This research is very cutting edge, and we’re hoping to add a data science major to the computer science department here.” The field has grown significantly since the advent of such commonly used tools as Google Earth.



Denton has focused on what she describes as “tool development”—finding ways to use the huge image data sets in ways that provide useful and accurate

information, developing structures so different sets of data can now “talk” to one another, and constructing faster tools for doing big data analysis. “By using big data techniques,” she said, “we can use all the information we have to make better decisions, and this information is useful for agriculture, hydrology, weather and climate experts, and a host of other industries. I feel like we’ve only scratched the surface of what can be done with these new techniques we’ve been developing. I would like to get to where we can do reliable assessments of soil and plant health using the spatial imagery, because I think it would also help us address the changes in climate more effectively. We won’t run out of problems to solve in the next 50 years or so!”

In addition to research, Denton also has an enthusiasm for helping students. Recently she celebrated a first in her career. “I had a Ph.D. student, **Rahul Gomes**, who graduated last year and got a job as a faculty member at Minot State University,” she said. “He applied for a ND EPSCoR STEM grant a few months ago as a principal investigator (PI), and I had the honor of being named the co-PI. He got the grant!” Helping students develop their skills so they can make an impact in the workforce in the state and across the region is important to Denton, and an ongoing focus of her work at NDSU.

EPSCoR support for ND K-12 instructors

Don’t miss this opportunity! The STEAM Energy Teacher Professional Development Course, an enroll-anytime self-paced online course, is open and available: <https://register.und.edu/learning/jsp/session.jsp?sessionId=PDE.20.0522&courseId=TL.ONL.SE&categoryId=10062>



As a part of the NSF RII Track-1 INSPIRE-ND effort, 25 Science teachers in ND who complete the course will be reimbursed

for the total cost.

Once enrolled, participants have 60 days to complete the modules.

This three-module course explores aspects of STEAM (science, technology, engineering, arts, and

mathematics) instruction through an integrated investigation of sustainable cities. Participants will imagine, research, design, and build their own sustainable city. Each module of the integrated curriculum has a specific content focus that engages through both a learner and teacher lens.

For more information, please contact Ryan Summers, EWD researcher and assistant professor of Science Education, UND, at ryan.summers@und.edu or call 701-777-3144.

Funding opportunities

Undergraduate Student Researchers:

The **Julia Bowsher** and **Kendra Greenlee** labs in NDSU's Department of Biological Sciences are inviting applications for undergraduate researcher positions for summer 2020. Students will assist with projects investigating the development and health of agriculturally-beneficial bee pollinators as a component of their NSF EPSCoR Track-2 award.

Students from underrepresented groups and tribal colleges/universities are particularly encouraged to apply. Applicants must be US citizens.

Application deadline: March 1, 2020

Program Dates: May 26 – July 31, 2020 (10 weeks)

Salary and Housing: \$4,500 (\$450/week). (For participants from outside Fargo, housing will be provided on the NDSU campus.)

Travel: Travel funds are available upon request on a first come, first-served basis.

Research focus: Students will conduct research in one of the following areas:

1. Gene expression and hormonal physiology of bees during development. Research will be lab- and field-based and involve molecular techniques.
2. Bee behavior, performance and reproduction.

For more information:

<https://icenetworkfargo.com/2020/01/23/pollination-nation/> or

<https://www.ndsu.edu/biology/pollinationnation/>

Questions: Please contact Dr. Greenlee:

kendra.greenlee@ndsu.edu.

NATURE Program Associate Coordinator of NATURE University Summer Camp - NDSU Campus

ND EPSCoR seeks to hire a North Dakota State University (NDSU) faculty member to act as an associate NATURE University Summer Camp Coordinator for the NDSU campus for its 2020 camp.

Working under the direction of **Scott Hanson**, ND EPSCoR Tribal Colleges Liaison Manager / NATURE Coordinator, and in conjunction with the Associate NATURE University Summer Camp Coordinator for the University of North Dakota (UND) campus, the duties of this position include:

1. participate in pre-planning meetings;
2. coordinate and implement the NDSU-based activities during the two-week residential camp (Sunday, May 31 – Friday, June 12, 2020); and
3. participate in a post-camp review session.

ND EPSCoR NATURE University Summer Camp

Each summer, up to 25 tribal college/university (TCU) students (five from each TCU in the state) spend two weeks living on the NDSU and UND campus, touring each campus and the research laboratories located there, and conducting research with a faculty mentor of their choosing. As the final element of the suite of NATURE programs, the University Summer Camp targets TCU students who plan to transfer to a STEM program at NDSU or UND upon obtaining an associate's or bachelor's degree at their TCU.

About ND EPSCoR NATURE Program

Comprised of four progressive elements 1) Tribal College Summer Camps, 2) Sunday Academy, 3) Bridge Camp, and 4) University Summer Camp, the NATURE program aims to improve STEM education among middle school, high school, and tribal college/university (TCU) students and to build a pathway for American Indians living in North Dakota who are interested in pursuing careers in STEM disciplines.

ND EPSCoR State Office

Established in 2018, the state office provides leadership and coordination to broaden and diversify ND's STEM workforce pathway from elementary through graduate school; supports and grows statewide STEM research efforts and competitiveness at participating institutions of higher education; and conveys the impacts of STEM research, outreach, and workforce efforts to ND stakeholders.

Deadline to Apply: Wednesday, February 26, 2020

Please submit a one-page narrative outlining how your background aligns with this position and a NSF-style bio sketch to Scott Hanson

(scott.martin.hanson@ndsu.edu) with a copy to Jean Ostrom-Blonigen (jean.ostrom@ndsu.edu).

Decision Date: Friday, February 28, 2020

Salary: 1-month summer salary

Questions: Please direct your questions to: Scott Hanson, ND EPSCoR NATURE Coordinator / Tribal Colleges Liaison Manager (scott.martin.hanson@ndus.edu) or see: <https://www.ndepscor.ndus.edu/for-researchers/funding-opportunities-researchers/>

NSF Track-4: EPSCoR Research Fellows:

The EPSCoR Research Infrastructure Improvement Track 4: PROGRAM SOLICITATION **NSF 20-543** provides an opportunity for non-tenured faculty to spend extended time at premier research facilities. The fellowship period may be used to initiate new or expand existing collaborative relationships, or to make use of unique equipment not available at the PI's home institution. Any research topic eligible for consideration under NSF's policies will be considered for support.

Full Proposal Deadline: (due by 5 p.m. submitter's local time) May 12, 2020.

Eligible PIs employed by degree-granting institutions of higher education must hold a non-tenured faculty appointment. RII Track-4 awards will be made as standard grants, not to exceed \$300,000 or 24 months in duration. Only single-PI proposals will be considered, with a limit of three proposals per institution (work with your sponsored programs). See: <https://www.nsf.gov/pubs/2020/nsf20543/nsf20543.pdf>

EPSCoR Workshop Opportunities Program

EPSCoR is designed to fulfill the mandate of NSF to promote scientific progress nationwide and welcomes proposals for workshops in **Solicitation NSF 19-588**. These workshops focus on multi-jurisdictional efforts of regional to national importance related to EPSCoR's goals and NSF's mission.

Please see the RFP for further details:

<https://www.nsf.gov/pubs/2019/nsf19588/nsf19588.pdf>

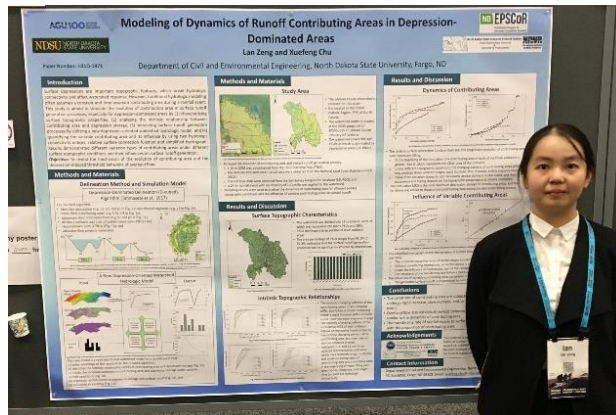
Center for Sustainable Materials Science (CSMS) publications

Metformin Uptake and Translocation in Chickpeas: Determination Using Liquid Chromatography–Mass Spectrometry by **Brett Nespor**, **Anastasia Andrianova**, **Sean Pollack**, **Creighton Pfau**, **Muhammad Arifuzzaman**, **Nazrul Islam**, **Alena Kubátová**, and **Khawaja Hossain** in *American Chemical Society Omega*, 2020. DOI: 10.1021/acsomega.9b02783

Activities of note

Surojit Gupta, Emerging Areas Seed recipient and associate professor in Mechanical Engineering, will present a faculty lecture at UND on February 19, 2020.

Lan Zeng (below), CRCS researcher and Civil and Environmental Engineering (CEE) graduate student at



NDSU, presented at the 2019 Fall AGU conference, and was awarded the prestigious AGU Outstanding Student Presentation Award. With more than 1,400 sessions and over 27,000 submitted abstracts, Zeng was one of the top 5% of student participants. The AGU Fall Meeting is the premier collection of hydrologic scientists in the USA, according to **David Steward**, professor and chair of NDSU CEE. Zeng's presentation was titled, *Modeling of dynamics of runoff contributing areas in depression-dominated areas*. Her advisor is **Xuefeng (Michael) Chu**, CRCS researcher and professor in CEE.

Guodong Du, CSMS researcher and associate professor in Chemistry at UND, presented *Furan-based Poly(silyl ether)s as Self-healing Materials* at the ACS Polymer Next Generation Smart Materials in Savannah, GA, on December 18, 2019. Co-authors include EPSCoR CSMS researchers **Jigna Parmar** and **Srikanth Vijjamarri** (both UND).

Alexander Parent, CSMS researcher and assistant professor in Chemistry and Biochemistry at NDSU, presented a poster on *Lowering Transition Metal Redox Potentials using Anionic Pyridyl Phosphonate Ligands* at the 2020 Electrochemistry Gordon Research Conference in Ventura, CA on January 4-5, 2020. Co-authors include CSMS researchers **Yutaro Aimoto** and **Hashini Herath** (both NDSU), along with Christian K. Nilles, Angel Ugrinov, Kenton Rodgers, and Gudrun Lukat-Rodgers.

In preparing the 2019 year-end statistics, **Dane Skow**, executive director for NDSU's Center for Computationally Assisted Science and Technology (CCAST), noted that the support of ND EPSCoR was helpful in training over 100 students on advanced research computing techniques for high performance

computing (HPC). He said this level of interest and training puts NDSU in the Top 25 in the nation.



Aaron Kennedy (above, photo credit Patrick Miller, UND), CRCS co-lead and associate professor in Atmospheric Sciences at UND, was featured in a recent article about blizzards. The blog notes that Kennedy's research relates to his desire to figure out why forecasts are sometimes wrong, especially about blizzards, and how the future forecasts can be improved. For more: <http://blogs.und.edu/und-today/2020/01/building-a-better-forecast-in-blizzard-alley/>.

Ning Wang, CRCS researcher and graduate student in Civil and Environmental Engineering at NDSU, provided an oral presentation at the 37th Red River Land & Water International Summit Conference of the Red River Basin Commission on the topic of *The Roles of Depressions in Hydrologic Processes of the Devils Lake Watershed* in Fargo, on January 15, 2020. His research co-author is his CSMS supervisor **Xuefeng Chu**, professor in Civil and Environmental Engineering at NDSU.

The UND Three-Minute Thesis celebrated research being done by students. The January 29, 2020, competition was a culmination of students' academic, presentation and research communication skills.

Four of the students who presented during the competition either are, or have been active, researchers with ND EPSCoR: **Kaela Lucke**, Atmospheric Sciences, **Robeam Melaku**, Civil Engineering, **Edirisuriya Siriwardane**, Physics/Astrophysics, **Melissa Sisson**, Biology.

A recent ND EPSCoR State Office call for STEM Research and Education proposals resulted in a UND faculty member earning one of the awards. **Woei Hung**, professor in Education, Health & Behavior, was the recipient of one of the awards for his proposal on *Community-based PBL using Unmanned Aircraft Systems (UAS) to Cultivate STEM Career Interest in North Dakota Middle School Students*. Students at

Grand Forks South Middle School received information, training, and flight time with 16 drones from UND. Their response to this innovative way of introducing middle school students to STEM disciplines was featured in a recent story:

<https://www.inforum.com/news/education/4923901-Grand-Forks-middle-school-hopes-drone-class-will-spark-interest-in-UAS-careers>.

STEM K-12 awards make a difference

This past fall the ND EPSCoR State Office put out a call for STEM Research and Education proposals. One of the awardees was **Robert Crackel**, chair of the Science Division and associate professor of Chemistry at Minot State University (Minot). On Tuesday, February 18, 700 – 800 elementary students in the Minot region will attend the Science Open House and experience activities and demonstrations in the areas of Biology, Chemistry, Geology, and Physics.



Students at the 2019 Science Open House. (Photo credit to Minot State University.)

Elementary students will launch rockets, use a water table to look at movement of ground water, ride a hovercraft and much more. The Science Open House is put on by student science organizations with about 40 – 45 Minot State students participating each year.

This year's event will be held in the Cyril Moore Science Center on the Minot campus and is open to the public. The building will be open and ready to receive students and the public by 8:30 a.m. The first floor will feature geology concepts. Second floor exhibits will focus on biology concepts. Third floor will host exhibits with a focus on chemistry.

Check out this video from the 2019 event:

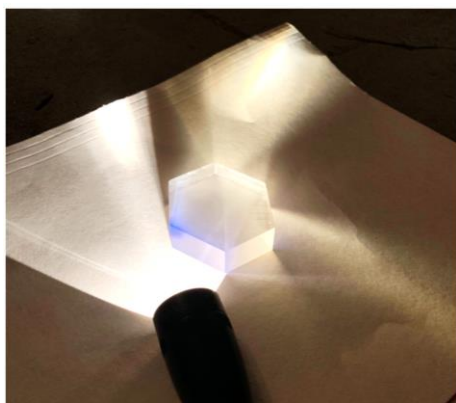
<https://www.facebook.com/MSUScienceClub/videos/648846298904491/>

For more information about K-12 STEM outreach and activities at ND EPSCoR, please contact **Shireen Alemadi**, STEM manager, at 701-231-8264 or shireen.alemadi@ndus.edu.

Upcoming events

- **Minot State K-12 Science Open House:** February 18, 2020, at the Cyril Moore Science Center.
- **ND EPSCoR Annual State Conference:** April 21, 2020, at the Alerus Center, Grand Forks, ND; Registration now open at <http://bit.ly/2020nd>.
- **NATURE University Summer Camp Opening:** 11 a.m. to 1 p.m. June 1, Gorecki Center at UND.
- **NATURE University Summer Camp:** June 1-12, 2020, at both NDSU and UND.
- **NATURE University Summer Camp Closing:** Research presentations from 9 to 10:45 a.m.; ceremony from 11 a.m. to 1 p.m., McGovern Alumni Center at NDSU.
- **Nueta Hidatsa Sahnish College Summer Camp:** July 13-17, 2020.

Sun dogs: in the lab and real world



Aaron Kennedy, CRCS co-lead and presenter for NATURE Sunday Academy, shared a few photos from his recent presentation on winter weather. "Sun dogs" are the ice equivalent of rainbows, Kennedy said. They are hexagonal ice crystals (like the shape in the picture on top) which change the direction of light to create



two rainbow-like features on either side of the sun. He showed a 'real world' example of a sun dog in the photo on the bottom.

NATURE Sunday Academy sessions

The last of the 2019-2020 Sunday Academy (SA) sessions is scheduled for March 1. Offered through NATURE, SA helps American Indian students in grades 7-12 develop an interest in STEM disciplines and potential careers.

To review any of the topics, please check <https://www.ndepscor.ndus.edu/ndep/nature/sunday-academy/stem-module-topics/>

For more information about any NATURE program, please contact **Scott Hanson**, ND EPSCoR Tribal Colleges Liaison Manager and NATURE coordinator, at scott.martin.hanson@ndus.edu.

- *Water is Life* led by Ali Alshami (UND-ND EPSCoR Emerging Areas and Translational Seed Awardee)
 - March 1, 2020 (SBC)
- *What Lives in Wetlands?* led by Jon Sweetman (NDSU)
 - March 1, 2020 (TMCC)
- *Winter Weather* led by Aaron Kennedy (UND-CRCS co-lead/researcher)
 - March 1, 2020 (UTTC)
- *Oxygen Sensing in Water* led by Julia Zhao and Xu (Steve) Wu (both UND)
 - March 1, 2020 (CCCC)
- *Synthesis of Gold Nanoparticles* led by Alex Parent (NDSU-CSMS researcher)
 - March 1, 2020 (NHSC)

Stay in touch

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- Prior newsletters, http://bit.ly/EPSCoR_Newsletters
- Submit stories to joyce.eisenbraun@ndus.edu, please complete: <http://bit.ly/2m43Eh7>
- To be added to the newsletter mailing list, please email ndepscor@ndus.edu, subject line: newsletter.

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Updates from ND EPSCoR State Office

INSPIRE-ND: A productive effort



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

At its February meeting, the ND EPSCoR State Steering Committee members¹ learned that 150 participants (including 63 students and 56 faculty) remain active in this sixth year of our \$20M National Science Foundation (NSF) EPSCoR Research Infrastructure Improvement (RII) Track-1 award: Innovative and Strategic Program Initiatives for Research and Education-North Dakota (INSPIRE-ND)

Since INSPIRE-ND began on August 1, 2014, participants have given 1,303 presentations, produced 415 publications, received three patents (with 13 more pending), and been awarded \$32.7M in additional funding.

These efforts clearly underline the success of EPSCoR's mission to "broaden and diversify ND's science, technology, engineering, and mathematics (STEM) workforce pathway from elementary through graduate school and to support and grow statewide STEM research efforts and competitiveness at participating institutions of higher education." Students across the state, faculty at each participating institution, and the economy of ND have been the beneficiaries of this particular program of ND EPSCoR.

Now in its second extension period (scheduled to expire on August 31, 2020), INSPIRE-ND has relied on the collaborative efforts of students and faculty at 11 campuses (one master's college/university, three primarily undergraduate institutions, five tribal colleges/universities, and two research universities) to develop two new research platforms through the Center for Regional Climate Change (CRCS) and the Center for Sustainable Materials Science (CSMS); foster critical research infrastructure; and integrate research, education and human resources with workforce development initiatives to strengthen the state's overall research competitiveness.

This collective impact has been the result of the participants' active involvement in research, outreach, education, and diversity activities across ND.

¹<https://www.ndepscor.ndus.edu/about/contactsandcommittees/#c638409>

Determining K-12 STEM needs across ND

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



How can we better prepare students for the growing number of jobs in North Dakota that require a background in STEM? What type of STEM professional development opportunities are North Dakota teachers looking for to help them become even better?

Over the next couple of months, we will be reaching out to every K-12 school across the state to learn more about their current STEM pedagogy and needs. The survey will also look at what types of opportunities teachers and administrators would like for professional development related to STEM subjects.

After surveying K-12 teachers, administrators and college/university education faculty we are looking to write a comprehensive report on the current K-12 STEM education and professional development needs across North Dakota. The goal: to better prepare our students for careers in STEM fields.



We are looking to K-12 teachers for information, and asking teachers to complete an anonymous survey, either through this QR code (left) or by completing the survey at bit.ly/K12STEMSurvey.

For a robust report, ND EPSCoR will need as many K-12 teachers and administrators as possible to complete the survey – that is where you come in! Connect with ND teachers you know, remind them to take the survey, and share the survey information.

For more information about this survey or other STEM K-12 questions, please contact Shireen Alemadi at shireen.alemadi@ndus.edu.

Together we can make a difference.