

Community

Efforts to slow the spread of COVID-19 have not been easy. Physical distancing measures have had an impact on every person and each family; nothing in our lives has been left undisturbed. The implications are more than just economic; they take a social and emotional toll on our communities.

COVID-19 reminds us that we are stronger together, working as a team. Remaining resilient and supportive of each other connects us even more closely as a community to our mission. We come together more than ever before to broaden and diversify ND's science, technology, engineering, and mathematics (STEM) workforce pathway from elementary through graduate school and to support and grow STEM research capacity and competitiveness at educational institutions across ND.

Team Science is a new paradigm that most researchers find both productive and fulfilling as projects have expanded in scope and effort. We work as a collaborative, unified team with a common goal. The collective effort allows the team to focus their energies in an area of specialty, while others add their expertise to create a more significant, more complete depiction.

Bringing together talented groups of researchers from around the state has been a mainstay of our Track-1 cooperative agreements. By embracing Team Science, we work collaboratively to solve important problems facing ND with commitment, passion, and dedication. Everyone on the team plays a vital role in this dynamic process.

Despite COVID-19, ND EPSCoR STEM outreach activities have continued to serve communities throughout the state. For many students, these activities provide an essential opportunity for mentorship. STEM outreach activities help students to discover and apply research techniques, which fulfills a

part of the EPSCoR mission to broaden and diversify ND's STEM workforce pathway.

To support physical distancing, the Nurturing American Tribal Undergraduate Research and Education (NATURE) program transformed all camps to a virtual format. With the use of technology, students are touring labs remotely, engaging in collaborative STEM activities from their own homes, learning about STEM disciplines from experienced faculty through video calls, and conducting independent research projects.

The STTAR (Students in Technology Transfer and Research) program is continuing another summer of internships. This program allows interns to discover how their classroom theories are applied in work experiences with various STEM industries throughout the state. By expanding student skills, the economy is strengthened through a well-equipped workforce. It's a notable example of how ND EPSCoR helps build a community of skilled professionals since many of the STTAR companies frequently hire past interns to fill permanent positions.

Our institutions, programs, and research teams instill a sense of community in students today that will benefit ND in the future. Collaboration improves our ability to cope with the unexpected and work together to solve complex problems, skills that are invaluable to us all.

As the ND community continues its research and outreach commitments, COVID-19 reminds us that we are always stronger together, which affirms our Team Science approach and our continued outreach to communities across the state.

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



Completing its 6th year of collaborative research

North Dakota's \$20M INSPIRE-ND RII Track-1, which will complete its 6th year on July 31, has been extended to June 30, 2021 by the National Science Foundation



(NSF). The agreement, which began August 1, 2014, consists of two agriculturally-based centers: Regional Climate Studies (CRCS) and Sustainable Materials Science (CSMS). Over the past six years, these centers have used

sustainability metrics early in polymeric material design and developed predictive forecasting models to meet the needs of ND's stakeholders. With over 1,100 participants across 11 institutions (613 of whom have been students), four patents related to CSMS efforts, and 482 publications, this cooperative agreement has impacted students, faculty, and citizens of the state.

Student impacts include: 3,264 American Indian (AI) student connections; 798 rural 4-12th graders involved in STEM activities; 356 student graduates; 44 external student internships; 18 tribal college/university (TCU), primarily undergraduate institution (PUI), or master's college/university (MCU) students recruited into graduate programs, and 16 distributed research experiences for undergraduate students across ND.

Faculty impacts include: 83 research university (RU) faculty connections with AI students, 17 non-RU faculty involved in research, and 10 women in engineering and science awards. Other impacts include: 127 media events, seminars, and science cafes and 109 visits to TCUs, PUIs, and MCUs.

New to INSPIRE-ND outreach this year, K-12 teachers in ND will also have access to new digital STEM resources. **Scott Hanson**, ND EPSCoR Tribal Colleges and Universities Liaison Manager and NATURE Manager and **Shireen Alemadi**, ND EPSCoR STEM Manager, are working to develop an easily-accessible digital space for teachers to find Sunday Academy education resources. Sunday Academy is part of the Nurturing American Tribal Undergraduate Research and Education (NATURE) program.

"We're working with K-12 teachers across the state to convert CRCS and CSMS Sunday Academy activities into full-fledged lesson plans that will be on a public education portal linked to our website to provide opportunities to K-12 teachers across our state to use as a resource," explained Alemadi.

Supporting people, pathways, and communities: Education and Workforce Development

North Dakota's new \$20M NSF RII Track-1 effort, which began July 1, ND-ACES (New Discoveries in the Advanced Interface of Computation, Engineering, and Science), builds university-based scientific and translational research capacity to help drive the continued growth of the state's biosciences ecosystem.

The ND-ACES outreach arm, PROmoting Sustainable Partnerships in Education and Research (PROSPER), will be working to build: a tech-savvy workforce through diverse STEM education and professional development pathways, broaden participation by underserved populations, and sustain impact through the translation of research into the private sector.



PROmoting Sustainable Partnerships in Education and Research

PROSPER stands for Promoting Sustainable Partnerships in Education and Research and is the ND-ACES outreach arm.

With a passion for the personal, educational, and professional success of all participants, the PROSPER team is focused on the implementation of activities that benefit many ND communities.

Education and Workforce Development (EWD) is one of the four components of PROSPER and is guided by leads, **Rachel L. Navarro**, Associate Dean for Research and Faculty Development, College of Education and Human Development, and Professor of Counseling Psychology (UND), **Sarah Sletten**, Associate Professor of Biomedical Sciences (UND), and co-lead, **Shireen Alemadi**, ND EPSCoR STEM Manager and Distributed REU Coordinator. The team also includes **Ryan Summers**, Assistant Professor of Science Education (UND).



The PROSPER Education and Workforce Development Team is comprised of, from left to right, Rachel L. Navarro, Sarah Sletten, Shireen Alemadi, and Ryan Summers.

PROSPER's EWD goal is to strengthen ND's bioscience and STEM ecosystem by building a diverse pool of competitive researchers, skilled workers, effective educators, and engaged students. The EWD team will make possible a variety of activities that grow knowledge, motivate innovation, and develop talent in materials engineering, cell biology, and computational sciences, emphasizing the inclusion of underrepresented groups along the education and career continuum.

In part, they aim to retain and advance early-career faculty and graduate students within the Center for Cellular Biointerfaces in Science and Engineering (CCBSE). One of the efforts behind this objective is the development of research training groups. Sletten says it is essential to build community among graduate students, "Research training groups are kind of an association of the graduate students in the ND-ACES project across all of the different labs and all of the different pillars and within the labs as well." Sletten articulates the role of relationships in developing persistence and promoting retention is an important one, "More senior graduate students would mentor more junior graduate students, and then the plan is to get students across all these different labs to also interact with each other."

According to Navarro, mentoring is a vital part of making these efforts successful, "We're going to be developing different kinds of activities across the life of the project hopefully to help retain faculty primarily through their tenure promotion process. We're going to be pairing early-career faculty throughout the ND-ACES project with more senior faculty into mentoring dyads

where they are going to get direct career support through monthly meetings. We're also going to help early-career faculty to develop academic strategic plans or professional development plans to help promote their success."

One of the objectives is to engage and develop K-16 student interest in biosciences. Part of that effort will include the distributed research experiences for undergraduates (dREU), an effort directed by Alemadi, "The distributed REUs get students involved in STEM research across the state." The distributed REU will allow students who are unable to come to UND or NDSU for a summer to have the same research experience closer to home, an experience that can be impactful for students. "Getting involved in undergraduate research gives students an opportunity to experience what is out there," explained Alemadi.



Map of ND-ACES participating institutions.

The group will also be supporting K-12 teacher and pre-service teacher development. Beginning with pre-service teachers, Summers will be organizing a dedicated rural student teaching internship program. According to Summers, the benefits are multifold, and exposing interested students to rural schools can have a potent effect. "By sending our students out to be rural student teachers in these areas, we are offering a very powerful form of professional development. These students have had both content and pedagogy instruction much more recently than their mentor teachers, and while the mentor teachers have experience, this is a wonderful chance for them to learn about new things that are going on in STEM education. This does serve to their benefit to host these students and to learn with them." Beginning in year two, teacher

professional development will be offered, as well as the continuation of activities and modules that were developed as a part of other projects.

The ND-ACES award began on July 1, and COVID-19 presents both challenges and opportunities to the PROSPER team. According to Summers, because of the disruption to the year and the need for offering professional development and support to teachers, the need for the work of the team cannot be understated. "We will have to be flexible to make sure that we put things in place that will allow us to shift and adapt," he said.

Navarro added, "We're in an unprecedented time in terms of dealing with COVID-19. We have to be as flexible as possible in terms of the delivery of the activities that we are talking about." The team has planned projects across the CCBSE and across all of the institutions participating within ND-ACES.

According to Sletten, PROSPER activities allow for participants to engage in experiences that normally they would not have access to, and it is a crucial component of ND-ACES. "Education and workforce development truly is this funnel all the way from the youngest of learners up through all levels of education. We are trying to keep this population of people that we've educated and expand into different industries. We want to grow North Dakota's industry beyond what traditionally we have had and also support those industries that we have and that have been very important to North Dakota," she specified.

NATURE mentor reflects on years of service

Since 2009, **James Schanandore**, Assistant Professor in the Physical Therapy Program at the University of Jamestown, has been a dedicated instructor for the Nurturing American Tribal Undergraduate Research and Education (NATURE) program. His work began over a decade ago when he assisted with education components for NATURE University Summer Camp programming.

Schanandore's (right) focus has always remained on the student experience, bringing together the tools students will need to succeed. Schanandore



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has seen the NATURE program evolve and expand through the years with the addition of new and different activities. This summer, he will be volunteering with the Sunday Academy program for the first time.

It was the mentorship opportunity that first drew Schanandore to NATURE, "Moving to a large university is tough for any student," said Schanandore. "Simple discussions can help students build confidence so that they can see that they can do it and be successful."

With a dedication to student success, Schanandore enjoys his time spent with NATURE. "I have found a lot of gratification from helping students to be successful." He thinks of his time working with students in the NATURE program as time spent training a future colleague.

According to Schanandore, the NATURE program allows students to see a new perspective on what studies and careers they can pursue. A member of the Three Affiliated Tribes, Schanandore also finds that the students give him something in return, a connection to his heritage.

For Schanandore, the experience has always been about facilitating student success, "I love seeing these students that were in the program in the early years that are now good engineers and have been successful."

ND EPSCoR is grateful for the many years of dedicated service Schanandore has provided to students in the NATURE program.

Get to know the 2020 STTAR participants



ND EPSCoR

ND EPSCoR recently kicked off another season of STTAR (Students in Technology Transfer And Research) internships. We are featuring a Q&A series from our participating companies, this month we will hear from Bernd Scholz of **CrossFire Technologies, Inc.**

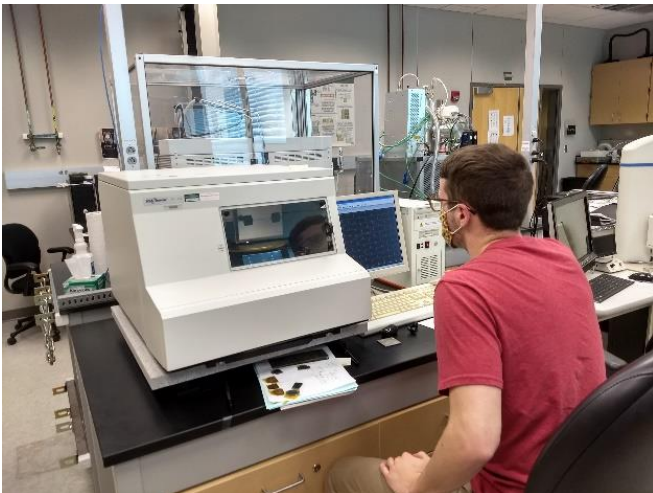
Q: Tell us about your company?

A: Crossfire Technologies, Inc., aka "CrossFire," is a startup focused on developing and manufacturing ultra-miniaturized electronic systems using its patented ultra-

low power, high-density die-to-die interconnect and integration technologies. CrossFire's capabilities allow it to produce complex electronic systems while reducing overall system size, system development cost, and time-to-market. In conjunction with our system partners, CrossFire's proprietary micro-scale systems combine multiple semiconductor die (DRAM or Flash memory, standard processor system-on-chip [SoC], FPGA, power device, or passive device) into a single integrated electronic System in Package (SiP) component." CrossFire is privately held, with headquarters in Saint Paul, MN, and offices in Hastings, MN, Research Triangle Park NC, and Fargo, ND. Please see and [ND EPSCoR's website](#) for more information about CrossFire.

Q: What are the benefits of having STTAR interns (to your company and the student)?

A: First of all, what makes the program work for CrossFire is the consistently high quality of individuals that we have seen in our STTAR interns. They are highly motivated, intelligent, and driven individuals with a strong educational background in the fundamentals of engineering. They also bring a different perspective to problem-solving and add age and cultural diversity to the company.



STTAR intern **Connor Wander** of Fargo (NDSU) at CrossFire Technologies, Inc. uses a Profileometer measuring instrument. A Profilometer is a highly sensitive surface profiler that measures step height, roughness, and waviness on sample surfaces.

CrossFire is probably unique among many of the STTAR portfolio companies in that, while we are aligned with the program's goal of providing an industry "laboratory" for the interns to further their practical (vs. academic) educations, we also expect tangible, quantifiable, bottom-line operating results from the company's investments of time and money. While

CrossFire demands more, we also deliver more to the STTAR program. Our Interns are a critical part of the team, often placed on the critical path of important programs and given responsibility and ownership of deadlines. In a lot of ways, we treat them more like new hire engineers than interns. We could not do what we do in our Fargo, ND office without them. We give them all they can handle technically, and also help develop their interpersonal and team participation skills via CrossFire's multi-site organization. CrossFire believes that it provides an experience second to none – and our goal is to enable a program participant who has interned with us a "leg up" when they graduate.



STTAR intern **Nicholas Feddersen** (NDSU) is working on a Pick & Place assembly machine at CrossFire Technologies, Inc. The Pick & Place assembly machine picks and places electronic devices as small as 0.020 x 0.010 to as large as 2 x 2 onto circuit boards before reflow.

Q: During their internship, what will the students be working on?

A: During their internships, the STTAR interns will work on a wide range of projects associated with the design and manufacturing of CrossFire's products. First off, they will be taught the basics of the Surface Mount Technology (SMT) assembly process, and how a printed circuit board (PCB) goes from design to layout to production. They will operate the machinery that assembles components onto the PCB, and gain hands-on experience with the various issues that are typical of putting a PCB into production. When necessary, the STTAR interns will be able to practice reworking boards that may have had issues, allowing them to hone their soldering skills. Later into the program, STTAR interns will begin working on the design side of the process by

learning basic design rules under a professional. These skills will be able to be applied to a future career and will provide the STTAR interns with a powerful background when applying for jobs.

Q: Have you partnered with the ND EPSCoR STTAR program before (if no, how did you hear about it)?

A: 2020 is CrossFire's first year participating in the program. We are very appreciative of the co-investment partnership that we have via the program, and truly believe that it has been beneficial to both parties.

Three TCUs collaborate with ND EPSCoR to offer the NATURE Bridge Camp

By **Scott Hanson**, ND EPSCoR Tribal Colleges and Universities Liaison Manager and NATURE Coordinator (right)



The NATURE bridge camp that is being implemented at Sitting Bull College (SBC), Turtle Mountain Community College (TMCC), and United Tribes Technical College (UTTC), is off to a great start with six sessions already concluded.

Due to COVID-19, in-person camps were cancelled; however ND EPSCoR staff, in a collaboration with tribal colleges and universities, across ND, worked hard to retool the bridge camp as a virtual camp. This effort allows for American Indian students to engage in STEM enrichment during the COVID-19 pandemic. This virtual camp experience will continue to strengthen the STEM pathways for American Indian youth in ND despite the need for physical distancing.

The camp is designed to prepare graduated high school seniors for college, and the coronavirus pandemic has made it necessary to conduct it online this summer. **Boamong Asare**, Math instructor at UTTC, has covered math and sustainability. **Joe Two Bear**, retired Solen School Language and Culture teacher, and **Frances Allard**, archivist at the Turtle Mountain Heritage Center, have talked about how traditional American Indian culture relates to STEM. **Megan Even**, former ND EPSCoR Administrative Coordinator, discussed the importance of and methods to do fact checking.

To help participants prepare for careers, **Connie Sheehan**, Career Services Director at UTTC, and **Stephanie Rusher**, Career and Tech Counselor at SBC,

discussed resumes and job interviews. **Mandy Guinn**, Chair of the Environmental Science & Research Department, explored STEM careers with the participants, **Mafany Ndiva Mongoh**, Agriculture/Science Instructor at SBC, introduced the participants to scientific research. **Lindsay Sandquist**, Outreach Coordinator at SBC, and **Cara DiMare**, Director of TRIO Student Support Services at SBC, discussed the personal, academic, and financial challenges that most college students face.

From the ND EPSCoR business office

By **Janelle Smith**, ND EPSCoR Business Manager (right)



As I write this, we are at a point of beginnings. We are beginning a new month, a new fiscal year, and the new Track-1 award, ND-ACES. It's an exciting time, and ND EPSCoR is looking forward to the new adventures with you!

With new projects, comes new faces! While we are excited to work with your teams, please remember that written approval by ND EPSCoR is required before adding employees (including students) to the ND-ACES Track-1 award.

For all ND-ACES additions, please use the ["Request to Add Personnel to ND EPSCoR Activities" form](#) and [send to ND EPSCoR](#) for approval. The form takes only a few minutes to complete and helps immediately to identify issues related to how an employee is classified and their allowability on these awards. This upfront effort will minimize the need for retroactive payroll adjustments, delays in invoice processing, and other negative impacts to departments and subawardees.

This form is also required to add NDSU personnel to the INSPIRE-ND award. UND should continue to work directly with **Trinity Bohlman** for INSPIRE-ND personnel changes, who will then reach out to ND EPSCoR as needed. Other institutions are encouraged to utilize this form for INSPIRE-ND, as this will reduce questions at the time of billing and minimize possible delays in payment.

Please also be aware that all students participating in research under these awards are required by NSF to complete Responsible Conduct of Research (RCR) training. This training should be completed after the student's hire and before the student begins research

activities. Notification of completion (RCR certificate or other documentation) should be emailed to [Kathy Wahlberg](#) (INSPIRE-ND students) or uploaded into the student's ERcore profile (ND-ACES students) within six working days of the individual's start on the project.

Awards and presentations

Seed Award Project

Utilizing ND EPSCoR seed award funds, **Sayed Sajal** (previously Minot State University), **Trung Bao Le** (NDSU), and **Israt Jahan** (Nueta Hidatsa Sahnish College) completed their project "Analysis and Simulation of Historical Flooding in Fargo, North Dakota." This project focused on: carrying out field measurements to survey floodplains, using artificial intelligence to classify inundation maps from remote sensing data, and hydraulic simulations of Red River flooding.

Research Award

Bakhtiyor Rasulev, Department of Coatings and Polymeric Materials, NDSU, received a Carl A. & Jean Y. White Memorial Endowment Award from the NDSU Foundation for his research titled: "Development of Macromolecular Systems from Corn Starch for Various Applications." The research is planned from June 1, 2020 through October 31, 2021. The results of the research will offer a set of new macromolecular products with desired biological properties that can be used in biomedical applications. In addition, the products will have biodegradable properties and low toxicity.

Congratulations, Bakhtiyor!

New partnership



ND EPSCoR is now partnering with **Gateway to Science**, North Dakota's hands-on science center. Its mission is to inspire the discovery of science through hands-on experiences. Gateway to Science fulfills its mission by operating an interactive exhibit gallery in Bismarck and by developing and delivering mobile

educational outreach programs across the state through the Gateway to Science on the Go van.

As an informal setting, the science center complements the formal education system. Gateway to Science offers youth, families, and the public a fun, stress-free gateway to explore science, technology, engineering, and math (STEM). Programs – including camps, afterschool clubs, Preschool Discovery Hour, and Girls Who Code – spark students' interests and connect their passions with STEM education and career opportunities in North Dakota. To learn more, visit [Gateway to Science](#).

Get social with ND EPSCoR

By **Cailin Shovkopyas**, ND EPSCoR Communication Manager (right)



Come socialize with us! We have multiple places where you can engage with ND EPSCoR and get the latest on the research and outreach activities across the state. Know what's happening when it's happening! Follow us on our social media platforms to stay informed:

Twitter: [@NDEPSCoR](#)

Facebook: [@ND EPSCoR](#)

Instagram: [@nd_epscor](#)

Funding opportunities

DEPSCoR FY20 Webinar

Congress recently re-established the Defense Established Program to Stimulate Competitive Research (DEPSCoR) Program. The DEPSCoR FY20 Webinar will be **Tuesday, July 21, 2020**. [Register for the webinar here](#), the slide deck will be sent to those who register for the event.

DEPSCoR Regional DoD Day

The Department of Defense (DoD) has asked the University of South Dakota to host a regional DEPSCoR DoD Day, where DoD program managers will provide information about the DEPSCoR program as well as general information about working with the DoD. The regional DEPSCoR Day will be held **on September 10, 2020**, in Vermillion, SD. For more information or to

register for the event, please see: [DEPSCoR Regional DoD Day](#)

DEPSCoR Funding Opportunity

The funding opportunity announcement for the FY20 DEPSCoR Competition is now available. DEPSCoR is a capacity-building program designed to support the research capabilities at institutions of higher education to perform competitive basic research in science and engineering that is pertinent to the DoD mission and reflect national security priorities. The deadline for paper submissions is **September 21, 2020**. The deadline to register is **September 14, 2020**. For more information, please see: [DEPSCoR Funding Opportunity](#)

EPSCoR Workshop Opportunities

EPSCoR is designed to fulfill the mandate of NSF to promote scientific progress nationwide, and NSF EPSCoR welcomes proposals for workshops in **Solicitation NSF 19-588**. These workshops focus on multi-jurisdictional efforts of regional to national importance related to EPSCoR's goals and NSF's mission. For more information, please see the RFP: [EPSCoR Workshop Opportunities](#)

Stay in touch

Our mailing address is:

ND EPSCoR

1805 NDSU Research Park Drive N

Fargo, ND 58102

701-231-8400

www.ndepscor.ndus.edu

email: ndepscor@ndus.edu

Twitter: [@NDEPSCoR](https://twitter.com/NDEPSCoR)

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