

NDSU



2016

School of Natural Resource Sciences Annual Highlights





Francis X.M. Casey, Ph.D.
Director of SNRS

Greetings from the School of Natural Resource Sciences at NDSU

With the downswing in agricultural commodity prices and oil came unprecedented reductions to the state's budget in 2016. In spite of this fiscally challenging environment, the School remains strong and sustains its very high level of productivity. Faculty, staff and students continue to make significant contributions to the state's agricultural and natural resource communities, delivering outstanding research, extension, and education. A major highlight from 2016 was the successful search and hire of Soil Health Research Assistant Professor Dr. Caley Gasch (see page 3). In her first months at NDSU, Dr. Gasch has spent much time engaging producers with the help of her extension counterpart, Dr. Abbey Wick. The current faculty membership in the School is twenty-five, up from twenty-one when I began as its director in 2012.

Other major highlights from 2016 were the promotion of Dr. Jason Harmon to Associate Professor, and Dr. Kevin Sedivec's acceptance of the interim responsibilities as Director of the Central Grasslands Research and Extension Center (CGREC). Last year also marked an exciting homecoming for the North Dakota Agricultural Weather Network (NDAWN). As a result of a recent administrative realignment, NDAWN rejoined the School with Daryl Ritchison as Interim Director.

Our faculty achieved many successes in 2016, "serving North Dakota's agricultural and natural resource communities through exploration, interaction, and education."

- Highly visible publications, including *Progressive Farmer* (510,000 subscribers) and *Successful Farming* (390,000 subscribers) featured research from the School. Also, Dr. Harris was awarded a USDA-NIFA grant to organize and host an international conference, entitled Achieving Durable Resistance to Wheat Pests and Diseases. This highly successful conference brought together twenty keynote speakers from the United States, Canada, Australia, Europe, and the United Kingdom, and drew ninety-five attendees from sixteen countries.
- Extension launched a new initiative in 2016 to "develop novel means to reach audiences in an effective manner." The adoption of high-tech, social media, and video approaches greatly expanded engagement, where, for example, over 130 thousand people have become engaged in soil health programming.
- The quality of education at all levels in the School is outstanding, and numerous 2016 teaching achievements highlight this fact. Our School has some of the most talented teachers at NDSU, and in 2016, Drs. Jay Goos and Christina Hargiss were awarded the CAFSNR senior and early career teaching awards, respectively. Also illustrating our success with education, alumna Dr. Andrea Travnicek (BS, MS, and PhD in NRM) won the Distinguished Alumni award for the CAFSNR and Dr. Jack Norland mentored NRM students who won first place for the 2016 NDSU Innovation Challenge.

Teaching

Drs. Hargiss and Pischmann-Voldseth participated in the first cohort of Gateways ND, which is a two-year National Science Foundation program to create classrooms with more active and engaging learning techniques. They put these techniques to work in 2016 in the brand-new A. Hill Center campus building.

Another novel teaching approach, developed by Dr. Daigh, incorporated Khan Academy to improve quantitative skills. This innovative pedagogical approach was recently published.

Research

Research productivity, in terms of publications and grants, was outstanding in 2016. Faculty published ninety-four peer-reviewed papers (4.09 papers per faculty member), which is a tremendous achievement.

Although our state faced economic challenges, our faculty were highly successful in securing funding with nearly \$8.5 million budgeted to active grants, and expenditures of over \$2 million. Our impact on the state's agriculture was evident with more than 1/3 of our support coming from soybean, corn, sugar beet, sunflower, and wheat.

Extension

2016 extension program highlights included efforts in range and pasture management, youth education in range camp and range judging, soil fertility and soil health, urban forestry, and prediction and management of pest outbreaks.

Extension faculty of the School increased the programs they planned and delivered, and presentations made. In 2016, School extension faculty had over 13,000 face-to-face interactions, which is a remarkable achievement considering that North Dakota has 30,000 family ranches and farms.

Faculty and Staff Updates | Personnel Changes in 2016

Dr. Jason Harmon was awarded tenure and promoted to Associate Professor in 2016. He has been a faculty member in Entomology since 2009.



North Dakota Agricultural Weather Network (NDAWN)

personnel joined the School in 2016.

We welcomed

Daryl Ritchison, Barbara Mullins, Dallas Morlock and Nicole Stone to SNRS in July. In

September, **Daryl Ritchison** was hired as the Interim Director of NDAWN.



Dr. Kevin Sedivec was hired as the Interim Director of the Central Grasslands Research Extension Center in December. He also continues to fulfill his role as Professor of Range Science.



Dr. Caley Gasch was hired as an Assistant Professor in Soil Science with a focus on Soil Health. She started in July 2016.



Research Specialist in Soil Science, **Radu Carcoana**, retired in December after thirty-two years of service to NDSU.



Assistant Professor of Range Science, **Dr. Ryan Limb**, accepted the position of Interim Program Leader of Range Science in December.



Awards & Honors | Recognition of SNRS personnel in 2016

Mariom Caravajal, an undergraduate student being mentored by **Dr. David Rider**, Professor of Entomology, was selected to present her paper at the National Conference on Undergraduate Research in January.



A number of NRM students received awards at the North Dakota Chapter of the Wildlife Society annual conference in February. They include:

• **Savannah Fritz, Jade Monroe, Samuel Harwood, Tyler Conley and Jack Norland**

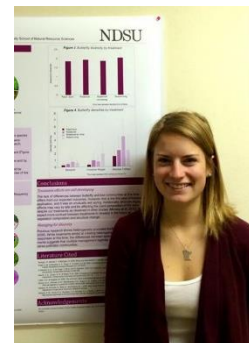
won the Best Professional Paper in the Natural Resource Communication Awards for excellence in presentation of natural resource information for the presentation, "The Future of Conservation in ND: How Does Telling Stories of the Future Improve Conservation?"

• **Kory Bonnell, Christina Hargiss and Jack Norland** won third place for the best student oral presentation with the talk, "How Do Students in Rural, Urban and Large Metropolitan Areas Perceive the Environment?"

• **Paula Comeau, Jack E. Norland, Cami Dixon, Kristine Askerooth** and Kyle Kelsey won second place for the best student poster presentation with the poster, "Reduction of Canada Thistle and Potential Promotion of Pollinator Habitat Through Spiking Native Seeding."



Cayla Bendel, Range MS graduate student advised by **Dr. Torre Hovick**, Assistant Professor of Range Science, won the National Society for Range Management poster contest that was held in February as part of their annual meeting.



Katherine Kral, PhD student in Range Science, was awarded the Outstanding Graduate Student award by the North Dakota Chapter of The Wildlife Society in February. Katherine is advised by **Dr. Ryan Limb** and **Dr. Torre Hovick**, both of the Department of Range Science.



Dr. Aaron Daigh, Assistant Professor of Soil Science, joined the Soil Science Society of America Board of Directors in March.



Awards & Honors | Recognition of SNRS personnel in 2016 (continued)

NRM students **Jade Monroe**, **Alexis Steinman** and **Jesse Riley** won first place for the NDSU Innovation Challenge, social track in March. Their plan involved helping communities sequester carbon and create new revenue streams by planting prairie vegetation on underused lands and then harvesting the vegetation and creating something called biochar, which can be used to improve soil health and water quality.



Soil Science MS student, **Meyer Bohn**, received an ND EPSCoR Graduate Student Research Award (GSRA) in April. He is advised by **Dr. David Hopkins**, Associate Professor of Soil Science.



Eduardo Faundez, Entomology PhD graduate student, received the College of Agriculture, Food Systems, and Natural Resources Graduate Research Award in April. Eduardo is advised by **Dr. David Rider**, Professor of Entomology.



Dr. R.J. Goos, Professor of Soil Science, completed his 40th year of teaching in May. He teaches the popular Introduction to Soils class every semester.



Dr. Kevin Sedivec, Professor of Range Science, is the coach of the Traill County 4-H Range Judging Team that received the reserve champion spot at the National Land and Range Judging Contest in Oklahoma City in May.



Dr. Larry Cihacek, Associate Professor of Soil Science, was awarded the 2016 Conservation Research Award by the Soil and Water Conservation Society at their Annual International Meeting in Louisville, KY in August.



Dr. Mark Boetel, Professor of Entomology, was selected in September to participate in the 2017 National Extension Leadership Development (NELD) training class.



Dr. Marion Harris, Professor of Entomology, received a USDA-NIFA grant to host an international conference. The Durable Wheat Resistance meeting was held in November in Minneapolis, MN.



Dr. R.J. Goos, Professor of Soil Science, won the H. Roald and Janet Lund Excellence in Teaching Award and **Dr. Christina Hargiss**, Assistant Professor of NRM, won the Early and Dorothy Foster Excellence in Teaching award. Both awards are part of the NDSU Agriculture and Extension Awards that were presented in December.



Dr. Abbey Wick, Assistant Professor of Soil Science, was presented the first annual 'friend of soil health award' at the December Conservation Tillage Conference.



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[Facebook.com/SNRSatNDSU](https://www.facebook.com/SNRSatNDSU)



SNRS Graduates | Degrees Awarded in 2016

Undergraduate Degrees

Troy Altmann, *Soil Science*
 Sara Bjorlin, *NRM*
 Branden Bott, *Soil Science*
 Courtney Caranicas, *NRM*
 Tyler Conley, *NRM*
 Bryce Crompton-Pazdernik, *NRM*
 Georgia Starr Davis, *NRM*
 Justin Delgado, *NRM*
 Nicole Ellingson, *NRM*
 Mason Fussy, *NRM*
 Brett Goehner, *NRM*
 Jacorian Goldmann, *NRM*
 Aaron Green, *NRM*
 Sean Griffin, *NRM*
 Jeremy Hackley, *NRM*
 Samuel Harwood, *NRM*
 Benjamin Hengel, *NRM*
 Soren Hjort, *NRM*
 Kyle Holling, *Soil Science*
 Isaac Holman, *NRM*
 Brandon Ingerson, *NRM*
 Ryan Kobilansky, *NRM*
 Gregory Lund, *NRM*
 Dalton Moore, *NRM*
 Brian Nord, *NRM*
 Jake Oakes, *NRM*
 Alexander Rischette, *NRM*
 Jordan Roob, *NRM*
 Taylor Tollefson, *NRM*
 Joseph Wagner, *NRM*
 Christina Weeks, *NRM*
 Nathan Welberg, *NRM*

MS Degrees

Mikayla Boche, *NRM*
 Stefanie Bohrer, *Range Science*
 Maria Breker, *Soil Science*
 Kirsten Butcher, *Soil Science*
 Travis Carter, *NRM*
 Brian Chepulis, *NRM*
 Jessica Creuzer, *NRM*
 Kayla Graber, *NRM*
 Aaron Klaustermeier, *Soil Science*
 Edward Kraft, *NRM*
 Chandra Langseth, *Soil Science*
 Purbasha Mistry, *NRM*
 Jade Monroe, *NRM*
 Jaclyn Nelson, *Entomology*
 Heidi Rasmussen, *Soil Science*
 Dwayne Sanders, *NRM*

MS Degrees (continued)

Eric Schultz, *Soil Science*
 Keshab Subedi, *Soil Science*
 Resham Thapa, *Soil Science*
 Hannah Tomlinson, *Range Science*
 Benjamin Uecker, *NRM*

MNRM Degrees

Sukhwinder Bali, *MNRM*
 Nathan Paler, *MNRM*

PhD Degrees

Arnab Bhowmik, *Soil Science*
 Kory Bonnell, *NRM*
 Paula Comeau, *NRM*
 Heather Dose, *Soil Science*
 Wannakuwatte Fernando, *NRM*



School of Natural Resource Sciences Student Symposium



The Annual SNRS Student Symposium was held on December 9th in the Memorial Union at NDSU. This year's theme was "Conservation of the Cog and Wheel." Students of the Graduate Seminar course for Range, Entomology, and Soil Science organized the entire event and presented talks on their research. There was also an open poster session. Poster winners were Cayla Bendel (3rd), Katherine Kral (1st) and Megan Endreson (2nd) (pictured left to right). All three are Range Science graduate students.

The SNRS graduate seminar students invite you to:

Conservation of the Cog and Wheel

What: A symposium of graduate research being done in the School of Natural Resource Sciences (SNRS). Students' research represents an array of topics ranging from soil amendments in agricultural systems to wildlife studies on grassland working landscapes. Together these topics further conservation of land as a resource that can be both used and respected.

When: Friday, December 9th from 9:00 AM-12:00 PM
**** Poster session 12:00-1:00 PM**

Where: Room of Nations, Memorial Union

Why: Immerse yourself in SNRS research, stimulate conversations about conservation, and of course indulge in NDSU catered refreshments

"To keep every cog and wheel is the first precaution of intelligent tinkering." - Aldo Leopold

SNRS Alumni Updates | News from SNRS Graduates

Erin Gaugler is an Agriculture and Natural Resources Extension Agent in Bowman County, ND. Erin graduated with an MS in Range Science from NDSU in 2015 under the advisement of **Dr. Kevin Sedivec**,



Professor of Range Science. In her position, she works collaboratively with a team of Extension and research professionals and volunteers to provide educational programs in agriculture, including farm business management/farm marketing, cropping systems, livestock systems and horticulture. She also provides leadership, resource support and program coordination in the areas of 4-H youth development and community development and leadership. Erin worked for the NRCS prior to joining NDSU Extension.

Dr. Andrea Travnick, who received three degrees in Natural Resources Management at NDSU (BS 2001, MS 2004, and PhD 2008), was recently hired as the Deputy Assistant Secretary for Water and Science at the U.S. Department of Interior. In her position, she will be working closely with the Bureau of Reclamation and the U.S. Geological Survey. Dr. Travnick was awarded the NDSU College of Agriculture, Food Systems and Natural



Resources alumni achievement award in 2016-2017. She previously worked as the senior policy advisor of natural resources to ND Govs. John Hoeven and Jack Dalrymple. She has also worked for the U.S. Army Corps of Engineers, Ducks Unlimited and the law firm Lockridge Grindal Nauen.

Lee Briese is an Agricultural Consultant for Centrol Inc. In his position, he uses innovation to design diverse cropping systems to address resistant pests and promote stewardship and resource conservation. He also works on incorporating cover crops and reduced-till systems as well as strategies to manage saline and sodic soils. He continues to collaborate with NDSU Soil Scientists in the area of Soil Health. He was honored with the Ag Consultant of the Year award in 2016 from National Alliance of Independent Crop Consultants as well as the International Certified Crop Adviser of the year award in



2017. Lee received his MS degree in Soil Science in 2010 under the advisement of **Dr. Thomas Desutter**, Associate Professor of Soil Science. He is also working toward his Doctor of Plant Health degree at the University of Nebraska-Lincoln.

Dr. Ayanava Majumdar is an Extension Entomologist who leads the integrated pest management (IPM) projects for vegetable and peanut crops in Alabama. He is also the State Coordinator for Sustainable Agriculture Research and Education (SARE program) and Team Leader for Commercial Horticulture Extension Programs. He serves as editor of the Alabama IPM Communicator newsletter. Dr. Majumdar has received numerous awards from the Southern Region IPM Center, the National Association of County Ag Agents, and the American Society of Horticultural Science for his impactful projects. He received his PhD in Entomology at NDSU in 2006 under the advisement of **Dr. Mark Boetel**,



Professor of Entomology.

SNRS Research Services | NDAWN & Soil Testing Lab Updates



Collaboration and expansion were the highlights for the North Dakota Agriculture Weather Network (NDAWN) in 2016.

Soil Moisture

NDAWN spent 2016 assisting the United States Geological Survey (USGS) in the expansion of soil moisture data availability in the Red River Basin. The collaboration resulted in the installation of seven additional soil moisture sites being added to the network. Currently, NDAWN provides soil moisture data from fourteen different locations across North Dakota and Minnesota. Users can access the real-time and historical data on the NDAWN website.

UAS Research

NDAWN partnered with the University of North Dakota, Appareo, and Harris Corporation in the installation of Unmanned Aerial Systems (UAS) Automatic Dependent Surveillance-Broadcast (ADS-B) Xtend units (pictured right, above). These ADS-B units are being used for the research and application of monitoring UAS traffic across the state. NDAWN currently has six sites with ADS-B Xtends.

Expansion

Additional projects for 2016 included network expansion and inversion alerts. NDAWN added three new stations and two enhanced tower locations to its network (pictured left, below). Most notably, it released its first inversion alert to the public. Inversions are a warming of temperatures with height and increase the risk of spray drift when one is present. Its success has resulted in the development of an entire inversion network for 2017.

Website: <https://ndawn.ndsu.nodak.edu/>



ADS-B receiver at station



Enhanced station at Carrington REC



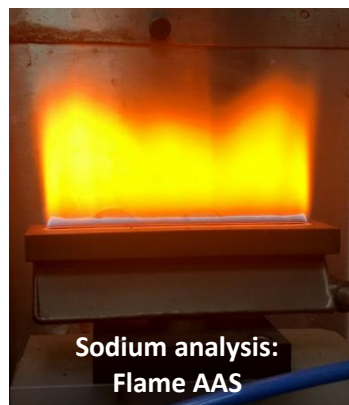
Soil testing is an invaluable tool used to diagnose soil nutrient deficiencies and even toxicities that affect plant growth. Information from soil test results are used extensively by crop growers, researchers and homeowners to understand soil fertility and to take steps to enhance soil productivity and the overall soil health.

During the year 2016-2017, the lab processed over 13,500 soil samples, 320 water samples, 550 plant samples, and 30 manure samples serving farmers, agricultural researchers and homeowners predominantly from North Dakota, Minnesota, South Dakota and Montana. The lab is certified by the Minnesota Department of Agriculture through the North American Proficiency Testing Program to test soil samples collected from any US state and is authorized to accept and process international soil samples under the USDA APHIS foreign soil permit. Apart from the testing services we provide, we have had the pleasure of having several graduate, undergraduate and high school students obtain hands-on experience in soil testing for internships, graduate research, course tours and science fair projects.

The current team at the soil testing lab at NDSU consists of Dr. Shiny Mathews, Larry Swenson, Christie Erickson, David Olson, Jason Umlauf, Moe Oo and Evan Bates along with several program advisors including Dr. David Franzen and Dr. Larry Cihacek.

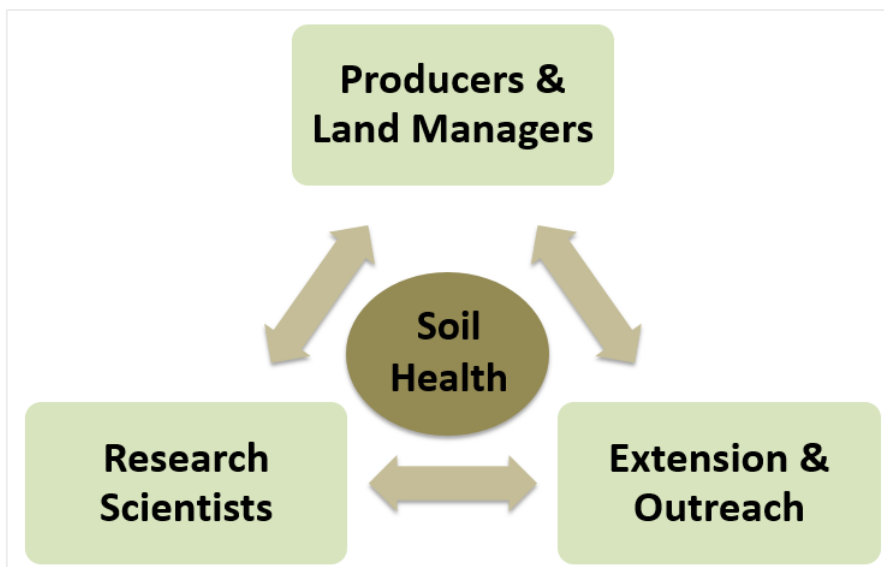
Website: https://www.ndsu.edu/soils/services/soil_testing_lab/

Email: ndsu.stl@ndsu.edu | Face book: <https://www.facebook.com/ndsustl/>



Sodium analysis:
Flame AAS

Soil health has become a hot topic around the globe in recent years. Farmers, ranchers, and land managers understand that soils are the foundation of productive and working landscapes, and that soil improvement and conservation are top priorities. North Dakota is fortunate to have faculty and staff specifically dedicated to research and outreach on soil health topics. The NDSU soil health model brings producers and land managers together with extension specialists and research faculty to identify knowledge gaps, conduct studies, and provide guidance and education on a variety of topics.



In 2016, soil health research and extension faculty helped secure \$3,974,251 of funding to support efforts. Twenty-three extension workshops were hosted and effectively reached 1,153 farmers, consultants and other educators with unbiased, timely information. On the soil health webpage, a total of 49 videos have been developed and posted in the past five years.

NDSU soil health covers a wide range of research, demonstration, and outreach topics in soil health, including:

- Improving soil health and conservation through the incorporation of cover crops, reduced tillage, and livestock integration
- Management and basic understanding of saline soils in cropping systems
- Soil nutrient and water management
- Rangeland soil health
- Restoration and remediation of soils affected by disturbance and contamination



Outreach to commodity groups on soil health practices.



Several field days were held on different farms showing soil health building practices at work.

Website: <https://www.ndsu.edu/soilhealth/>

Dr. Abbey Wick, Soil Health- Extension | abbey.wick@ndsu.edu

Dr. Caley Gasch, Soil Health – Research | caley.gasch@ndsu.edu

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