

# Tech Transfer Times

## NDSU TTO Statistics from NDSU Innovation Week '13

- 10 teams, comprising 27 students, filed Invention Disclosures with NDSU TTO.

- Roughly one third of finalist teams filed Invention Disclosures with NDSU TTO.

- 5 students are listed on two or more teams, contributing to the inventions created by each team.

- 15 teams, comprising 39 separate students, talked to the NDSU TTO regarding Intellectual Property.

- 4 provisional patent applications have been filed by the NDSU Research Foundation naming student inventors.

The vast majority of the teams/students would likely not have filed disclosures or investigated Intellectual Property without NDSU TTO involvement and advising during Innovation Week 2013.

## NDSU Policy 190

### INTELLECTUAL PROPERTY

The purposes of this policy are to encourage and promote research and scholarship based on the traditional principles of the academic profession. Read NDSU Policy 190 at:

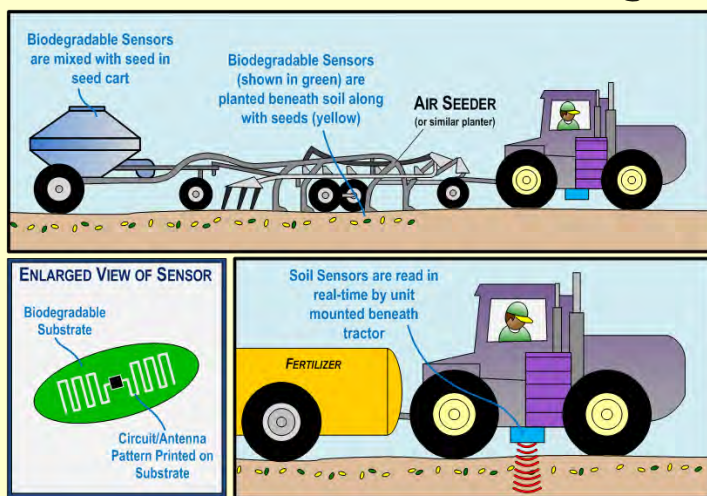
[www.ndsu.edu/fileadmin/policy/190.pdf](http://www.ndsu.edu/fileadmin/policy/190.pdf)

## NDSU-Developed Biodegradable Soil Sensor Can Be "Planted" with a Seed Mixture

Scientists working at NDSU have created biodegradable sensors capable of directly monitoring and reporting the soil environment in which they are placed. The sensors are constructed by using NDSU's patent-pending "direct write" electronic printing techniques to print circuit and antenna patterns directly onto renewable, bio-based materials. The circuit patterns are printed with trace amounts of metallic materials such as aluminum, that are safe for the soil when the sensors naturally biodegrade over time.

The Sensing Earth Environment Directly (SEED) sensors are self-contained and could be deployed directly into the soil during the seeding process by mixing the sensors in with the seed mix being planted, or by a separate attachment or standalone device. A reading unit mounted beneath a tractor or other agricultural vehicle would interact with the SEED sensors embedded in the soil and provide direct measurements of soil conditions, moisture, and chemical content in real time.

The SEED sensing technology was developed by engineers and researchers at NDSU's Center for Nanoscale Science and Engineering (CNSE) in cooperation with lead researchers from NDSU's Department of Mechanical Engineering. The team of inventors includes CNSE researchers **Cherish Bauer-Reich**, **Justin Hoey**, **Rob Sailer**, and **Nathan Schneck**, as well as **Dr. Chad Ulven**. Dr. Ulven is the Associate Professor of Mechanical Engineering, and co-founder and Chief Technology Officer for C2renew Corporation, a North Dakota technology start-up company specializing in performance-driven biocomposite materials which incorporate agricultural by-products for a wide range of engineering applications. C2renew licenses one of its core technologies from the **NDSU Research Foundation**.



## Innovation Week Students Contribute to NDSU Intellectual Property

The NDSU Technology Transfer Office would like to recognize the following student teams and individuals for their contributions to NDSU intellectual property. The following list provides a non-confidential summary of the 10 invention disclosures that were submitted to our office as a direct result of the Innovation Week 2013 competition.

**Student:** Erin Nyren-Erickson, Overall Winner, Technology: RFT-414, *Test for Contaminants in Heparin*.\*  
(see story on next page)

**Student:** Zhengping Zhou, Technology: RFT-392, *New Material for Supercapacitor-Battery Hybrids*.\*

**Students:** Jeffrey Garty, Eric Nelson, Mark Zachmann, Kai Chia Tan, Indika Pathirage, William Refling, Technology: RFT-443, *Ion Exchange Automated Packaging System*.\*

**Students:** Andrew Dalman, Joel Hedlof, Michael Tchida, RFT-444, *Artificial Jaw for Training Dentists*.\*

**Students:** Albert Mattison, Robert Field, Chris Sieberg, Jeremiah Johnson, Kar Mun Koh, Elizabeth Ugelstad, Technology: RFT-429, *Sudden Infant Death Syndrome Research Device*.

**Students:** Lucas Budzien, Dustin Mueller, Technology: RFT-433, *Capillary Simulation Testing Equipment*.

**Students:** Darshika Amarakoon, Su Hyeon Hwang, Dusan Petrovic, Nilushni Sivapragasam, RFT-434, *Corn Resistant Starch as Encapsulation Material for Fatty Acids as a Preventive Cardiovascular Disease*.

**Students:** Dusan Petrovic, Nilushni Sivapragasam, Darshika Amarakoon, Su Hyeon Hwang, Winner Corn Innovations Track, Technology: RFT-435, *Material for Colonic Drug/Nutrient Delivery from Corn*.

**Students:** Kirty Wadhawan, Paul Fenlason, Casey Johnson: RFT-436, *Corn-Based Flavor Delivery*.

**Student:** Feng Guo, Technology: RFT-440, *High-Efficiency, Low-Cost Design of Wind Energy Generator*.

\* A provisional patent application has been filed on those inventions marked with an asterisk.

# Success Stories

## NDSU's Wheat Breeding Program



**Dr. Mohamed Mergoum in a wheat field**

Dr. Mohamed Mergoum is currently the Hard Red Spring Wheat Breeder (HRSW) at NDSU. He came to NDSU as Associate Professor in 2002 and in 2009 earned the title of Richard C. Frohberg Spring Wheat Breeding/Genetics Endowed Professor, after years of working with Dr. Frohberg who was NDSU's HRSW Breeder for 37 years. Previously, Dr. Mergoum worked with wheat breeding programs in Turkey, Mexico and Morocco.

Hard Red Spring Wheat contains the highest percentage of protein compared to other wheat, making it an excellent choice for bread, with its superior gluten, milling and baking characteristics. It is grown in much of North Dakota's approximately 5.5 million HRSW planted acres with approximately 5.5 million in 2012. HRSW production in North Dakota continues to have a major impact on the economy of the state and region. Many of the current varieties planted in North Dakota were developed by Dr. Mergoum and his team at NDSU. Varieties include 'Dapps', 'Steele-ND', 'Glenn', 'Howard', 'Faller', 'ND 901CL Clearfield', 'Mott', 'Barlow', 'Prosper', and 'Velva'. The most recently released HRSW is 'Elgin-ND', which has been shown to have a very high yield, high grain protein and an excellent disease resistance package. 'Elgin-ND' will be available for planting in the next growing season.

Developing new varieties is very important to North Dakota's farmers, as North Dakota is the leading HRSW producing state in the U.S. In order to continue its lead, growers need wheat varieties that will combat new diseases, and adapt to all types of weather and soil conditions. The combination of environmental factors (production practices, pests, weather, and soil type) peculiar to a HRSW production region, such as North Dakota, requires the organization of a breeding team to effectively and efficiently deal with the ever changing production problems and limitations in the region. They also need a quality product to provide to the U.S. and international markets, which includes the milling and baking industries. New improved and adapted HRSW varieties developed by NDSU are readily accepted by North Dakota wheat growers and the milling and baking industry in the USA and around the world. Increased economic return and reduced risk for production are the main reasons for adopting these newly developed NDSU varieties.

Wheat generated over \$1.07 million dollars in research fee/royalty revenue to the NDSU Research Foundation in FY-12, of which a portion will be used to support continuing wheat breeding research at NDSU.

## Patent Pending Invention Takes Top Prize at NDSU's Innovation Week Challenge 2013

Out of 22 contestants in this year's Innovation Challenge sponsored by NDSU's Research and Technology Park, Erin Nyren-Erickson, a graduate student in pharmaceutical sciences at NDSU, won the \$5,000 "Tangible Innovations" track prize and the \$5,000 "Best in Show" prize for a test that detects impurities in heparin.



**Erin Nyren-Erickson**

In 2008, heparin, a drug used for anticoagulant or blood thinning purposes, was recalled by the FDA because of contamination. Inspection of batches of raw heparin were found to have a counterfeit substance, namely chondroitin sulfate, added that caused users of this medicine to have difficulty breathing, nausea, vomiting and ultimately led to the death of a confirmed 149 people. Since this time, the FDA has mandated that heparin be inspected for purity.

Although there are other tests for heparin contamination, Erin's test delivers a high sensitivity at a substantially greater speed and lower cost. Erin's "a-ha" moment came when she was researching a different application for liposomes. She noted that contaminants to heparin reacted with the liposomes in a fashion that was visibly distinct from the reaction one would expect from a pure sample. The resulting test she developed clearly shows a change when a contaminant is present.

The NDSU Research Foundation filed a provisional patent application on this innovation last September and is currently looking for companies that could optimize this test and eventually make it available for sale to pharmaceutical manufacturers of heparin.



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## Contact

**Dale Zetocha**  
Director  
dale.zetocha@ndsuf.edu

**Jonathan Tolsted**  
Licensing Associate/  
Patent Agent  
jonathan.tolsted@ndsuf.edu

**Grant Brewer**  
Licensing Associate  
NDSU Research Foundation  
gbrewer@ndsuf.org

**Location:**  
Technology Transfer Office  
1735 NDSU Research Park Dr.  
Suite 124  
Fargo, North Dakota 58108-6050

**Office:** 701-231-6659

## Q & A: How will "First to File" affect inventors at NDSU?

**Q: On March 16, 2013, the new America Invents Act went into effect. As an inventor, what changes concern me?**

A: One thing inventors need to be know is that, in order to obtain a patent, consideration will no longer go to the inventor who was "First to Invent", but rather to the inventor who was the "First to File". Before March 16th, if you could prove that you were the first to come up with a new innovation and had the necessary documentation (i.e., notebooks, dated and witnessed, invention disclosures, etc.), and reduced it to practice by filing a patent application, your patent

would prevail. Beginning March 16th, however, the rules have changed such that a patent will now be granted to the inventor who files a patent application first, regardless of who has the earliest date of actual invention.

Another change will be the significance of foreign prior art. Searching for prior art will widen from the United States to anywhere in the world, which may have an impact on the decisions our office makes in filing patent applications.