Annual Report

July 1, 2014 - June 30, 2015

College of Agriculture, Food Systems, and Natural Resources
(CAFSNR)

with contributions from

North Dakota Agricultural Experiment Station
NDSU Extension Service

Kenneth F. Grafton – Vice-President for Agricultural Affairs, Dean and Director, North Dakota Agricultural Experiment Station
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Jane M. Schuh – Interim Associate Director, North Dakota Agricultural Experiment Station
A. Significant departmental achievements 2014

a. Teaching

Enhance learning outcomes:
- ABEN generated 2106 student credit hours with 4.25 teaching faculty FTE.
- ABEN graduated 42 undergraduate students and 3 graduate students.
- ABEN faculty addressed course evaluation methods to continually improve our teaching programs.
- Initiatives in teaching: Based on feedback from machinery industry employers, ABEN continues expansion of our hydraulics offering and building a hydraulics lab for ABEN & ASM students.
- ABEN enrolls 92 undergraduate students and ABEN faculty supervises 24 graduate students.

Innovative approaches:
- Two of our highly rated faculty advisors provided training to all our faculty on student advising.
- ASM378 was taught for the first time with a newly developed curriculum emphasizing economics of machinery management.
- Tegrity was used in ABEN255 and ASM225 for the first time.
- Scott Pryor successfully implemented a “flipped classroom”, an innovative teaching method in his classes.
- Field trips for ABEN263 to Cargill, West Fargo and Simplot, Grand Forks; American Crystal Sugar, Moorhead and Dakota Specialty Milling for students in ABEN 458/658. Invited guest speaker on process safety management by Zachary Deshayes, Conagra for students in ABEN 458/658. ABEN 458/658 students developed and tested a prototype reboiler and a continuous distillation system.

b. Research/Scholarly/Creative activities

Major research accomplishments:
- ABEN published 39 refereed journal articles, 42 proceedings papers and 5 invited presentations.
- ABEN faculty brought in $3.5 million in cumulative grants funding from 70 grant projects.
- ABEN provided national and regional leadership for UAS research and education in agriculture.
- Research to quantify dust emission and characterization of dust in western ND was initiated.
- The impacts of subsurface drainage on spring floods in the Red River basin was quantified.
- ABEN faculty actively participated in professional societies, journal editorial boards, proposal reviews, and conference organization.

Significant additions to research capability:
- ABEN provided a portion of AES operational budget as research money to research faculty.
- ABEN acquired major instrumentation such as a universal testing machine, Innova multigas analyzer, hammermill, two unmanned aerial systems, sensors and shop equipment.
- A new waste and wastewater quality laboratory was set up by Dr. Simsek
- ABEN hosted seven visiting scholars who significantly contributed to its research capability

New initiatives, innovative approaches:
- Grain Drying and Storage Education- Farmers and the grain industry had science and research based information to make decisions on how to dry and store grain valued at billions of dollars.
- The Bio-Industry Summit was organized to focus on four Bio-Industries - Biotechnology, Bio-energy, Life Sciences and Bio-materials which have significant economic development implications for our region.
- National Extension Disaster Education Network - EDEN & eXtension.org. EDEN Flooding Leader and Chair was from NDSU ABEN.
- Unmanned aircraft system - Applications to Agriculture, crop and livestock management. During 2014 ABEN collaborated with several NDSU faculty and UAS-related private sector businesses.
- Precision Agriculture - evaluated UAS optic sensors applications to precision agriculture.
- Training program for the NRCS: trained 600+ NRCS personnel from 12 Midwest states in Drainage Water Management.

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• Training Session on Evapotranspiration Mapping was sponsored by the ND State Water Commission. Five professional development hours were provided to 12 participants.

**Outreach:** Several outreach presentations were made by faculty, some of which are listed below.
• A “Bioresource Research at NDSU” presentation was made to the International Hazardous Substance & Environmental Management Dept., Chulalongkorn University, Bangkok, Thailand, 30 participants.
• A “Postgraduate Study in the US” presentation was made to the Food Science & Food Engineering and College of Science & Engineering, Jinan University, Guangzhou, China. 120 participants.
• A “Bioresource Research at NDSU: Current, Recent & Pending Projects” was presented to the Food Science & Food Engineering Depts., Jinan University, Guangzhou, China., 50 participants

**Service Elections, organization of professional meetings**
• Provided leadership to UAS Application in Agriculture on behalf of NDSU Agriculture
• ABEN faculty chaired or served as officers in several ASABE committees, multistate project groups, and local and regional committees/groups.
• ABEN faculty served on Planning Committees for the Precision Agriculture Summit in Jamestown, the Bio-Industry Conference in Fargo, and the Big Iron Show in Fargo
• Board of Directors, Dakota Precision Agriculture Center, Lake Region Community College
• Chair of the ND Electric Utility Workshop Committee

**B. Department Goals and Priorities for 2014**
• Provide leadership in addressing state research and extension education needs in agricultural and biosystems engineering areas, and maintain/enhance research and extension productivity - ongoing
• Complete curriculum mapping for assessment and improvement of teaching programs - completed
• Continue to address departmental space needs. Efficient utilization of space- building proposals were submitted to the dean and SBARE, and request for release of Room 223 has been submitted.
• Continue to provide student recruiting and retention activities, enhance student experience – ongoing.
• Begin the process of developing a vision and long-term goals for ABEN department – haven’t started.
• Encourage international experience and professional development for our students and faculty – ongoing, partly successful

**C. Department Challenges in 2014**
• Lack of space for research, teaching labs, graduate student offices, etc.
• Lack of personnel to address the teaching and research needs in precision agriculture & machinery.
• Limited funding and interest in bioenergy (with low oil prices) and irrigation engineering.
• Generating support for more in-depth hydraulics training for our students.
• Keeping abreast of changes in technology, gaining access to resources to develop better tools for irrigation water management, tile drainage design, drinking water systems, precision agriculture and onsite wastewater management.

**D. ABEN Department Goals for 2015**
• Address the space needs of the department.
• Grow ABEN’s reputation by fostering excellence in research and education, providing leadership in locally driven globally relevant research & education focused on grand challenges in food, energy, and resource conservation.
• Continue to improve student experience, and maintain strong and relevant teaching programs.
• Plan for transition through the retirement of key faculty members.
• Establish/maintain strong working relationship with alumni, employers and stakeholders to generate support for ABEN programs and needs.
• Maintain a productive and collegial environment for personal & professional development.
• Begin the process of developing a vision and long-term goals for ABEN department.
A. Goals and Priorities: 2014

- Increase reputation and visibility of the department
- Increase stability/excellence by continuing fund raising on endowed chair positions in Cooperatives and in Risk and Trading
- Complete draft of department’s strategic plan document
- Hire new faculty/staff to replace retirements/resignations
- Enhance student learning in both undergraduate programs and graduate programs
- Complete Assessment Report for 2014
- Continue to increase/maximize use of the CTR with other programs in the Tri-College

B. Executive Summary of Accomplishments in Achieving Goals and Priorities

The year 2014 was a challenging but very successful year. The department organized several outreach conferences and continued regular news column on “Spotlight on Economics,” “It’s Happening at State” and “The Exchange.” Secretary Schafer joined the department as an Adjunct Professor to teach an Ag Leadership course, which was very well received. Faculty, support staff, and students won six awards for excellence within the university and nationally. Fund raising for one endowed chair position in Cooperatives and another in Risk and Trading were very successful and nearing completion. A draft Strategic Plan document for our department was completed. The focus is on excellence, maximum impact, stability and emerging issues in food and applied economics. The department continues to advance efforts to increase collaboration with other units within the College, major stakeholders, the College of Business, and the Tri-college region.

The department filled two research scientist positions in the areas of renewable energy and consumer economics. We had two retirements and one resignation (due to health problems). The department also had two faculty promoted to Associate Professor with Tenure during the 2014/2015 academic year. Our students received top national awards, 3rd place in the nation at the NAMA competition and 10th place in risk and trading (at the Chicago Mercantile Exchange Trading Competition) out of 502 teams from around the world.

a. Teaching

- Our students’ accomplishments in the global risk and trading competition were greatly enhanced by knowledge gained from the Commodity Trading Room (CTR). The CTR has also helped increase collaboration with the College of Business, teaching a Portfolio class for both our students and theirs.
- Demand continues to be high for the department’s undergraduate majors and graduate students in terms of job placement and internships.
- Faculty continue to use innovative teaching and assessment methods for both face-to-face offerings and online classes with traditional students and stakeholders using the CTR.
- The department continues to have a ratio of produced FTE higher than budgeted FTE.
- Most MS theses result in peer reviewed journal articles. And some MS graduates continued their education to Ph.D. programs.
- Dr. Ryan Larsen received the College award for Excellence in Teaching.
- Dr. Jeremy Jackson received the College award for excellence in Advising.
• The students received several awards; third place in NAMA competition, three in the top ten students in the college, two “Paul Abrahamson Scholarships,” and 10th place in an international Risk and Trading competition at the Chicago Mercantile Exchange.

b. Research, Scholarship, and Creative Activities

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<th>Research, Scholarship, and Creative Activities</th>
<th>Totals</th>
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<td>Peer-Reviewed Publications (published or accepted)</td>
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<td>Research Grants and Contracts: cumulative/participated in</td>
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c. Service/Outreach/Extension

- Completed a regional “Commodity Transport” conference.
- Extension: Completed Agricultural Lenders Conference.
- Extension: Completed Crop Insurance Conference.
- Completed work on ND Tax Department on ND Agricultural Land Valuation Model.
- Extension: Held more than 295 presentations around the state.
- Dr. Miljkovic: Editor of Journal of International Agricultural Trade and Development.
- Dr. Koo served as Co-editor for Chinese Agricultural Economic Review and Economic Advisor to the U.S. Secretary of Agriculture and Trade Ambassador.
- Dr. Cheryl Wachenheim served as Managing Editor for IAMA.
- Support staff received the university award for excellence.
- Judy Moe received a university award for excellence.

d. Goals and Priorities for 2015

- Increase reputation and visibility of the department.
- Increase stability/excellence by continuing fund raising for endowed chair positions in Cooperatives and Risk and Trading.
- Complete department’s strategic plan document.
- Hire new faculty/staff to replace retirements/resignations.
- Enhance student learning in both undergraduate programs and graduate programs.
- Complete Program Review Report for 2015.
- Continue to increase/maximize use of the CTR with other programs.
ANIMAL SCIENCES 2014 ANNUAL REPORT  
Prepared: July 2015

A. Department/Unit/College Goals and Priorities for the Past Year

- Hold an annual professional development training for faculty and staff.

Teaching Goals
- Pursue avenues for additional teaching resources (faculty members and budgets) in order to deal with increased enrollment.
- Review and refine the curriculum in the Veterinary Technology program.

Research Goals
- Hire an epigenetics faculty member.
- Seek additional resources for properly staffing the AIM Laboratory.

Extension/Outreach Goals
- Hire a new environmental stewardship specialist.
- Hold the second annual Alumni Reunion.

B. Executive Summary of Accomplishments in Achieving Goals and Priorities for the Past Year

Overall Goal. A professional development workshop was held August 13, 2014, for faculty and staff in the department. An outside speaker was brought in who addressed the role of attitude in relation to workplace morale and happiness. A book was provided for each participant. Our intent is to make this an annual event. The 2015 professional development workshop will be held on August 13, 2015, and will include speakers and time for faculty to address issues related to curriculum and future direction of the department.

Teaching. In 2014, the department had the opportunity to hire an additional instructor to deal with enrollment growth. This person was hired in March 2015 and will be teaching ANSC 114L, ANSC 150, AGRI 189, managing our internship program, and providing coordination for our student newsletters. In addition, the department received some funding to partially fund a teaching assistant for extra sections of our introductory courses.

Research. In 2014, the department redirected a vacant position and developed a job description for a nutritional epigeneticist. This position will have a majority research appointment and will direct a research program which will develop a better understanding of how nutrition and the environment impact the genome. The Advanced Imaging and Microscopy Center was also able to hire a research technician to assist the laboratory director with management of day-to-day laboratory activities.

Extension/Outreach. In 2014, the department took additional steps to strengthen our efforts in the area of livestock stewardship by redirecting a vacant position into the area of environmental stewardship. This new faculty hire joined the department in March 2015 and will focus on helping livestock producers with science-based recommendations related to livestock and environmental interactions. The department held the second annual Alumni Reunion and Scholarship Fundraiser in Detroit Lakes, Minnesota. The event was well attended and we were able to raise over $10,000 to support our scholarship endowment.
**Other Highlights.** Joel Caton was named associate editor-in-chief of the Journal of Animal Science. Dr. Anna Grazul-Bilska was named an Outstanding Reviewer by Elsevier Publishing. Dr. David Newman was named to the Vance Publishing List of “40 Under 40” for his outstanding efforts to serve the pork industry. Greg Lardy served as past-president for the American Society of Animal Science.

The department held the fifth annual Moos, Ewes, & More event in September. This community open house attracted over 1,500 people. The department also published its second volume of the electronic alumni newsletter which highlights departmental activities and accomplishments. The newsletter is published three times per year. The department hosted visiting scientists from Brazil, China, and Thailand. The visiting scientists worked with our faculty to learn new techniques and enhance their research capabilities. The department also continued to enhance professional growth opportunities for students by hosting a resume workshop and a career networking session with employers prior to the Ag Career Fair.

**Goals for 2015-2016**

**Overall Departmental Goals**
- Engage the Future Directions Committee to examine future needs for the department and use this data for internal and external engagement and funding opportunities.
- Determine whether or not a department advisory board would be beneficial.

**Teaching Goals**
- Work with faculty in the Veterinary Technology program to continue to address items identified in their AVMA Accreditation Report.
- Review the results of curriculum changes in Animal Sciences. It has been five years since our new curriculum was implemented.

**Research Goals**
- Work with the AIM Laboratory director to seek additional laboratory space and support for that facility.
- Continue to seek funding for the construction of a new Meats Research Laboratory.

**Extension/Outreach Goals**
- Seek support for technical support for Extension Specialists in the department.
- Execute a plan to grow the department’s scholarship endowment.

| Peer reviewed publications (published or accepted) | 55 |
| National or international invited presentations | 20 |
| Juried presentations/performances/exhibitions | 0 |
| Research grants and contracts (number that are active) | 55, plus 24 Hatch |
| Cumulative amount (total value of active grants and contracts) | $1,068,475 |
A. Significant departmental achievements in research, teaching and outreach during the past year

a. Teaching

   **Curriculum review.** Following consolidation of the School of Food Systems into the Department in 2013, a curriculum review was conducted. The Cereal/Food Science group identified a need for a position in Cereal Chemistry and one in Food Engineering/Food Packaging. They also determined that there was no need for development of additional classes at this time. A new faculty position to teach CFS 460/660 and CFS 461/661 each fall semester and CFS 464/664 each spring semester has been requested.

b. Research/Scholarly/Creative Activities

   The following varieties were released by Plant Science Faculty: Gold ND Flax, ND 1406HP and ND Henson soybean, Dakota Ruby Potato, ND Genesis two-rowed barley, Rosie Light and Talon Dark kidney bean, Northern Empress Japanese Elm, and Cinnamon Curls Dwarf Korean Birch.

   The NDSU Horticulture project coordinated a team of 275 households in 48 counties that evaluated promising vegetable, herb and cut flower varieties in gardens. This project led to improved gardening practices, higher vegetable yields and healthier diets for North Dakota gardeners.

   Over 75% of the spring wheat and 90% of the durum wheat, barley and flax planted in North Dakota, as well as a high percentage of other crops, are planted with varieties that originated from foundation seed maintained and distributed by the NDSU Foundation Seedstocks Project.

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<tr>
<td>Peer Reviewed Publications (published or accepted)</td>
<td>107</td>
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<td>National or International Invited Presentations</td>
<td>104</td>
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<td>Cumulative Amount (total value of active grants and contracts):</td>
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c. Extension/Outreach


d. Service

   Dr. Berti received the Larson/Yaggie Excellence in Research Award.
   Brenda Deckard received the Service-Learning Award.
   Dr. Hatterman-Valenti received the Outstanding Faculty Advising Award.
Dr. Mike McMullen was honored with the Distinguished Service to Oat Improvement Award by the American Oat Workers Conference. Dr. Mohamed Mergoum was honored as a Fellow of the Crop Science Society of America. Dr. Rebekah Oliver received the Bison Ambassadors Apple Polisher Award that recognizes those that have had an exceptional impact on a student’s college experience.

B. Department goals and priorities for the past year, including narrative about progress toward those goals.

**New teaching lab.** Funding has been approved to build a new teaching lab in the space now occupied by growth chambers in Loftsgard Hall. While the new STEM building is exciting for our campus as a whole, many of the classes taught in Plant Sciences need ready access to greenhouse space. The new teaching lab in Loftsgard will provide our students with the same new teaching technologies available in the STEM building and access to greenhouse space in Waldron Hall that is connected by a skywalk.

C. Department challenges for the past year, including narrative on how those are being addressed.

**Continued High Enrollment.** The enrollment in the Plant Sciences curriculum reached a record high of 287 students (237 in CWS, 29 in HORT, and 21 in SUTM). The Food Science program had an additional 41 students. The CWS program has more than doubled in six years, from 98 students in 2008 to 237 in Fall Semester 2014. The increases are driven by strong employment opportunities in the region. Many of the CWS students have multiple job offers following graduation. Graduate student enrollment remains strong with 74 enrolled in the Plant Sciences MS and PhD and HORT MS programs, and 26 MS and PhD students in the Cereal Sciences graduate program.

While the undergraduate enrollment increases are exciting, they present challenges, including the need to add extra sections for courses such as PLSC 225 (Principles of Crop Production), PLSC 320 (Principles of Forage Production), and PLSC 491 (Senior Seminar) without additional funding or instructors. The current workload is not sustainable for the long-term. Additional faculty and/or an enrollment cap will be required to keep our courses at the high standards our students expect and deserve.

D. Department goals and priorities for the coming year

**Complete the process of eliminating Sports and Urban Turfgrass Management as a stand-alone major.** The SUTM undergraduate program will become an option under the Horticulture major and cease to enroll students as SUTM majors by Fall semester 2016.

**Develop a plan to update the Plant Sciences Learning Center.** The Plant Sciences Learning Center is the only space on campus that is specifically set up for a department’s undergraduate students to work and study either in groups or individually for multiple classes.
A. Significant Departmental achievements in research, teaching and outreach during the past year

a. Teaching.
The department worked with the university to improve assessment activities in 2014. Meinhardt led this effort. Del Rio added new laboratory practices to PPTH754 (Plant Disease Epidemiology) that include R codes in addition to SAS codes to analyze data. LeBoldus (PPTH 457/657) introduced a module using 3-D printing as part of a graduate student project to facilitate student understanding of the 3-D relationship between host and pathogen in infected trees. Meinhardt developed new course on pesticides which will be first given in the fall of 2016. Yan developed new material for Plant Nematology, a course on the books that has not been taught for several years. PP324 (Introductory Plant Pathology) had record of 92, making it necessary to add a fifth laboratory section without additional university resources.

b. Research/Scholarly/Creative Activities
   - Major research accomplishments.
The department’s research continued to focus on 1) developing effective and sustainable strategies and tools to manage economically-important plant diseases in the state, 2) working with breeders to develop disease-resistant germplasm and varieties for the state and 3) understanding fundamental aspects of plant disease, resistance and epidemiology.

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<td>Research Grants and Contracts (number that are active)</td>
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<td>Cumulative Amount (total value of active grants and contracts):</td>
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Numbers above are reflected in the Appendices. In addition to these accomplishments, Khan, del Rio and Liu hosted total of four visiting scientists from Serbia and Brazil.

   - Significant additions to research capability.
Yan joined the faculty as a nematologist. This is a new position created by the 2013 legislature. Gudmestad assisted the VP of Agricultural Affairs and the NDSU Development Foundation in identifying 40 potato producers, processors and allied industries as donors for the Neil C. Gudmestad Endowed Chair of Potato Pathology. Those donors, from 13 states, contributed $4.2 million to the endowment which was matched with $2.1 million from the ND Higher Education Challenge Fund. This is the first fully endowed chair position at NDSU.

c. Extension/Outreach
   - List new initiatives, innovative extension approaches
Departmental Extension activities, generally supported by applied research activities, continued to focus on plant disease and insect pest management programs. The department coordinated departmental and university IPM activities with national efforts. Extension faculty conducted commodity surveys for several crops, coordinated summer scouting activities and published weekly Crop and Pest Reports.

d. Service
   - Summarize state, national, or international professional service activities.
**Brueggeman:** Panel member for two NSF programs (Division of Integrative Organismal Systems in the Biology Directorate Symbiosis Defense and Division of Integrative Organismal Systems in the Biology Directorate); Chair of National Barley Improvement Committee; Chair of Barley Coordinated Project for the U.S. Wheat and Barley Scab Initiative (USWBSI). **Del Rio:** Member and incoming Chair of American Phytopathological Society (APS) Biological Control Committee. **Friskop:** Search Committee for Langdon REC pathologist; elected Secretary of FHB Management Committee for USWBSI. **Khan:** Chair, APS Extension Committee and member of APS General Policy Committee; hosted Congressman Jason Smith (8th District in Missouri) who visited with growers. **LeBoldus:** Panel member for USDA-NIFA-AFRI: Understanding Plant Associated Microorganisms; Chair of and meeting organizer for NCERA-224 and Judge for ND State Science & Engineering Fair. **Liu:** Vice chair of APS Molecular and Cellular Phytopathology Committee; member of APS Host Genetics Committee; Member of editorial board for three scientific journals: bioprotocol.org, Scientific World Journal and Advances in Biology. **Markell:** Chair of APS Extension Committee; Chair of Research Program for the International Rust Symposium (meeting to be held in March 2016); NDSU Athletic Director Search Committee; Invited judge for ‘More for Everyone Program’: Sponsored by Bayer CropScience and InVigor; ND Soybean Council commercial TV shoot. **Nelson:** Outside reviewer for Promotion and Tenure of faculty member at Department of Plant Pathology, University of Minnesota. **Pasche:** Pulse Crop Health Diagnostic Laboratory Advisory Committee; Chair of and meeting organizer for USDA-NIFA-sponsored Pulse Crop Working Group; Chair W2150 multistate group. **Secor:** Chair, APS Editorial Board for ‘Focus on Potato’. **Yan:** Secretary of NC1197 multistate group and member of APS Nematology Committee. **Zhong:** Member of Durum Coordinated Project of the USWBSI and member of four APS committees (Genetics, Mycology, Host Resistance and Molecular and Cellular Phytopathology).

**B. Department Goals and Priorities for the past year, including narrative about progress toward those goals.**

The department made excellent progress on its previous years’ goals. Faculty worked hard and successfully toward fulfilling department’s mission to the university. In addition, we successfully hired a nematologist, completed a successful third year review of a probationary faculty member and achieved record graduate enrollment.

**C. Department Challenges for the past year, including narrative on how those are being addressed.**

Space continues to be the biggest challenge facing the department. We are dealing with the issue by 1) working with Ag Administration to secure and improve space and 2) rejecting more graduate student applications as a means to reduce department size and to reduce the space needed. Dr. LeBoldus has indicated he will leave the department for another opportunity. We will work with Ag Administration to try to refill or redirect the position.

**D. Department Goals and Priorities for the Coming Year.**

Goals for the next year would be to: 1) continue meeting the departmental mission objectives, 2) initiate efforts to replace Dr. LeBoldus and 3) to continue to address our space limitations. North Central Division Early Career Award.
A. Significant Departmental achievements in research, teaching and outreach during the past year

d. Teaching

- Changes made since last report to enhance student learning to achieve the intended student learning outcomes for the curriculum.
  o For the first time, bylaws were created to govern the interdisciplinary Curriculum and Assessment Committee, and the Graduate Committee of the SNRS.
  o Faculty across the SNRS disciplines contributed to the development of Common Learning Outcomes and assessment strategies for the entire school.
  o Our 2014 Assessment Report received very high marks from the University Assessment Committee, which is now using it as a model for other departments.
  o Faculty from different academic programs in the SNRS worked together on several experiential learning activities, where students collaborated to write journal articles. These faculty were asked to lead discussions on these activities during a NDSU Pedagogical Luncheon.
  o In 2014, we started to align all of our School’s disciplines (ENT, RNG, SOIL, NRM) so that the course schedules do not conflict. This information is now provided to all SNRS faculty to minimize conflicts.
  o Faculty across disciplines now advise NRM students.

- List new initiatives, innovative teaching approaches (providing evidence of quality improvements in teaching and learning).
  o All of the SNRS’ undergraduate disciplines adopted a portfolio system in which students are provided a portfolio and populate the portfolio with examples of different learning outcomes throughout their undergraduate program.
  o For the first time, we now have one NRM/Range/Soils capstone course for all our undergraduate students. Dr. Hargiss is taking lead on this course, but will receive help from faculty of other disciplines of the School.
  o The first ever SNRS Research Symposium was held in 2014, highlighting the work of our different disciplines. It brought together faculty, staff, and students at the MU, and included a keynote presentation, and student seminars and posters.

e. Research/Scholarly/Creative Activities

- Major research accomplishments
  o The School’s research productivity was up overall in 2014. Active grants were up by 9% from 2013 for a total of $6,957,397 (value from Ag. Budget). There were ninety-two total graduate students advised by SNRS faculty, which was also up in 2014. The breakdown of graduate students by degree was 20 MNRM, 51 MS, and 21 PhD. Peer-reviewed publications also increased by 18% in 2014 for the previous year, where 72 faculty published.

- Significant additions to research capability
  o We hired Assistant Professor of Range Science, Dr. Torre Hovick, which completes our Range Science Program, and increasing the research potential of the discipline and SNRS.
  o We recently transitioned Dr. Christina Hargiss from Assistant Professor of Practice to a tenure track position in research and teaching. This transition will greatly benefit the research productivity of the School, and the NRM Program.

f. Extension/Outreach

- List new initiatives, innovative extension approaches
  o Activities of the Extension faculty have increased. The number of Extension programs planned went from 26 in 2013 to 36 in 2014, with approximately 2608 face-to-face contacts. Extension faculty also provided 129 presentations reaching over 10,000 people in-person.
  o Soil health agent training was initiated where five agents were brought to campus to participate in a 2-day "pilot program". These agents play an integral role in developing and testing materials for more extensive soil health training of agents being offered in 2016.
• Summarize state, national, or international professional service activities over the past year that are most noteworthy (for example: elected to lead national or international professional organization, organizing national or international professional meetings, etc.)
  o School faculty have established national and international reputations, where their expertise is being sought for a variety of services, such as grant review panels, editorial boards, external promotion and tenure evaluations, and manuscript reviews in the peer-review process. For example, in 2012, we had 7 faculty serve on editorial boards, and in 2014 there are now 11. During this same time frame, the manuscript reviews in the peer-review process went from 73 to 175. Faculty have also been awarded national awards in 2014, including (among others) Fellow in the Agronomy Society of America, Outstanding Young Professional in Society Range Management, and Excellence in Conservation Award for Soil and Water Conservation Society. Regionally, the visibility and reputation of School’s faculty across the state has also increased. Several of the state’s commodity requests for proposals have reflected the importance of research in the areas of the School’s disciplines. In 2014, roughly one-third of the School’s active grants came from commodity/livestock groups for approximately $2 million. This was almost a 60% increase in commodity/livestock funding from the previous year.

B. Department Goals and Priorities for the past year, including narrative about progress toward those goals.

Of the goals that were established from last year, the following three were addressed:
(1) Conduct a backwards audit of the School’s courses
   A critical review of the courses was conducted and as a first step all the courses in the School were aligned so there were no schedule conflicts.
(2) Increase undergraduate student engagement and learning
   We developed the idea of using a portfolio and incorporated it into the assessment of all the School’s programs. Students will be able to populate the portfolio throughout their academic careers with examples from their classes that demonstrate specific learning outcomes (e.g. critical thinking, writing)
(3) Pursue an innovative MNRM tuition model to gain resources
   A draft proposal was written and is under review.

C. Department Challenges for the past year, including narrative on how those are being addressed.

The School is still relatively new compared to more established programs in the university. The ongoing challenge is to develop synergies across disciplines. Efforts are made to foster synergies across the School’s disciplines and between Extension and research faculty to provide solutions to complex problems. For example, when making requests (e.g. AES assistantships, revolving equipment funds), preference is placed on proposals that are interdisciplinary, or forming diverse committees, especially search committees. Also, when articulating goals for our curriculum discussions, an emphasis is placed on academic uniformity. Synergistic, integrated activities have emerged throughout the School for research and teaching.

D. Department Goals and Priorities for the Coming Year

  1) Form bylaws for remaining SNRS committees;
  2) Identify opportunities to meet needs of agricultural and natural resource stakeholders impacted by oil and gas;
  3) Look for means to recruit and maintain high quality graduate students.
A. Significant Departmental achievements in research, teaching and outreach during the past year

g. Teaching

- Changes made since last report to enhance student learning to achieve the intended student learning outcomes for the curriculum.

  Dr. Peter Bergholz - National Academies Midwest Summer Institute, University of Minnesota, June 9 – 14, 2014 - workshop on active learning, assessment and inclusiveness in the life sciences.

- List new initiatives, innovative teaching approaches (providing evidence of quality improvements in teaching and learning.

  Dr. Teresa Bergholz taught MICR 453/653, food microbiology, for the first time the fall of 2013. She developed 3 different in-class case studies for this course. She also developed 4 new lab exercises for MICR 453.

  Dr. John McEvoy participated in the National Academies/HHMI Midwest Summer Institute on Undergraduate Education at University of Minnesota. The goal was to explore new models of scientific teaching that transform undergraduate education at universities.

h. Research/Scholarly/Creative Activities

- Major research accomplishments

  A total of $1,894,690 was generated through the successful funding of 18 grant proposals written by 7 faculty.

  - Significant additions to research capability

i. Extension/Outreach

  Dr. Teresa Bergholz has performed Microbial testing services for two local companies: FormulaNow in Fargo and Saladmakers in Moorhead.

  Dr. Bergholz designed a one-day exercise on Food Safety for use in the NATURE Sunday Academy program in 2013-2014. It will be taught at five participating tribal college sites, and an estimated 200 students will participate.

  Dr. John McEvoy interacts with the North Dakota and Minnesota Departments of Health and the Wisconsin State Laboratory of Hygiene regarding the biology of Cryptosporidium. He has provided those agencies with data to help them understand the transmission of Cryptosporidium in the Upper Midwest. Through his USDA funded applied research, he is working with local water treatment plants and watershed districts to identify sources of pollution.

j. Service

- Summarize state, national, or international professional service activities over the past year that are most noteworthy (for example: elected to lead national or international professional organization, organizing national or international professional meetings, etc.)
E. Department Goals and Priorities for the past year, including narrative about progress toward those goals.

Unfortunately I am unable to contribute much to this section as I become Interim Head of the VMS in January of 2015. Therefore, I am unaware of details concerning last year’s goals and priorities and cannot comment on progress made towards those goals. Please see comments under “C” below.

F. Department Challenges for the past year, including narrative on how those are being addressed.

Since Dr. Wolf-Hall resigned as Department Head in January of 2015, this has been a year of personnel challenges for the department. Following Dr. Wolf-Hall’s resignation, Jessica Ebert requested a year of unpaid leave of absence, Dawn Doetkott resigned due to chronic health problems, Rebecca Datzov resigned due to work relocation by her husband, and Dr. Fisher resigned his faculty position when offered a job in Maryland. In addition, Dr. Eugene Berry has been on sabbatical this year. Therefore, VMS is significantly compromised by lack of available faculty and staff; a series of events that has redistributed the departmental workload onto a smaller group of people. These staffing vacancies are being addressed by individual search processes that will take time and patience.

The Department continues to face challenges with numbers of teaching assistants and space for research. Dr. Dorsam, a departmental faculty member, still does not have lab or office space in VMS. We will continue to petition the Dean and Provost for TAs to help with MICR 202, a large Gen Ed course which always produces more laboratory enrollment that VMS can service. In addition, with the construction of a new VDL, VMS is planning to request some of the vacated laboratory space to address departmental teaching and research needs.

G. Department Goals and Priorities for the Coming Year

1. Successfully recruit a new Department Head
2. Successfully recruit a new Assistant Professor to fill Dr. Fisher’s position
3. Successfully hire a new technician for Dr. Fisher’s laboratory
4. Successfully hire a new front office support staff
5. Develop a new departmental mission statement that embraces the university plan
6. Complete the redesign of the departmental graduate program
7. Complete creation of a professional Master’s degree in microbiology
Veterinary Diagnostic Services Department

H. Significant Departmental achievements in research, teaching and outreach during the past year
   a. Teaching
      • Drs Newell and Webb taught a necropsy laboratory for the Veterinary Technology class. This
        provided a hands on sampling opportunity for the students.
      • MICR 465 was successfully migrated to Animal Science and given a numeric designation of ANSC
        370. This class covers animal health in livestock species (cattle, sheep, swine). For the first time,
        dogs cats and horses were taught as ANSC 399 in the spring of 2015. The Animal Health
        Management courses were migrated to Animal Science as well (ANSC 378).
   b. Research/Scholarly/creative Activities
      c. The VDL is involved in a variety of research opportunities totaling $539,430 from 9 different
         grants/cooperative agreements.
      d. Three referred articles, two abstracts, three presentations and one book chapter originated from
         VDL faculty this year.
   e. Extension/Outreach
      • Dr. Webb implemented the use of a new electronic newsletter that is available to veterinarians in
        North Dakota and western Minnesota.

• Service
   o Dr. Dyer served as president of the NDVMA.
   o The VLD hosted its annual CE event in May.
   o Tour of the VDL with the North Dakota Lieutenant Governor, 7/29/14
   o Tour of the VDL with the minister of agriculture from Kyrgyzstan, 9/10/14
   o Met with Minister of Education for Republic of Liberia, George S.S. Wuo

I. Department Goals and Priorities for the past year, including narrative about progress toward those goals.
   A considerable amount of time was spent in achieving full accreditation status with the American
   Association of Veterinary Laboratory Diagnosticians (AAVLD). This was successfully accomplished in
   the summer of 2014; the VDL is now fully accredited. The VDL was successful in hiring a full-time
   veterinary microbiologist (Dr. Claire Miller) to oversee the microbiology, virology and serology sections of
   the lab. Dr. Miller successfully passed her Veterinary Microbiology board exam in December and has
   assumed her full responsibilities at the VDL. Finally, the third priority was enlisting assistance and
   providing information for the successful funding of a new VDL by the North Dakota legislature in 2015.

C. Department Challenges for the past year, including narrative on how those are being addressed.
   Our challenges are linked to the need for a new VDL – space. In addition, we need more technical staffing
   as many of our sections are one person deep. Sources of funding for a new technician have been discussed
   and would have to come from collections income.

D. Department Goals and Priorities for the Coming Year
   Priorities for the coming year include: 1) beginning the design of new Veterinary Diagnostic Laboratory, 2)
   continue to consider ways to hire new technical help for the VDL, 3) streamlining the VDL Quality
   Assurance system, and 4) refining our use of IT to make dissemination of case results more efficient.
Awards
Agricultural and Biosystems Engineering Department
Awards (State, Regional, National, International)


Wiesenborn, Dennis. Visiting professor in the International Program for Food Quality & Safety, Jinan University, Guangzhou, China (Nov. 6 - Dec. 10, cost of travel & housing covered plus stipend awarded)

Dr. Tom Bon was recognized with the Teacher of the Year Award for his teaching accomplishments and impact on students by the College of Engineering at the annual college awards ceremony in October 2014.

Elton Solseng, ABEN instructor, was presented the North American Colleges and Teachers of Agriculture (NACTA) “Teaching Award of Merit” for his meritorious efforts in college teaching. 2014.

Juan Vargas-Ramirez, graduate student for Dennis Wiesenborn, was presented the “Graduate Student Teaching Award of Merit” sponsored by the North American Colleges and Teachers of Agriculture (NACTA) and the College of Agriculture, Food Systems and Natural Resources. 2014.

Animal Sciences Department
Awards (State, Regional, National, International (n = 3)

Bauer, Marc. 2014 NACTA Journal Award – Honorable Mention.

Grazul-Bilska, A.T. Outstanding Reviewer status awarded by Elsevier for reviews completed in 2012-2014 for the Elsevier journals.


Plant Sciences Department
Awards

Berti - Larson/Yaggie Excellence in Research Award, December 2014.
Carena - Plant Breeding Award, by professors and students in the Genetics and Plant Breeding Department of the Federal University of Lavras (UFLA) and the Genetics and Plant Breeding Study Group (GEN), Minas Gerais, Brazil.

Hatterman-Valenti - Excellence in Academic Advising of Undergraduates Award. Service Award as newsletter editor for NCWSS.

Kandel - Received 2014 Program of Excellence Award (as team leader) for ‘Getting it Right in Soybean Production’ from the NDSU Extension Service (October 2014).

McMullen - Distinguished Service to Oat Research from the American Oat Workers Conference.

Mergoum - 2014 CSSA Fellow.

Oliver - Bison Ambassadors Apple Polisher Award.

Plant Pathology Department
Awards (State, Regional, National, International)

Khan: APS Excellence in Extension. This is highest national Extension award in discipline.
Knodel: Entomology Society of America Outstanding Service as member of the Thomas Say Editorial Board.
Knodel and Markell: Program Excellence Award as part of the team for Getting It Right in Soybean Production, NDSU Extension Service.
Markell: APS North Central Division Early Career Award.

School of Natural Resource Sciences
Awards (State, Regional, National, International)
Limb, R. 2014. Received Society for Range Management Outstanding Young Professional award (Jan 2015)
Wick, A. 2014. Received the Persistence and Vision award for efforts at SHARE farm by ND Corn Utilization Council and Growers Association.
Wick, A. 2014. Received the National Harold-Kay School Excellence in Conservation award through the ND Soil and Water Conservation Society.
Hargiss, C. 2014. Received the 10 years of service award for River Keepers for volunteering for 10 years for the Red River Water Festival teaching area 4th graders about water.
Wick, A. 2014. Received Service Award for the NDSU Soil Health Program through the ND Chapter of the Soil and Water Conservation Society.
Grants
Appendix 1: Active Grants and Contracts

I. **Active Research Grants in 2014 $3,464,895 awarded amount / $7,175,875 total awards):**

<table>
<thead>
<tr>
<th>Award Name</th>
<th>PI/Role</th>
<th>Sponsor Name</th>
<th>Type</th>
<th>Title</th>
<th>Awarded Amount</th>
<th>Total award</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bajwa, Sreekala</td>
<td>CPI</td>
<td>ND Industrial Commission</td>
<td>New</td>
<td>Commercial application of soybean stalk as a new alternative fiber in particle boards</td>
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<td>$398,700</td>
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<td>CPI</td>
<td>ND Soybean Council</td>
<td></td>
<td>Novel Soy based Resin for Wood Composite Industry</td>
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<td>$30,900</td>
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<td>CPI</td>
<td>ND Ag. Products Utilization Commission</td>
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<td>Market Study of Flax Fibers for Industrial Applications</td>
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<td>$55,612</td>
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<td>CPI</td>
<td>ND Corn Utilization Council</td>
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<td>Development of a Biofiber Composite Building/Landscaping</td>
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<td>CPI</td>
<td>Cotton Incorporated</td>
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<td>Value Added Use of Cotton Ginning Byproducts - Fire Log</td>
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<td>Bio-industry Conference: Creating North Dakota</td>
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<td>Bio-industry Conference: Creating North Dakota</td>
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<td>Bio-industry Conference: Creating North Dakota</td>
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<td>ND Soybean Council</td>
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<td>Digital Imaging Technique to Detect and Count Aphids</td>
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<td>$24,595</td>
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<td>Bajwa, Sreekala</td>
<td>PI</td>
<td>ND Soybean Council</td>
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<td>Digital Imaging Technique to Detect and rate iron deficiency chlorosis (IDC) in soybean</td>
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<td>NDSU Development Foundation</td>
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<td>Economic Development of ND and UAS Research and Ed</td>
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<td>Award PI Name</td>
<td>Role</td>
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<td>Total award</td>
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<td>Bora, Ganesh</td>
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<td>Asia-Pacific Network for Global Change R</td>
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<td>Scoping Workshop to Develop an APN Proposal on Capacity</td>
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<td>Spectrum Technologies, Inc.</td>
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<td>Field Evaluation of GreenIndex in Corn and Wheat</td>
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<td>Capacity Building for Mitigation of Climate Change</td>
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<td>North Dakota Grain Dealers Educational Foundation</td>
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<td>Equipment and Instruction Grant</td>
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<td>Agriculture Research Service</td>
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<td>Mechanical, Thermal, and Storage Characteristics of Bio</td>
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<tr>
<td>Cannayen, Igathi</td>
<td>CPI</td>
<td>Agriculture Research Service</td>
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<td>Mechanical, Thermal, and Storage Characteristics of Bio</td>
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<td>Cannayen, Igathi</td>
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<td>Flood Affected Wood Biomass Utilization Opportunities in ND</td>
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<td>ND Energy commission/ Green Vision Group</td>
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<td>Image Processing Based Wool Testing System</td>
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<td>National EDEN Issue Leaders: Flooding Educational</td>
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<td>Statewide Energy Efficiency Educational Program</td>
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<td>Jia, Xinhua</td>
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<td>USDA SARE</td>
<td>Effect of Optimal Water Management for Sustainable and profitable crop production and improvement of water quality in the Red River Valley</td>
<td>$199,706</td>
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<td>Subirrigation with High Sodium Adsorption Ratio</td>
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<td>Plastic Mulch Effects on Corn Yields</td>
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<td>Effect of Optimal Water Management for Sustainable</td>
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<td>MN Wheat Research &amp; Promotion Council</td>
<td>Evaluating Wheat Germplasms and Wheat Varieties</td>
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<td>ND Corn Utilization Council</td>
<td>Improving Corn Growth and Production with Clear Mulch</td>
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<td>ND Wheat Commission</td>
<td>Assessing ND Wheat Varieties and Germplasm for Waterlog</td>
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<td>Growth and Fresh Yield Responses of sweet corn to mulch, planting date, and hybrid</td>
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<td>Jia, Xinhua</td>
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<td>ND SWC</td>
<td>Subirrigation with high sodium adsorption ratio groundwater and its effect on soil and water quality</td>
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<td>ND SBARE/WHEAT</td>
<td>Assessing ND Wheat Varieties and Germplasm for Waterlogging tolerance</td>
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<td>Snowmelt Water Infiltration into Frozen Soil in RR of the North Basin</td>
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<td>Jia, Xinhua</td>
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<td>Development of a model for subsurface drainage and subirrigation water management</td>
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<td>NASA ROSES</td>
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<td>Satellite enhanced snowmelt flood predictions in the Red River of the North Basin</td>
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<td>$1,529,924</td>
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<td>Application of SWAT for Estimating Nutrient Loads to Lake Ashtabula under different climate scenarios</td>
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<td>Lin, Zhulu</td>
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<td>Soil Health and Water Quality Impacts of Growing Energy</td>
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<td>University of North Dakota/NIFA</td>
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<td>Evaluating How Market and Policy Affect Cellulosic</td>
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<td>New</td>
<td>CNH-Ex: A Model of Groundwater Allocation and Management</td>
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<td>Reducing Sodification in High Risk Northern Great Plains Soils</td>
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<td>Optical Crop Sensor Technology Applications to Soybean</td>
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<td>Demonstrate the Effectiveness of Unmanned Aircraft</td>
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<td>Pulsar Operational Boundary, Inc.</td>
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<td>Nowatzki, John</td>
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<td>New</td>
<td>Optical/UAS Crop Sensor Technology Applications to Soy</td>
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<td>Award Name</td>
<td>PI Name</td>
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<td>Awarded Amount</td>
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<td>Pryor, Scott</td>
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<td>NSF</td>
<td>pH responsive Capsules for Enhanced Delivery</td>
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<td>North Dakota Corn Innovation Program</td>
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<td>Pryor, Scott</td>
<td>PI</td>
<td>ND Corn Growers Association</td>
<td>Creation of an NDSU Student Competition to Develop</td>
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<td>Pryor, Scott</td>
<td>CPI</td>
<td>North Central SUN</td>
<td>New Energy Beets: A New Industrial Sugar Source for the Production of Advanced Biofuels</td>
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<td>Rahman, Shafiqur</td>
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<td>ND Dept of Health, EPA</td>
<td>Demonstration and Evaluation of Vegetative Buffer Strips</td>
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<td>Acquisition of 1412 Photoacoustic Multigas Monitor</td>
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<td>Evaluation of Bioavailable Dissolved Organic Nitrogen Using Various Algal Species</td>
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<td>Sivarajan, Saravanan</td>
<td>PI</td>
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<td>Software for UAS (Unmanned Aerial System) Precision Agri</td>
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<td>NRCS National CIG</td>
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<td><strong>$3,464,895</strong></td>
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Aakre, Dwight. Co-PI with Chris Boerboom on a grant from USDA of $43,525 to be used for Farm Bill education to producers.


Bangsund, Dean. “Assessment of the Oil and Gas Industries Workforce Characteristics,” $149,931, North Dakota Oil and Gas Research Council, ND Industrial Commission.


Bangsund, Dean. “ND Legislative Management Study,” $16,785, KLJ.

Bangsund, Dean. “Updated employment, housing, and population projections in western North Dakota,” $3,000, University of Nebraska Center for Rural Entrepreneurship.

Haugen, Ron. “Energy Beets Risk Project” from the North Central Risk Management Education Center. I am the project director. David Ripplinger and Frayne Olson are co-project directors. This project is intended to educate agricultural producers about energy beets in regard to production practices financial management. $34,000. April 30, 2014.


Hodur, Nancy. North Dakota Industrial Commission. $149,931. “An Assessment of the Oil and Gas Industries Workforce Characteristics” 01/01/14 - 03/31/2015

Hodur, Nancy. Center for Rural Entrepreneurship. $3,000. “Employment, Housing and Population Projections for the Williston Basin” 01/01/14 - 03/31/2015


Hodur, Nancy. FM Diversion Authority. $64,695. “Ag Risk Economic Evaluation for Temporary Water
Retention Easement Values and Crop Insurance” 09/16/2014 - 7/31/2015.


Jackson, Jeremy. $7,500; Charles Koch Foundation, funding supports `Capitalism and Society' lecture series

Jackson, Jeremy. $24,000; Charles Koch Foundation, Research grant to support `Free to be Happy’

Larsen, Ryan. “UNL Farm Benchmarking Collaboration.” Funding Amount: $837,944. Funding Agency: USDA, NIFA. My role is to work with Corey Walters to diversification changes of farms in the northern great plains. NDSU’s portion of funding: $35,353.

Larsen, Ryan. “Corn Wet Mill Market Analysis and Valuation Study” Funding Amount: $75,000. Funded by North Dakota Agriculture Product Utilization Committee. My role is to develop a real option model to estimate value of a corn wet mill facility.

Lim, Siew Hoon. Co-PI, Zhulu Lin, PI. “A Model for Groundwater Allocation and Management at the Bakken Shale in Western North Dakota” National Science Foundation (Award No.: 1413954) $249,423 (my budget: $142,171.11)


Lin, Zhibin, PI, Mijia Yang and Dr. Lei Zhang, Co-PI’s, “Full-Spectrum Dust Control Techniques and Economy-Based Criteria” NDSU internal grant. $30,000.

McKee, G.J. Donations to Quentin Burdick Center of Cooperatives Endowed Professorship. March 2014. $80,000.


Miljkovic, Dragan (PI), David Ripplinger (Co-PI), and Saleem Shaik (Co-PI): "Change in Land Use in ND Due to Ethanol Production from Corn," North Dakota Department of Commerce, State Energy Program. Effective Date: 10/2014-06/2015. Miljkovic's Amount: $27,000.


Olson, Frayne. “Spring Wheat Protein Spread Analysis” – PI (Ron Haugen is Co-PI) – Minnesota Research and Promotion Council - $34,000 (2014 – 2015)


Wilson, William. Economic Impact of USWBSI’s Impact on Reducing FHB, USDAA ARS 73608 ($113,000 over 2 years), December 2014.

Wilson, William. North Dakota Soybean Council. Marketing Programs and Strategies for North Dakota Soybean Council: Research and Support for NDSU Dept. of Ag Econ $40,000

Wilson, William. ND Corn Council, Risk Exposure of Financial Failure in ND Grain Handling, $49,500.

Wilson, William. Victoria Agribiosciences Center, Building Expertise in Trait Valuation and Commercialization Strategy VABC and NDSU $40,000

Wilson, William. Renewable Energy Commodity Trading Educational Program To the North Dakota Industrial Commission $234,376 and supplemented to $500,000 over 4 years.

Wilson, William Commodity Trading Room funding. $1.8 million and endowment approaching $10 million

Wilson, William. Center of Excellence in AgBiotechnology. In total, this is $2 million (plus $2 million in COE I), and became available July 1, 2008. That share for the department is $444,597 from COE I and $425,000 from COE II which became available in August 2009.

Wilson, William and P. McClean. Center of Excellence II Oilseed Development, $2.0 million, match $5.5 million. Department share = $370,000 commencing July 2008 to June 30 2012.


2014 Animal Sciences Department Appendix

I. Listing of Active Grants and Contracts

Active (Continuing) Research Projects (n = 55)


Berg, E.L. Equine assisted activities and therapies education program grant. American Quarter Horse Association.


Caton, J.S. Impacts of maternal nutritional plane and selenium supply on the small intestinal microbiome of the dame and offspring. No external funding.

Caton, J.S. Countering nutritionally induced intrauterine growth restrictions with VEGF gene therapy: Impacts on fetal developmental outcomes. USDA-AFRI.

Caton, J.S. and J. Peine. Effects of maternal nutrition and rumen-protected arginine supplementation of ewe and postnatal lamb performance. SBARE.


Caton, J.S. and K. McLean. Endogenous retroviruses and nutritional management in placental syncytium formation during early gestation. SBARE.

Caton, J.S. and M. Crouse. Maternal nutrition and embryonic survival: nutrient transport to the embryo during day 16 to 50 of gestation. SBARE.


Dahlen, C.R. Evaluating the sustainability of beef cattle breeding systems. USDA SARE.


Grazul-Bilska, A. Impact of nutrition on ovarian function in sheep. State Board of Agricultural Research and Education.

Grazul-Bilska, A. Impact of nutrition on ovarian function in sheep. State Board of Agricultural Research and Education.

Grazul-Bilska, A. and D. Redmer. Role of nitric oxide (NO) system in ovarian function. USDA CSREES/NRI.

Hammer, C. Preliminary study examining the equine digital cushion. No external funding.

Hammer, C. Potential of horses consuming a novel nutritional supplement to test positive on a drug screen. No external funding.

Hammer, C. Palatability of a novel horse supplement. APC, Inc.


Maddock, R., et al. Renewal on the Standing Rock Sioux Reservation. USDA.


Maddock Carlin, K.R. The effects of growth promotant technologies on tenderness variation within a beef retail cut. SBARE.

Maddock Carlin, K.R., E.P. Berg, and Chirasak Phoemchiralad. Collagen content of two muscles from Piedmontese x Angus cattle and changes related to field peas in the diet. No funding source.


Maddock Carlin, K.R. and R.J. Maddock. Influence of rate of temperature and pH decline on intramuscular beef tenderness variation in muscles in the round. SBARE.


Newman, D.J. Acquisition of goods and services II. USDA-Agriculture Research Service.


Park, C.S. Lipotropes and mammary growth. National Institute of Health-NCI.


Redmer, D. and A. Grazul-Bilska. Acquisition of equipment for the shared reproductive physiology laboratory spaces. USDA-NIFA.


Smith, D.J., W.L. Shelver, L. Tell, and J.W. Schroeder. Plasma kinetics and tissue residues after label and extra label administration of flunixin meglumine to cull dairy cows with and without endotoxemia. USDA-ARS.


Vonnahme, K. How does a twin pregnancy impact umbilical blood flow in sheep? No external funding.


Vonnahme, K., M.V. Hidalgo, and K. Swanson. Influence of nutrient restriction and realimentation during pregnancy on uterine blood flow in ewes. No external funding


Wagner, S.A. and D. Newman. The effects of ramp exposure during the nursery period on behavior and production in swine. No external funding.

Active (New) Research Projects (n = 24, $1,068,475)


Dahlen, C.R. and C.L. Stoltenow. The NDSU bull test project. Zoetis. 7/1/14-6/30/15. $5,000.

Dyer, N.W. NAHLN member laboratory agreement. National Animal Health Laboratory Network. 5/1/14-4/30/15. $55,000.


Dyer, N.W. Epidemiology and laboratory capacity (West Nile virus surveillance). Centers for Disease Control and Prevention/North Dakota Department of Health. 8/1/14-7/31/15. $34,073.

Hammer, C. Partnering with horses to raise awareness, shift perspective and embrace change. NDSU Diversity Initiatives. $230.

Maddock Carlin, K.R. Effect of implant strategy and supplementation of ractopamine hydrochloride on beef skeletal muscle proteome. Total = $15,916.

Bridge funding from NDSU Prov000ost. $10,600.

Bridge funding from NDSU Agricultural Experiment Station $2,650.

Bridge funding from NDSU Animal Sciences Department, $2,666.

Maddock Carlin, K.R. The effects of growth promotant technologies on tenderness variation within a beef retail cut. SBARE Animal Agriculture grant. 2014. $9,346.


Park, C.S. Canola oil, breast cancer risk: Synergistic effect with methyl nutrients. Total = $100,000.
Northern Canola Growers Association. 6/1/14-5/31/14. $50,000.
Agricultural Products Utilization Commission. 8/1/14-7/31/15. $50,000.

Redden, R. Needs assessment for national sheep improvement program. American Lamb Board. 2014. $50,000.


Stokka, G.L., K. Swanson, and J. Gaspers. Evaluation of the impact of vaccination on intakes, the acute phase response, and antibody titers of weaned beef calves. Zoetis. $7,000.


Wagner, S.A. Lameness in dairy cows. Zoetis. 5/15/14-12/31/15. $61,312.

Wagner, S.A. Behavioral methods to evaluate the analgesic effects of non-steroidal anti-inflammatory drug therapy in lame dairy cows. Zoetis. 5/15/14-12/31/15. $61,312.

**Other Funding (n = 17; $80,145)**


Berg, E.L. Equine assisted growth and learning association training for expansion of existing Therapeutic Horsemanship minor at NDSU. American Quarter Horse Foundation. 4/1/14-8/31/15. $6,970.

Berg, E.L. Moos, Ewes, and More promotion. NDSU Development Foundation Board of Trustees Endowment. $950.


Maddock Carlin, K.R. and W.L. Keller. Renovation of the Muscle Biology/Meat Science Laboratory to make space for newly acquired Typhoon FLA 9500 Imager and accessory equipment. NDSU Forward Lab Renovation Grant. 2014. 5/1/14-4/30/15. $9,346.

Newman, D.J. NDSU BBQ Boot Camp. Total amount = $5,885.  
North Dakota Bankers Association. $3,600.  
North Dakota Beef Commission. $5,000.  
Lamb Promotion Research and Information Board. $500.  
North Dakota Association of Extension Agents. $2,375.  
City of Beulah. $500.  
Cloverdale Meats. $2,000.  
North Dakota Pork Council. $5,600.  
North Dakota Department of Agriculture Turkey Federation. $2,500.  
119th WG MWR. $6,400.  
North Dakota Association of Agriculture Educators. $2,800.  
NDSU Alumni Foundation. $2,610.  
National Pork Board. $10,000.  
Northern Canola Growers Association. $2,000.

Newman, D.J. Research support agreement: Acquisition of goods and services. USDA Agriculture Research Service. 2014. $28,500.

Redden, R. Sponsorship for North Dakota Lamb and Wool Expo. Total = $3,500 in-kind.  
North Dakota Lamb and Wool Producers Association  
North Dakota Corn Growers  
Hendrickx Manufacturing  
CHS Nutrition  
Sydell  
Geitzen Sheep Shearing  
Equity Livestock

Redden, R.R., D. Black, M. Crosswhite, and C. Dahlen. Effect of CIDR and PG 600 on ewe productivity. 7/1/14-6/30/16. $3,000 in-kind.


Vonnahme, K.A. Acquisition of a scale. NDSU Development Foundation. 2014. $4,982.

**Hatch Projects (n = 24)**

Berg, E.P. Impacts of stress factors on performance, health, and well-being of farm animals (from W1173). 10/1/11-9/30/16.


Caton, J.S. Improving ruminant use of forages in sustainable production systems for the western U.S. 10/1/12-9/30/14.

Dahlen, C.R. Methods to increase reproductive efficiency in cattle (NC 1038). 10/1/12-9/30/17.


Grazul-Bilska, A.T. Role of the nitric oxide (NO) system in ovarian function. 1/1/12-12/31/14.


Maddock Carlin, K.R. Molecular mechanisms regulating skeletal muscle growth and differentiation. 10/1/10-9/30/15.

Maddock Carlin, K.R. Factors influencing muscle ultrastructure and subsequent impacts on muscle growth and meat quality. 10/1/13-9/30/18.

Maddock, R.J. Enhancing the competitiveness and value of U.S. beef. 10/1/12-9/30/17.


Newman, D.J. Swine production management to enhance animal welfare and value of U.S. pork. 10/1/11-9/30/16.


Redmer, D.A. Regulation of vascular growth and function in reproductive tissues of livestock. 10/1/12-9/30/17.

Redmer, D.A. Acquisition of equipment for the shared reproductive physiology laboratory spaces. 9/1/13-8/31/14.


Schroeder, J.W. Metabolic relationships in supply of nutrients for lactating cows. 2/14/14-9/30/18.

Stokka, G.L. Evaluation of holistic systems/strategies to enhance the health and well-being of livestock. 10/1/14-9/30/19.

Swanson, K.C. Factors Influencing efficiency of nutrient use in ruminants. 10/1/12-9/30/17.

Vonnahme, K.A. Reproductive performance in domestic ruminants. 10/1/12-9/30/16.

Wagner, S.A. Improvement of animal welfare through the assessment and treatment of pain in livestock. 10/1/12-9/30/17.
### Department of Plant Sciences

**Appendix** (to be used for departmental and college records but not forwarded to Provost.)

I. Listing of active grants and contracts (Investigators, funding agency, total value)

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<td>Moving Corn North: Developing the Next Generation of Early Maturing Products</td>
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<td>Breeding the Next Generation of Short-Season Corn Products</td>
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<td>Introduction of Raspberry Cultivars for Small Fruit Production in North Dakota</td>
<td>Dai, W.</td>
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<tr>
<td>Identify and Develop Durum Wheat Resistant to Fusarium Head Blight (Amendment)</td>
<td>Elias, E., Manthey, F., Zhong, S.</td>
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<td>Identify and Develop Durum Wheat Resistant to Fusarium Head Blight</td>
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<td>Identification of Molecular Markers Associated with a Low Cadmium Uptake Gene(s) in Durum Wheat</td>
<td>Elias, E.</td>
<td>ND Crop Improvement Seed Association</td>
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<td>Use of Throughput Genotyping Systems to Detect Markers Associated with Agronomic Traits in Durum Wheat</td>
<td>Elias, E., Chao, S.</td>
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<td>Targeted Grazing as a Keystone Ecological Process to Reduce Tillage Intensity and Terminate Cover Crops</td>
<td>Gramig, G., Carr, P.</td>
<td>Montana State University</td>
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<td>Multifunctional Natural Food Additive from Corn and Dried Distillers Grains</td>
<td>Hall, C.; Manthey, F.; Jeradechachai, T.</td>
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<td>Development of Reduced Flavored Pea Flour</td>
<td>Hall, C.; Jeradechachai, T.</td>
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<td>Selecting Superior Juneberry Cultivars from North Dakota</td>
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<td>Northern Grapes: Integrating Viticulture, Winemaking</td>
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<td>Germplasm Evaluation of Cold Hardy Winegrape Cultivars and Management Research to Support a Growing Industry in ND</td>
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<td>Developing a Vinification Procedure for the Testing of NDSU Grape Accessions and Continued Nursery Evaluations</td>
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<td>Developing Cold-Hardy Wine Grapes with Early Acclimation</td>
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<td>Development of Superior Juneberry Cultivars</td>
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<td>Defining Glyphosate &amp;Dicamba Drift Injury Thresholds in Field Peas, Dry Beans, and Potatoes</td>
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<td>HOPS Selections for ND</td>
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**Helms**

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<td>Visual Ratings for Iron-Deficiency Chlorosis</td>
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<td>Breeding of Improved Non-GMO Cultivars and Germplasm</td>
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<td>Breeding of Glyphosate-Resistant Soybean Cultivars</td>
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<td>Increasing Awareness of Soybean Cyst Nematode in ND</td>
<td>Markell, S.; Helms, T.</td>
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**Horsley**

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<td>Horsley, R.; Edwards, M.</td>
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<td>Breeding and Genetics of Six- and Two-Rowed Malting Barley</td>
<td>Horsley, R.</td>
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<td>Developing 6- and 2-rowed malting barley cultivars with enhanced FHB resistance and reduced DON accumulation</td>
<td>Horsley, R.</td>
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<td>Development of Two-Rowed Malting Barley and Salt-Tolerant Cultivars for North Dakota</td>
<td>Horsley, R.; Schwarz, P.</td>
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<td>Sunflower Seed Size Effect on Pyroxasulfone Injury to Seedlings and Droplet Size Effect on Weed Control</td>
<td>Howatt, K.</td>
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<td>Nozzle Performance Impacts on Roundup plus Co-Herbicides</td>
<td>Howatt, K.</td>
<td>Monsanto</td>
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<td>Seeding Date, Cultivar, and Location Influence on Soybean Performance and Phenology in Eastern ND</td>
<td>Johnson, B.</td>
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<td>Genotype Screening and Seeding Date Influence on Winter Canola in North Dakota</td>
<td>Johnson, B.</td>
<td>Northern Canola Growers</td>
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<td>Seeding Date Effect on Winter and Spring Canola</td>
<td>Johnson, B.; Eriksmoen; Rickertsen; Hanson</td>
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<td>Soybean Productivity with Iron Chelate on Raised Seedbeds</td>
<td>Kandel, H.</td>
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<td>Soybean Response to Nitrogen Management under Tile Drained Conditions</td>
<td>Kandel, H.</td>
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<td>Revision of Recommendations for Selected Establishment Factors in Dry Bean</td>
<td>Endres, G.; Kandel, H.</td>
<td>Northarvest Bean Growers Association</td>
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<td>Impact of Selected Establishment Factors on Soybean Production</td>
<td>Endres, G.; Kandel, H.</td>
<td>ND Soybean Council</td>
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### Lee

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<td>Selection and Breeding of Vegetable Crops for Local Production</td>
<td>Lee, C.</td>
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<td>Ensuring Accessibility and Suitability of Open-Pollinated Vegetable Varieties</td>
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### Manthey

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<td>Identifying Genotypic Differences in Kernel Bleaching of Durum Wheat</td>
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<td><strong>Transfer of FHB Resistance to NDSU Hard Red Winter Wheat Breeding Material</strong></td>
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<td>USDA/ARS - USWBSI</td>
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<td><strong>Development for Hard Red Winter Wheat Breeding Material for the Northern Plains</strong></td>
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<td><strong>Use of Recurrent Mass Selection to Pre-Breed Hard Red Winter Wheat</strong></td>
<td>Marais, F.</td>
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<td><strong>An Integrated Program to Accelerate Breeding of Resilient, More Productive Beans for Smallholder Farmers</strong></td>
<td>McClean, P.</td>
<td>Penn State University</td>
<td>9/23/2013-9/22/2014</td>
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<td><strong>Development and Implementation of Robust Molecular Markers and Genetic Improvement of Common and Tepary Beans to Increase Grain Legume Production</strong></td>
<td>McClean, P.; Osorno, J.</td>
<td>US AID - University of Puerto Rico</td>
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<td><strong>Development and Implementation of Robust Molecular Markers and Genetic Improvement of Common and Tepary Beans to Increase Grain Legume Production</strong></td>
<td>McClean, P.; Osorno, J.</td>
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<td><strong>Iron Deficiency Chlorosis: Getting to the Root of the Problem</strong></td>
<td>McClean, P.; Stupar, R.; Orf, J.</td>
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<td>Targeted Development of Modern Common Bean Ideotype</td>
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**McGinnis**

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<td>Evaluating Apples (Edible and Ornamental) for North Dakota Commercial Nursery and Orchard Industries</td>
<td>West, T.; Hatterman, H.; McGinnis, E.; Garden-Robinson, J.</td>
<td>ND Dept of Ag/Specialty Crop Block Grant</td>
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**McMullen**

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<tr>
<td>Production of Oat Varieties with Improved Milling Quality and Unique Nutritional Characteristics Attractive to Consumers - Phase 2</td>
<td>McMullen, M.</td>
<td>PepsiCo, Inc</td>
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**McPhee**

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<td>Studies on Cold Acclimation of Winter Legumes</td>
<td>McPhee, K.</td>
<td>ND Specialty Crop Block Grant</td>
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<td>Pea, Lentil, and Chickpea Breeding</td>
<td>McPhee, K.</td>
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<td>Characterization and Validation of Two Distinct Mechanisms for Partial Resistance to Sclerotinia Sclerotiorum in Pea</td>
<td>McPhee, K.</td>
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<td>Western Regional Cool Season Food Legume Evaluation Trials</td>
<td>McPhee, K., Vandemark, G., McGee, C., Chen, C., Schauer, C., Bergman, J., Schatz, B.</td>
<td>USA Dry Pea and Lentil Council</td>
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<td>Identification of Major Genes - QTL for Sclerotinia Resistance in Cultivated Sunflower and Wild Helianthus</td>
<td>McPhee, K., Lili, Q.</td>
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<td>Continuing Breeding Adapted Spring Wheat Cultivars to Better Serve MN Wheat Growers</td>
<td>Mergoum, M.</td>
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<td>Developing Specialty Spring Wheat Germplasm/Cultivars with Insect Resistance and Adapted to ND</td>
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### Osorno

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<td>Genetic Improvement of Middle-American Climbing Beans in Guatemala</td>
<td>Osorno, J. McClean, P.</td>
<td>Michigan State/USAID</td>
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<td>Planning Meeting - Genetic Improvement of Guatemalan</td>
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<td>Dry Bean Improvement for the Northern Plains</td>
<td>Osorno, J.</td>
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<td>Genetics of Resistance in Dry Bean to Soybean Cyst Nematode</td>
<td>Nelson, B.; Osorno, J.</td>
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<td>Developing Pinto Bean Breeding Lines with Multiple Resistance to Diseases of Importance in ND</td>
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<td>Weed Control in Sugarbeets</td>
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<td>Sugarbeet Res. &amp; Ed. Board of Mn &amp; ND</td>
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<td>Duration of Spent Lime Effects in a Field with High Aphanomyces Population</td>
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<td>Evaluation of Potential Conventional Canola Breeding Lines Developed from Winter X Spring Crosses in ND</td>
<td>Rahman, M.</td>
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<td>Breeding for Frost Tolerant Spring Canola in North Dakota</td>
<td>Rahman, M.</td>
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<td>Development of High Oil per Acre Conventional Canola Cultivar by Utilizing Modern Double Haploid Breeding Technique</td>
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<td>Development of New Canola Germplasm for Increased Oil Per Acre Adapted in the North Central Region</td>
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<td>Strategies for Meeting N Requirements of Wheat with New Fertilizers and Fertilizer Additives</td>
<td>Ransom, J.</td>
<td>MN Wheat Research &amp; Promotion Council</td>
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<td>Technical Support for a Revised Corn Hybrid Testing Program</td>
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<td>Evaluation of Bt-Traits in Corn Hybrids for Control of Corn Rootworm in ND</td>
<td>Knodel, J.; Ransom, J.</td>
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<td>Demonstrating the Value of Distillers Grain for Soil Fertility Enhancement</td>
<td>Ransom, J.</td>
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<td>The Effects of G77 Nitrification Inhibitor on Corn Nitrogen Response (2014)</td>
<td>Ransom, J.</td>
<td>Koch Agronomic Services, LLC</td>
<td>3/1/2014-3/31/2015</td>
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<td>CRW Product Efficacy in the Corn Growing Region</td>
<td>Ransom, J.</td>
<td>Monsanto/Service Order #12</td>
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<td>Verification of the Value of Genetic Resistance and Fungicides on the Control of FHB in Winter Wheat</td>
<td>Ransom, J.</td>
<td>USDA/ARS-USWBSI</td>
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<td>Can Grain Protein Content be Predicted Prior to Flowering?</td>
<td>Ransom, J.</td>
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<td>Increase Durum Yield</td>
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<td>Sustainable Durum Production in North Dakota</td>
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<td>Barilla</td>
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<td>Improving Postemergence Herbicides in Potato Production</td>
<td>Robinson, A.; Hatterman, H.</td>
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<td>Fresh Market Potato Variety Testing</td>
<td>Robinson, A.; Thompson, S.; Secor, G.</td>
<td>Northern Plains Potato Growers</td>
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<td>Fresh Market Potato Variety Testing</td>
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<td>Sustainable Production of Dakota Trailblazer</td>
<td>Robinson, A.; Thompson, S.; Gudmestad, N.; Larsen, R.</td>
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<td>Operational Needs for the Potato Extension Specialist</td>
<td>Robinson, A.</td>
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<td>Operational Needs for the Potato Extension Specialist</td>
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<td>Validation of Biochemical Markers to Predict Sugar End Development under Field Conditions</td>
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<td>Defining Glyphosate &amp; Dicamba Drift Injury Thresholds in Field Peas, Dry Beans, and Potatoes</td>
<td>Ostlie, M.; Zollinger, R.; Robinson, A.; Hatterman, H.;</td>
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<td>Managing Blemish Problems to Improve Marketing of Fresh Potatoes</td>
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<td><strong>Schwarz</strong></td>
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<td>Evaluation of Barley and Malt for DON and Deoxinivalenol-3- Glucoside</td>
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<td>Schwarz, P.</td>
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<td>Development of Two-Rowed Malting Barley and Salt-Tolerant Cultivars for North Dakota</td>
<td>Schwarz, P.; Horsley R.</td>
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<td>Validation of a Model for the Prediction of Malt Fermentability</td>
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<td>American Malting Barley Association</td>
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<td>From Hybridizing to Release - Cultivar Development for the Northern Plains</td>
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<td>Development of Multipurpose Potato Cultivars with Enhanced Quality, Disease, and Pest Resistance</td>
<td>Thompson, S.; Gudmestad, N.; Secor, G.; Hatterman, H.; Robinson, A.; Voldseth, D.</td>
<td>USDA/NIFA</td>
<td>9/1/2014-8/31/2015</td>
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<td>Discovery of Specific Starch Properties of NDSU Potato Germplasm for Nutritional and Industrial Applications</td>
<td>Thompson, S.; Simsek, S.</td>
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<td>Assessing the Potential for Remote Sensing of Potato Virus Y in Potato Seed Fields</td>
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<td>Selection, Evaluation, and Propagation of Woody Plants for the Northern Great Plains</td>
<td>West, T.</td>
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<td>Evaluating Apples (Edible and Ornamental) for North Dakota Commercial Nursery and Orchard Industries</td>
<td>West, T.; Hatterman, H.; McGinnis, E.; Garden-Robinson, J.; Leboldus, J.</td>
<td>ND Dept of Ag/Specialty Crop Block Grant</td>
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<td>$36,063 (Shared $98,075)</td>
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**Zhang**

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<td>Salinity Tolerance in Alkaligrass Compared to Other Cool-Season Turfgrasses</td>
<td>Zhang, Q.</td>
<td>Barenbrug</td>
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<td>Dry Edible Bean Tolerance to Dicamba</td>
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<td>Northarvest Bean Growers Association</td>
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<td>Controlling Volunteer Roundup Ready (RR) Canola with PRE Herbicides</td>
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<td>Weed Control in HPPD Resistant Soybean</td>
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<td>Dicamba Rotational Crop Safety - Service Order #14</td>
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<td>Monsanto</td>
<td>4/30/2014-4/30/2015</td>
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<td>Evaluation of MON 63479 Premergence in Soybeans</td>
<td>Zollinger, R.</td>
<td>Monsanto</td>
<td>4/30/2014-4/30/2015</td>
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<td>BAS 820H/Helan/Formulation/Timing/Weed Control Efficacy</td>
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<td>Soil Water Use Shift in Soybeans</td>
<td>Goos, J.; Zollinger, R.</td>
<td>ND Soybean Council</td>
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<td>$4,725 (Shared $11,345)</td>
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<td>Defining Glyphosate &amp; Dicamba Drift Injury Thresholds in Field Peas, Dry Beans, and Potatoes</td>
<td>Ostlie, M.; Zollinger, R.; Robinson, A.; Hatterman, H.;</td>
<td>ND Dept of Ag/Specialty Crop Block Grant</td>
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<td>Educational Programs that Promote Soybean Production Practices to Manage Herbicide Resistant Weeds and the Development of Herbicide Resistance</td>
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### Appendix

#### I. Listing of active grants and contracts (Investigators, funding agency, total value)

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<thead>
<tr>
<th>Investigator(s)</th>
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<th>Departmental portion</th>
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<tr>
<td>J. Anderson, L.E. del Río, M. Foley, D. Horvath</td>
<td>Sclerotial germination in response to environmental and crop-specific factors: USDA-ARS Sclerotinia Initiative</td>
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<td>Brueggeman R.</td>
<td>USDA-ARS</td>
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<td>Burrows, M. and Pasche, J.S.</td>
<td>Northern Pulse Growers Association</td>
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<td>del Río L.E.</td>
<td>Identification of resistance and pathogenicity genes associated with <em>Sclerotinia sclerotiorum</em> infection using next-generation sequencing: USDA-ARS Sclerotinia Initiative</td>
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<td>del Río, L.E.</td>
<td>Improving the Sclerotinia stem rot advisory: monitoring ascospores and leaf wetness duration: USDA-ARS Sclerotinia Initiative</td>
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<td>del Río L.E., J. Knodel, S. Markell, M. Smith</td>
<td>2014 Canola disease and flea beetle survey for North Dakota and Minnesota- Northern Canola Growers Association</td>
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<td>Project Title and Agency</td>
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<td>del Río L.E., M. Rahman, and S. Halley</td>
<td>Identification of <em>B. napus</em> sources of resistance to and development of <em>B. juncea</em> breeding populations with resistance to blackleg: USDA-CSREES</td>
<td>$80,205</td>
<td>$63,718</td>
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<td>DeJong, W., Charkowski, A., Gray, S., … Yan, G. P. … and 25 other PIs</td>
<td>Biological and economic impacts of emerging potato tuber necrotic viruses and the development of comprehensive and sustainable management practices, funded by USDA-NIFA-SCRI</td>
<td>$8.4 million</td>
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<td>Dill-Macky, R.</td>
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<td>Ishimaru, C.</td>
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<td>Dubcovsky, J , et al, including S. Zhong</td>
<td>Triticeae-CAP - USDA-NIFA</td>
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<td>Friesen T. and Brueggeman R.</td>
<td>Montana Wheat and Barley Commission</td>
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<td>Friskop, A.</td>
<td>Developing a Corn Plant Pathology Program at NDSU – North Dakota Corn Council</td>
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<td>Friskop, A., Schatz, B., and Gautam, P.</td>
<td>Uniform Fungicide Trials in ND – US Wheat and Barley Scab Initiative</td>
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<td>Gautam, P., del Río L.E., and J. Knodel</td>
<td>Integrated management of blackleg in canola: Northern Canola Growers Association</td>
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<td>Gudmestad, NC</td>
<td>Screening of potato germplasm for genetic resistance to the potato mop top virus- USDA-ARS</td>
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<td>Gudmestad, NC</td>
<td>Support of irrigated potato research in North Dakota in 2011- Northern Plains Potato Growers Association</td>
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<td>Gudmestad, NC</td>
<td>Screening of cultivars for susceptibility to PMTV-induced tuber necrosis-USDA/AMS/ND Dept Ag</td>
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<td>Assessment of potato cultivars for expression of bacterial ring rot-USDA-ARS</td>
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<td>Gudmestad, NC</td>
<td>Zebra chip and potato exports: Pest delimitation and vector/pathogen biology- National Potato Promotion Board</td>
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<td>Gudmestad, NC</td>
<td>New breeding strategies for Verticillium wilt resistance in potato using Ve gene- USDA-ARS</td>
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<td>Metam Sodium Control of Verticillium Wilt in High OM and Fine-Textured Soils- MN Area II</td>
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<td>Evaluation of fluxapyrazad foliar fungicide in the laboratory- BASF</td>
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<td>Khan, M.</td>
<td>Sugarbeet extension programs and program maintenance. Sugarbeet Research and Education Board of Minnesota and North Dakota</td>
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<td>Khan, M.</td>
<td>Improving disease management and agronomic practices of sugarbeet. Sugarbeet Research and Education Board of Minnesota and North Dakota</td>
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<td>Khan, M.</td>
<td>Evaluating fungicides for controlling diseases of sugarbeet. Gift funds from chemical and sugar companies.</td>
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<td>Khan, M.</td>
<td>Sensitivity of <em>Rhizoctonia solani</em> to fungicides. Western Sugar Cooperative</td>
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<td>Khan, M.</td>
<td>Evaluate biological fungicides, Serenade and Sonata, for controlling Rhizoctonia damping off of sugarbeet-North Dakota State Board of Agricultural Research and Education</td>
<td>$7683</td>
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<td>Kinzer, K., Knodel, J.J., and S. Markell</td>
<td>Great Plains Diagnostic Network, National Plant Diagnostic Center Laboratories for Plant Disease and Pest Diagnosis &amp; Surveillance, USDA / Kansas State University</td>
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<td>Knodel, J.J.</td>
<td>2014 Wheat Pest Survey in North Dakota, North Dakota Department of Agriculture</td>
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<td>Knodel, J.J.</td>
<td>Fall Soil Survey for Wheat Midge in North Dakota, ND Wheat Commission 2014 Research Grants</td>
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<td>EIPM-CS Program in North Dakota, USDA NIFA - ND EIPM Coordination Grant.</td>
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<td>Dow AgroSciences, potato insecticide trials</td>
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<td>Monsanto Company, potato insecticide trials</td>
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<td>Bayer CropScience, corn insecticide trials</td>
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<td>Knodel, J.J. and P.B. Beauzay</td>
<td>Field Demonstration of Different Insecticide Strategies for Management of Soybean Aphids, North Dakota Soybean Council</td>
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<td>Knodel, J., D. Grafstrom, V. Chapara and L. Lubenow</td>
<td>Early Alert System in Canola: Aster Leafhopper- Aster Yellows, Northern Canola Growers Association</td>
<td>$15,750</td>
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<td>Knodel, J.J., J. Ransom, and M. Boetel</td>
<td>Evaluation of Bt-traits in Corn Hybrids for Control of Corn Rootworm in ND, North Dakota Corn Utilization Council</td>
<td>$39,802</td>
<td>$27,532</td>
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<td>LeBoldus, J.M., Blodgett, J.T.</td>
<td>Monitoring riparian forest health on the Northern Great Plains: a case study examining <em>Armillaria</em> induced tree mortality following extreme flooding and drought- USDA Forest Service</td>
<td>$30,000</td>
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<td>LeBoldus J.M</td>
<td>Cottonwood Restoration in Riparian Forests- USDA-Specialty Crop Block Grant</td>
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<td>Liu, Z.H.</td>
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<td>ND Wheat Commission</td>
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<td>Monsanto</td>
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<td>Liu, Z.H</td>
<td>NDSU Provost Office</td>
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<td>Markell, S.</td>
<td>Downy mildew: Establishment of baseline sensitivity to two fungicides and monitoring for pathogen race changes.</td>
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<td>$23,342</td>
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<td>Markell, S.</td>
<td>Evaluation of select biofungicides of efficacy as seed treatments in canola - BASF</td>
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<td>Markell, S.</td>
<td>Increasing awareness of SCN in North Dakota – North Dakota Soybean Council.</td>
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<td>Markell, S. and Harveson, R.</td>
<td>Evaluation of fungicides for management of Phomopsis stem canker – National Sunflower Association</td>
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<td>$8,000</td>
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<td>McPhee, K., Pasche J., Chilvers, M. and Porter, L.</td>
<td>National Sclerotinia Initiative</td>
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<td>Nelson, Berlin Jr.</td>
<td>Virulent Types of Soybean Cyst Nematode in North Dakota- State Board of Agriculture, Research and Education and the North Dakota Soybean Council</td>
<td>$76,500</td>
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| Nelson, Berlin Jr. | Soybean Research Program  
Seedling diseases of soybean: Characterization and education. United Soybean Board | $64,630 | |
<p>| Nelson, Berlin Jr., Brueggeman, Robert | High density genotyping of a diverse population of Sclerotinia sclerotiorum. USDA-ARS Sclerotinia Initiative | $115,798 | 115,798 |
| Nelson, Berlin Jr., Osorno, Juan M. | Genetics of resistance in dry bean to soybean cyst nematode. Northarvest Bean Growers Association. | $44,415 | $29,280 |
| Nelson, B., Osorno, J., Markell, S. Jain, S. | Soybean Cyst Nematode Outreach and Characterization of the Genetic Basis for Resistance in Dry Bean – North Dakota Department of Agriculture- 2014 Specialty Crop Block Grant | $100,000 | $9,000 |
| Nelson, Berlin Jr., Wick, Abbey | Effect of soil salinity on disease resistance of soybean- North Dakota Soybean Council | $37,500 | $37,500 |
| Nowatzki, J., Markell, S., Bajwa, S., Kandel, H., and Bora, G. | Demonstrate the effectiveness of unmanned aircraft systems (UAS) in soybean crop management. | $18,791 | $0 |
| Pasche, J. S. | Industry support includes research support dollars for applied research from private companies including but not limited to Valent, Gowan, BASF, The McGregor Company and Syngenta | $25,200 | |
| Pasche, J.S. | Northern Pulse Growers Association | $21,490 | $21,490 |
| Pasche, J.S. | Northern Pulse Growers Association | $10,719 | $10,719 |
| Pasche, J.S. | Northern Pulse Growers Association | $29,702 | $29,702 |
| Pasche, J.S. | North Dakota Dry Edible Bean Seed Growers Association | $9,270 | $9,270 |
| Pasche, J.S. and Markell, S.G. | Northarvest Dry Bean Growers | $63,652 | $63,652 |
| Pasche, J.S. and Markell, S.G. | State Board of Agricultural Research and Education | $6,779 | $6,779 |</p>
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<td>Monitoring sensitivity of Cercospora beticola to foliar fungicides in sugarbeet fields of Minnesota and North Dakota. Sugar Beet Research and Education Board of MN and ND</td>
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## II. Listing of active grants and contracts (Investigators, funding agency, total value)

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<td>NIFA</td>
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<tr>
<td>Zeleznik</td>
<td>Agriculture Research Service</td>
<td>$4,160</td>
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</table>

**Grand Total** | **$ 6,597,397.00**
Appendix

I. Listing of active grants and contracts

**Teresa Bergholz**

“Implementing inquiry-driven assessments of microbial diversity in undergraduate laboratory courses” funded by the Academic Section of the Association of Public Land-Grant Universities, September 2014 to August 2015. PI, Teresa Bergholz. $2,000

“Novel treatments to reduce pathogens on fresh produce” funded by NDSU Development Foundation, May 2014 to September 2014. PI Teresa Bergholz. $4,000

“Role of cell envelope stress responses in *Listeria monocytogenes* transmission” funded by NDSU COBRE, July 2014 to June 2015. PI Teresa Bergholz. $45,000


**Total - $134,765**

**Peter Bergholz**

Status: Active Departmental Start-up Funds

Dates: 1/1/2014 – 12/31/2015

Amount: $97,000

Principal Investigator: Peter Bergholz

**Total - $97,000**

**Prüß**

Graduate Student Research Award

ND EPSCoR

Ph.D. Student: Sara Smith

Advisors: Birgit M. Prüß and Teresa Bergholz

Amount: $ 42,046

Award period: Jul 2014 to Jun 2016

**Total - $42,046**

**Fisher**

NASA / UND EPSCORE Program, “Improving Ultraviolet Germicidal Irradiation—microbiological tests.”

$27,178/direct cost

The goal of this study is to evaluate the influence of various UV-reflective environments on the kinetics of UVGI inactivation of microorganisms on sensitive electrical components of spacecraft, with a focus on inactivation of Gram-positive endospores and geometrically complex surfaces.

**Total - $27,178**

**Gibbs**

State Board of Agriculture Research and Education “Phenotypic and Genotypic Epidemiology of Infectious Bovine Keratoconjunctivitis (Pink eye) due to Moraxella bovis and M. bovoculi
across North Dakota. Amount granted $10,333.

**Total - $10,333**

**Ramamoorthy**
Rapid, computational immuno-assay for the detection of the porcine epidemic diarrhea virus [PEDV]
Agency: ND-SBARE
Investigators: Sheela Ramamoorthy, Eric Nelson
Role: PI
Amount: $6300
Award Period: Mar 2014 – Mar 2015

Homing in on “effective” antibody responses to enhance PRRSV prophylaxis
Agency: ND Dept. of Commerce Venture Awards
Investigators: Sheela Ramamoorthy, Peter Nara, Brett Webb
Role: PI
Amount: $ 99,965
Award Period: April 2014- July 2016

Rational antigen design for porcine circovirus strain 2 (PCV2) vaccines and diagnostics
Agency: ND Dept. of Commerce Venture Awards
Investigators: Sheela Ramamoorthy, Peter Nara, Brett Webb
Role: PI
Amount: $ 99,995
Award Period: April 2014- July 2016

Novel, first generation vaccine against the porcine epidemic diarrhea virus
Agency: ND APUC
Investigators: Sheela Ramamoorthy, Brett Webb
Role: PI
Amount: $ 56,500
Award Period: May 2014- May 2015

Tools for Torque Teno virus research
Agency: NDSU Protease COBRE center pilot projects
Investigators: Sheela Ramamoorthy, Brett Webb
Role: PI
Amount: $ 188,500 [Direct funds - $130,000, Indirect costs- $58,500]
Award Period: June 2014- June 2016

Designing vaccine antigens to enhance efficacy and detection
Agency: USDA -AFRI
Investigators: Sheela Ramamoorthy, Brett Webb, Peter Nara, Eric Nelson
Role: PI
Amount: $ 149,976 [Direct funds - $104,995, Indirect costs- $44,981]
Award Period: June 2014- June 2016

Polymeric adjuvants for peptide vaccines
Agency: ND-APUC
Investigators: Andriy Voronov, Sheela Ramamoorthy, Shane Stafslien, Eric Nelson
Role: CO-PI
Amount: $ 87,792 [$25,875 to me]
Award Period: June 2014- June 2016
Total - $689,028

**Schuh and Dorsam**

NIH/NHLBI-1R15 HL117254-01 HA in fungal allergic asthma
Agency: NIH/NHLBI
Investigators: Schuh (PI), Dorsam (collaborator)
Award: $434,750

NIH/NIAID-1R15 AI101968-01 Eosinophil trafficking in fungal allergic asthma
Agency: NIH/NIAID
Investigators: Dorsam (PI), Schuh (collaborator)
Award: $434,750

Endotoxin exposure in the allergic lung: agriculture-related health pilot project
Agency: High Plains Intermountain Center for Agricultural Health and Safety
Investigators: Ghosh (PI), Schuh (supervisor)
Award: $24,840
Total - $894,340
Veterinary Diagnostic Services Department

Appendix

I. Listing of active grants and contracts (Investigators, funding agency, total value)

**Mostrom** Grants funded: FY14 USWBSI and ARS grant *Diagnostic Services for Vomitoxin (DON) in Wheat* ($106,055)


Ramamoorthy, S., **Webb B.T. (co-PI)** Novel, first generation vaccine against porcine epidemic diarrhea virus. ND Agricultural Products Utilization Committee, 6/2014, $56,000.

**Webb, B. T. (PI)** Enhancing analytical and diagnostic capabilities to strengthen the national food safety system. FDA, CVM. 7/2014, $16,500/ year.

**Dyer, NW.** NAHLN Member Laboratory Agreement. National Animal Health Laboratory Network. $55,000, 5/1/14. 1 year

**Dyer, NW.** NAHLN Swine surveillance cooperative agreement. National Animal Health Laboratory Network. $3850. 4/1/14. 1 year

**Dyer, NW.** Epidemiology and Laboratory Capacity (West Nile virus surveillance). Centers for Disease Control and Prevention/North Dakota Department of Health. $34,073. 8/1/14. 1 year

*Total of $539,430*
Publications
Publications and Presentations

Refereed Journal articles: 39


Abstracts

Bora, G. The Effect of Temperature and Precipitation on the yield of Spring Wheat in North Dakota. ASABE Paper No. NC-14-027


Jia, X. Tile drainage converted to controlled drainage and subirrigation. 2014. Red River Basin Commission 31st Annual Conference

Jia, X. Tiling water management. 2014. North Dakota’s 11th Annual Certified Crop Advisers Meeting


Sun, J., Khan, E., Simsek, H. 2014. Bioavailability of organic nitrogen in wastewater to two different pure culture algal species. ASABE Intersectional Meeting, March 28-29, Brookings, SD

Proceedings Papers


Bora, G. Evaluation of sensors for sensing characteristics and field of view for variable rate technology in grape vineyards in North Dakota. Journal of Applied Horticulture


Maharlooei, M., S. Sivarajan, S. G. Bajwa, J. P. Harmon and J. Nowatzki. 2014. Digital imaging technique to detect and count aphids in soybean. 18th World Congress of CIGR, Beijing, China, 16-19 September 2014. – oral presentation with proceeding article


Pothula, A. K., C. Igathi, M. A. Momin, R. Whittaker, and J. Halvorson. Effect of water temperature on milled industrial beet juice multiple extraction. ASABE Annual International Meeting, New Orleans, Louisiana. CONTROL ID: 2189954


Pothula, A. K., C. Igathi, S. Kronberg, and J. Hendrickson. Identification of nodes and internodes of chopped biomass stems by Image analysis. ASABE and CSBE/SCGAB Annual International Meeting, Montreal, Quebec Canada. Paper number: 14192378


Shen, J., and C. Igathi. Effective Moisture Diffusion Coefficients Determination During the Initial Stage of Biomass Pyrolysis under Non-isothermal Conditions Using a Thermogravimetric Analyzer. ASABE and CSBE/SCGAB Annual International Meeting, Montreal, Quebec Canada. Paper number: 141912985


Tumuluru, J. S., C. Igathi, and D. Archer. Energy analysis and break-even distance for transportation for biofuels in comparison to fossil fuel. ASABE Annual International Meeting, New Orleans, Louisiana. CONTROL ID: 2188618


National or International Invited Presentations

Bon, Tom.   Lectured one week at the Tashkent Institute of Irrigation and Melioration, Tashkent, Uzbekistan.  Introduction to Statistical Experimental Design with 15 professors, MS, and Ph.D. students in attendance

Bora, Ganesh. Taught Advanced Agricultural Technology Management. Kazak National Agricultural University, Almaty, KZ. 40 students


Books (0)

Book Chapters

Schemer, M., Igathi, C. 2014. “Production and supply logistics of switchgrass as an energy feedstock” In “Sustainable Bioenergy Production” CRC Press (Taylor & Francis Group), USA L. Wang (Eds)

Research Reports


Popular Press articles


Hellevang, K. 8 Tips for Long-Term Storage. Successful Farming Magazine Agriculture.com 2014


Hellevang, K. To Bag or Not to Bag? Grain Bags One Option for Farmers Who Need Temporary Storage Quickly. The Progressive Farmer. August 14, 2014


Hellevang, K. Piling Corn Outside? Here are 9 things to know before you dump the first load Farm Progress. October 28, 2014

Hellevang, K. Alternative Grain Storage. North Dakota Corn Growers Association CORN TALK, October/November 2014

Hellevang, K. NDSU Offers Tips on Harvesting, Drying and Storing Late Maturing and High Moisture Corn. University of Minnesota Crop News


Hellevang, K. Railcar Shortage Puts Grain in Bins at Risk, May 23, 2014. Farmprogress.com
Hellevang, K. Monitor stored corn, soybeans as weather warms, March 25, 2014. Corn & soybean Digest, cornandsoybeandigest.com

Hellevang, K. Be prepared for grain quality surprises in your bins, April 25. Farm Journal Magazine


Hellevang, K. Humidifiers, August 2014. Consumers Digest

Nowatzki, J. Precision Agriculture Technologies. News Magazine. FM Extra

Nowatzki, J. The importance of Good Planter Set-up. Article. Urbandale News

Nowatzki, J. NDSU, collaborators set Ag drone research plan. AgWeek


Nowatzki, J. LiDAR Applications to Precision Agriculture. May 22, 2014. Successful Farming

Nowatzki, J. UAS Research at Carrington. May 22, 2014. AgWeek


Patents

Department of Agribusiness and Applied Economics Annual Report: Calendar Year 2014

Journal Articles (published/accepted)

Aakre, Dwight, “Projected Budgets for Irrigated Crops”, Farm Management Planning Guide, March 2014. Publications for eastern, central and western North Dakota were completed


Haugen, Ron, Tim Petry, Frayne Olson and Dwight Aakre; “Plotting a Course 2014: Short-term and Long-term Agricultural Planning Prices for North Dakota; North Dakota State University Extension Service Circular EC-1090 (Revised), January 2014


Lim, SH, C Wachenheim, D Roberts, L Burbidge and J Jackson. 2014. Gender Differences in Economics. NACTA Journal 58: 335-340


Wachenheim, Cheryl, Brook R, Robert Hearne, William Nganje “Identifying Market Preferences for High Selenium Beef” Paper Conditionally Accepted for Publication, Journal of Food Distribution Research, October 2014


2014 Book/Book Chapters


2014 Departmental Reports

2015 No. 739

2015 No. 738

2015 No. 737
Valuing Switching Options in International Grain Marketing, Johansen, Stephan, William Wilson, Bruce Dahl

2015 No. 736
Petroleum Industry's Economic Contribution to North Dakota in 2013, Bangsund, Dean A., Nancy M. Hodur

2014 No. 735
Regional Economic Effects of Irrigation Along the McClusky Canal in North Dakota, Bangsund, Dean A., David M. Saxowsky, David Ripplinger

2014 No. 734
Economic Feasibility of Irrigation Along the McClusky Canal in North Dakota: Farm-level Returns, Ripplinger, David, David M. Saxowsky, Dean A. Bangsund

2014 No. 733
Results of the North Dakota Land Valuation Model for the 2014 Agricultural Real Estate Assessment, Aakre, Dwight G., Ronald Haugen

2014 No. 732
Risk Exposure of Financial Failure for North Dakota Grain Handling, Wilson, William W., Bruce Dahl
2014 No. 731
Financial Characteristics of North Dakota Farms, 2004-2013, Swenson, Andrew L

2014 No. 730

2014 No. 729
Economic Impact of the North Dakota University System in 2013, Coon, Randal C., Dean A. Bangsund, Nancy M. Hodur

2014 No. 728
Potential Availability and Cost of Flax Straw for Commercial Application, Coon, Randal C., Nancy M. Hodur, Dean A. Bangsund

2014 No. 727

2014 No. 726
Dynamic Changes in Spatial Competition for Fertilizer, Wilson, William W., Sumadhur Shakya, Bruce Dahl

2014 No. 725

2014 No. 724

2014 No. 723
The Conservation Reserve Program: A Literature Review, Wachenheim, Cheryl J., William C. Lesch, Neeraj Dhingra

2014 No. 722
Factors Influencing Conservation Practice Adoption in Agriculture: A Review of the Literature, Lesch, William C., Cheryl J. Wachenheim

2014 No. 721
North Dakota Agricultural Land Valuation Model, Aakre, Dwight, Ron Haugen, David Saxowsky

Other Reports:


Bangsund Dean A. and Nancy M. Hodur. 2014 “Socio-Economic Effects of Oil and Gas Industry in Western North Dakota 2014 to 2019”, report to KLJ for inclusion in contract report to ND Legislative Management interim committee, August, 2014

II. Publications and Presentations

Refereed Journal Articles Published (n = 51, 2 invited)


pregnancy. Reprod. 148:1-10


Vonnahme, K.A. 2014. 2013 Early Career Achievement Award: Recognizing achievement of young scholars working to foster the discovery, sharing, and application of knowledge concerning the responsible use of animals to enhance human life and well-being. J. Anim. Sci. 92:873-874


Refereed Journal Articles Accepted or In Press (n = 14, 1 invited)


Papers Published in Proceedings of Meetings (n = 3)


Abstracts Published in Refereed Publications (n = 39)


Abstracts Published in Proceedings of Meetings (n = 47)


**Abstracts Accepted or In Press in Refereed Journals (n = 9)**


Doscher, F.E., M.C. Ruch, J.D. Kirsch, M.L. Bauer, and K.C. Swanson. 2015. The influence of dry-rolled corn particle size and dried corn distillers grains plus solubles inclusion levels on digestibility in steers


Gaspers, J.J., G.L. Stokka, J.M. Young, T.C. Gilbery, S.R. Underdahl, M.L. Bauer,


Abstracts Accepted or In Press in Proceedings of Meetings (n = 4)


National or International Invited Presentations (n = 20)


Caton, J.S. Impacts of maternal nutrition and selenium supply on offspring responses. Western Nutrition Conference. Edmonton, Canada. September 24, 2014

Caton, J.S. Effects of maternal nutritional plane and selenium supply on offspring growth and intestinal biology. University of Nottingham. Nottingham, UK. June 17, 2014


Newman, D.J. Pork quality factors to consider: Retail benchmarking audit. Hormel Foods Corp. Austin, MN. March 2014


Reynolds, L.P. 5α-Reduced Steroids in Parturition and Extra-Uterine Survival. No Name Society Mtg. Albuquerque, NM. October 2014


Swanson, K.C. Feedlot Nutrition at NDSU. NCCC208 USDA Regional Feedlot Nutrition Committee Meeting. Wooster, OH. May 2014

Swanson, K.C. What technologies are available to increase carcass gain, especially if Zilmax is lost permanently? Great Lakes Professional Cattle Feeding and Marketing Short Course. Michigan State University. Michigan, OH, and Ontario. January 2014


**Books (n = 1)**


**Book Chapters (n = 9)**


**Book Chapters in Press (n = 1, 1 invited)**


**Reports to Granting Agencies (n = 7)**

Dahlen, C.R. and E.P. Berg. Evaluation of glycated hemoglobin as a metabolic marker for marbling in commercial feeder cattle. Final report submitted to the North Dakota State Board of Agriculture Research and Education

Berg, E.P. Comparison of red meat versus high carbohydrate diet as a means of preventing tissue-specific down-regulation of insulin receptors. Final report submitted to the North Dakota State Board of Agriculture Research and Education

Berg, E.P. Comparison of red meat versus high carbohydrate diet as a means of preventing tissue-specific down-regulation of insulin receptors; qPCR. Final report submitted to the National Pork Board
Grazul-Bilska, A.T. Progress report for USDA grant

Maddock, R. J. and K. Beauchamp. Land, cattle, beef, and people. Update report to USDA at Project Directors Meeting

**Popular Press Articles in 2014 (n = 67)**

Bauer, M.L. Every man has a right to his own opinion, but no man has a right to be wrong in his facts: But facts don’t always persuade. ND Stockman. February 2014


Dahlen, C.R. NDSU leads beef cattle breeding research. 2014 Annual Highlights of NDSU AES and NDSU Extension Service


Dahlen, C.R. It’s time to body condition score cattle, adjust nutrients for calving and re-breeding goals. ND Stockman. November 2014


Dahlen, C.R. Increasing plane of nutrition is important heading into breeding season. ND Stockman. April 2014
Dahlen, C.R. Help cattle cope with cold weather. NDSU Agriculture Communications news release. January 3, 2014


Lardy, G.P. Be flexible on weaning dates. Progressive Cattleman

Lardy, G.P. Ownership Options: The ins and outs of retaining a calf crop. Santa Gertrudis J. 2014


Lardy, G.P. Late winter management. Tri-State Livestock News. February 2014

Lardy, G.P. Argentina trip was a learning experience. Tri-State Livestock News. March 2014

Lardy, G.P. False teeth for the older cows down in Argentina: South American ranch provides plastic dentures to keep costs down. Tri-State Livestock News. April 13, 2014


Lardy, G.P. Crop residues one means of extending grazing. Tri-State Livestock News. September 2014


Maddock, R.J. Decreasing utility usage in meat plants. Meatingplace.com. September 2014

Maddock, R.J. Improving beef carcass yields by temperature recording. Carnetec. December 2014
Newman, D.J. Keep North Dakota swine virus free. NDSU Ag News. February 21, 2014

Newman, D.J. Biosecurity vital in combating swine virus in North Dakota. NDSU Ag News. February 27, 2014

Newman, D.J. Seminar set on swine health at fairs, sales. NDSU Ag News. March 17, 2014

Newman, D.J. 2015 should be profitable for hog producers. NDSU Ag News. September 16, 2014


Schroeder, J.W. Dairy Focus: Spring thaw can contribute to feed waste. Agri-View. March 12, 2014

Schroeder, J.W. Dairy Focus: North Dakota has rich dairy history. Dairy Herd Management. March 28,
Schroeder, J.W. Will 2014 be a dairy industry year to remember? Agri-View. April 7, 2014


Schroeder, J.W. Dairy Focus: Meeting the dairy portion of the Farm Bill. NDSU Agriculture Communication. August 29, 2014

Schroeder, J.W. Dairy Focus: The basics of corn silage. NDSU Agriculture Communication. September 15, 2014

Schroeder, J.W. Dairy Focus: Holstein bull calves have value. NDSU Agriculture Communication. October 15, 2014


Schroeder, J.W. Dairy Focus: Little time left to decide on MPP. NDSU Agriculture Communication. November 26, 2014

Swanson, K. Thoughts on beef research priorities. North Dakota Stockman. November 2014


**Reviewed Extension Publications in 2014 (n = 9)**


Dahlen, C.R. AS-1712. Estrus synchronization for natural service breeding in beef cattle

Hammer, C.J. V-541. Strangles

Lardy, G. and V. Anderson. AS-1242R. Feeding coproducts of the ethanol industry to beef cattle

Newman, D. and J. Young. AS-1708. North Dakota swine health recommendations: Exhibitors of all pigs going to exhibits or sales

Newman, D. and J. Young. AS-1709. North Dakota swine health recommendations: Organizers of exhibits or sales

Stokka, G.L. and C.R. Dahlen. AS-1731. A preventative herd health program: Checklist for beef producers

**Videos (n = 3)**

https://www.youtube.com/watch?v=yCTF57Js39A&feature=youtu.be

Stokka, G.L. 2014. Remove net wrap from baled forages. NDSU Extension Communications Camp


**Software (n = 1)**

Hanna, L.H. Cow Herd Appraisal Performance Software (CHAPS). Assisted with concepts and items that should be included in the upgraded CHAPS program. Provided ideas of how research data could be collected through program
Department of Plant Sciences

II. Publications and presentations

1. Refereed Journal Articles

Berti


Cai


Carena

Hallauer, A.R., and M.J. Carena. Registration of BS39 maize germplasm (under review)

Carena, M.J. A call to preserve public short-season maize cultivar releases carrying unique genetic diversity (under review)
Dong, N., and M.J. Carena. NDSU EarlyQPM and NDSU Early QPMF programs: Developing the next generation of corn nutritional products (under review)


Laude, T.P., and M.J. Carena. Genetic diversity and heterotic grouping of tropical and temperate maize populations adapted to the northern U.S. Corn Belt (published)

Bari, M.A.A., and M.J. Carena. Can expired proprietary maize (Zea mays L.) industry lines be useful for short-season breeding programs? II. Agronomic traits (published)


Dai

Huang, D. and W. Dai. 2014. Molecular characterization of the basic helix-loop-helix (bHLH) genes that are differentially expressed and induced by iron deficiency in Populus. Plant Cell Reports (in press)


Elias


Hall


Xu, Y., **Hall III, C.*,** and Manthey, F. 2014. Effect of flaxseed flour on rheological properties of wheat flour dough and on bread characteristics. J. Food Research. 3(6):83-91. doi:10.5539/jfr.v3n6p83

Stastny, S.*, Keith, K. and **Hall III, C.* 2014. Lipid and moisture content of commercial reduced-fat deep-fried potatoes compared to advertised claim. J. Food Research. 3(5):45-48. doi:10.5539/jfr.v3n5p45. (Role: all research in this paper was conducted under my direction)

Stastny, S., Keith, K. and **Hall III, C.* and Garden-Robinson, J. 2014. Flash-frying vs. Deep-fat frying: fat content and sensory evaluation of fish fried using two methods. Food Studies: An Interdisciplinary Journal 3:19-26. (Role: all analytical and sensory research in this paper was conducted under my direction)

**Hammond**


**Hatterman-Valenti**

**Hatterman-Valenti, H. M.** 2014. Simulated glyphosate drift to potato mother plants and effect on daughter tubers used for seed production. Weed Technology 28:253-258

**Johnson**


**Kandel**


Lee


Li, Deving


Han L., Y. Gao, and D. Li. 2014. Ion uptake in tall fescue as affected by carbonate, chloride, and sulfate salinity. PLoS ONE 9(3): e91908. doi:10.1371/journal.pone.0091908

Yin, S., Q. Li, W. Liu, and D. Li. 2014. Managing tall fescue (Festuca arundinacea L.) and zoysiagrass (Zoysia japonica Steud.) mixtures as turfgrass in transition zone. Agron. J. 106:1-6. doi:10.2134/agronj2013.0148. I am the corresponding author for all with responsibility in experimental design, data analysis, and final write up.

Lym

Lym, R.G. 2014. Comparison of aminocyclopyrachlor absorption and translocation in leafy spurge (Euphorbia esula) and yellow toadflax (Linaria vulgaris). Weed Sci. 62:321-325
Manthey


Marais


McClean

Schmutz J, McClean (Schmutz and McClean are co-first authors) P, Mamidi S, Wu GA, Cannon SB, Grimwood J, Jenkins

J, Shu S, Song Q, Chavarro C, Torres-Torres M, Geffroy V, Moghaddam S M, Gao D, Abernathy B, Barry K, Blair M, Brick


MMS, Miklas PN, Osorno JM, Rodrigues J, Thureau V, Urrea CA, Want M, Yu Y, Zhang M, Wing RA, Cregan PB, Rokhsar


O'Rourke JA, Iniguez LP, Fu F, Bucciarelli B, Miller SS, Jackson SA, McClean PE, Li J, Dai X, Zhao PX, Hernandez G,


Mamidi S, Lee RK, Goos RJ, McClean PE (2014) Genome-wide association studies identifies seven major regions responsible for iron deficiency chlorosis in soybean (Glycine max). PLoS ONE 9(9): e107469


Rahman M, Mamidi S, McClean P (2014) Quantitative trait loci mapping of seed colour, hairy leaf, seedling anthocyanin, leaf chlorosis and days to flowering in F2 population of Brassica rapa L. Plant Breeding 133:381-389

McGinnis


McPhee


Mergoum


Mona Mazaheri, Penny M.A. Kianian, Mohamed Mergoum, Giorgio L. Valentini, Ajay Kumar, Raed Seetan, Yong Q. Gu, Seyed M. Pirseyedi, Nils Stein, Marie Kubaláková, Jaroslav Doležel, Anne M. Denton, Shahryar F. Kianian. 2014. Deployment of transposable element junctions to unlock the barley genome. Plant Genome 7 (1): (published online: https://www.crops.org/publications/tpg/articles/7/1/plantgenome2013.10.0036)


Oliver


Osorno


Rahman

Schwarz


Shetty


Simsek


Chong, H.H., Simsek, S., Reuhs, B.L. 2014. Chemical properties of pectin from industry hot and cold break tomato products. Food and Nutrition Sciences. 5:1162-1167


One of the most downloaded articles. Please see link: (http://cerealchemistry.aaccnet.org/action/showMostReadArticles?journalCode=cchem)


West
Journal Articles – Published


Journal Articles – Submitted

West, T.P. and N.J. Jahnke. Micropropagation of ‘Blue Moon’ Wisteria. Submitted to Propagation of Ornamental Plants. Under review. This manuscript is from an undergraduate research project which Nathan presented a research poster at the annual American Society for Horticultural Science meeting and won 1st place for undergraduate research poster competition.

Zhang

Zhang, Q. and K. Rue. 2014. The effect of glycinebetaine priming on seed germination of six turfgrass species under drought, salinity, or temperature stress. HortScience 49:1454-1460

Zhang, Q. and K. Rue. 2014. Alkalinity showed limited effect on turfgrass germination under low to moderate salinity. HortScience 49:1201-1204


2. Abstracts

Carena


Dai


Elias


Gramig


Hall

Hatterman-Valenti


Howatt


**Johnson**


Lee


Li, Deying

Gao, Y. and D. Li. 2014. Influence of Nitrogen forms of fertilizer on tall fescue salinity tolerance. Nov. 2-5, 2014. ASA, CSSA and SSSA Annual Meetings. Long Beach, Ca

Lym


Manthey


Marais


R Sharma Poudel and GF Marais (2014). Pyramiding Fhb1 with Useful Rust Resistance Genes in a Winter-hardy Wheat Genetic Background. National Fusarium Head Blight Forum, December 7-9, St. Louis, Missouri


Mcclean


McPhee


Adhikari, E., M.A. Grusak, and K.E. McPhee. Genetic and environmental effect on mineral nutrient accumulation in pea. VI IFLRC and VII ICLGG Conference, Saskatoon, Saskatchewan, July 7-11, 2014.


Mergoum

Ajay Kumar, Shalu Jain, Muhammad J. Iqbal, Elias M. Elias, Shahryar Kianian, Mohamed Mergoum. 2014. Fine Mapping and Validation of a Major QTL for Gluten Strength. In ASA-CSSA-SSSA Abstracts 2014 [CD-ROM], Along Beach, CA, USA


Osorno


Peters


Rahman


Rahman, M. (2014) Modern Canola Breeding Program at North Dakota State University. An abstract for 2014 International Annual Meetings organized by ASA-CSSA-SSSA at Long Beach, CA, USA from Nov. 2-6, 2014

Ransom


Robinson


Robinson, Andrew P. Utilization of NAA as a Seed Treatment to Control Stem Number in Russet Burbank. Potato Expo. 8-10 Jan 2014. San Antonio, TX.

West


Zhang
Zhang, Q. and K. Rue. 2014. Effects of mixed saline-alkaline conditions on turfgrass quality and vegetative growth. In Annual meetings abstracts [CD-ROM]. ASA, CSSA, and SSSA, Madison, WI.


Zollinger


Zollinger, R., 2014. Herbicide efficacy through adjuvants. Midwest Laboratory Annual Conference. Omaha, NE

Zollinger, R. 2014. Common Lambsquarter Control – Chapter 3. WSWS (81)


Howatt, K. and R. Zollinger. 2014. Glufosinate efficacy with tank-mix partners and droplet size. NCWSS, St. Paul, MN. (172)

3. Proceedings/papers

Berti

Cai


Hall


Hammond


Hatterman-Valenti


Kandel


Manthey


Peters

Soil-Applied Herbicides over Spring Seeded Cover Crops. Thomas J. Peters and Aaron L. Carlson, North Dakota State University, Fargo ND, Presented at the NCWSS, Minneapolis, MN, December 3, 2014, 10:50 to 11:30 [35]

Waterhemp Control in Sugarbeet, Aaron L. Carlson and Thomas J. Peters, North Dakota State University, Fargo ND, Presented at the NCWSS, Minneapolis, MN, December 3, 2014, 11:00 to 11:30 [30]

4. National or International Invited Presentations/Other Presentations

Berti


Samarappuli, D., A. Aponte, O. Teuber, R.W. Gesch, and M.T. Berti. 2014. Intercropping corn and forage sorghum for hay production in North Dakota. ASA-CSSA-SSSA International Annual Meetings. 2-6 November 2014, Long Beach, CA


Cai

Wheat cytogenetics project: enriching the gene pool for wheat breeding (project report and proposal), ND Wheat Commission, Fargo, ND, April 1, 2014

Homoeologous recombination-based genome mapping and gene introgression (invited), Huazhong Agricultural University, China, March 16, 2014

Chromosome biology: potentials and challenges for plant improvement (invited), Huazhong Agricultural University, China, June 8, 2014

Manuscript preparation in biology: writing and data Analysis and interpretation (invited), Huazhong Agricultural University, China, June 9, 2014

Carena

Carena, M.J. 2014. Corn breeding webinar, invitation by Dr. Rex Bernardo, University of Minnesota, October 10
Carena, M.J. 2014. Corn breeding and production invited field lecture for CFS450/650 class (40 students under Dr. Leland Myers). Fargo, ND, October 1


Carena, M.J. 2014. At the request of the National Institute of Agricultural Technology (INTA, Argentina) and the National Association of Agronomy Engineers (AIAMBA), I was invited as plenary speaker of the seminar ‘Mejoramiento genetico del maiz para el desarrollo de la proxima generacion de cultivares de ciclo corto’. Pergamino, Argentina. May 9

Carena, M.J. 2014. At the request of the National University of Rosario (UNR, Argentina), I was invited as plenary speaker of the seminar ‘Desafios y oportunidades del sector publico para el desarrollo de cultivares de maiz’. Rosario, Argentina. May 8


Christoffers


Dai


May 15, 2014, “Mapping of X-disease resistant genes in chokecherry” at Anhui Agricultural University in Hefei, China. Invited talk

May 20, 2014, “Mapping of X-disease resistant genes in chokecherry” at Agricultural University of Hebei in Baoding, China. Invited talk


Deckard

March 26, 2014. Introduction to College Teaching. NDSU College of Engineering (invited)
June 24 to July 5, 2014. World Agriculture/Food Security. Ten two-hour lectures to 300 undergraduate students at China Agriculture University, Beijing, China

July 21, 2014. North Dakota Agriculture. Presentation to new International Students, Department of Communication (invited)

Gramig

Invited guest lecture for Pat Carr’s class at Dickinson State University, Oct. 20, 2014

Hatterman-Valenti

January, Weed science research update for high-value crops, Wild World of Weeds, Fargo, ND invited

February, Grape growing for the novice North Dakota Grape and Wine Association annual meeting, Bismarck, ND invited

February, Glyphosate drift to potatoes: a producer and seed grower perspective, NPPGA and MN Area II Reporting Conference, Grand Forks, ND invited

March, Understanding glyphosate injury to seed potatoes, North Dakota Potato Seed Growers annual meeting, Grafton, ND invited.

April, Low maintenance perennials, Spring Fever Extension Video-conference, Fargo, ND invited

April, Grape growing for gardeners, Spring Fever Extension Video-conference, Fargo, ND invited

April, Pruning your backyard grapes, Garden Saturday, Bismarck, ND invited

June, Growing grapes in Montana: what you need to consider, MSU grape extension mtg, Kalispell, MT invited

July, Considerations when growing grapes in central ND, Carrington REC field day, Carrington, ND invited.

July, Small fruit field research update, NDSU Horticulture field day, Fargo, ND invited.

August, High-value crops field research update, ND Horticulture Society annual meeting, Absaraka, ND invited.

August, How to implement balanced pruning in grapes, ND Horticulture Society annual meeting, Absaraka, ND invited.

September, Understanding grape quality parameters for wine, NDGWA Vine to Dine, Buffalo, ND invited.

October, High-value crops field research, Mid America Collegiate Horticulture Society annual meeting, Absaraka ND, invited.

October, North Dakota small fruit and grape research, NC222 annual meeting, Corvalis, OR invited
November, North Dakota NE1020 variety trial update and other grape research, Geneva, NY invited

**Howatt**


January 8. Small grain and oilseed research discussion. Manitoba-North Dakota Zero Tillage Farmers Association Workshop

Minot, ND. invited


February 18. Controlling tough weeds in soybean. Soybean Expo. Fargo, ND invited

February 21. Common herbicide use and new technologies for controlling tough weeds. Crop Production Meeting. Napoleon, ND invited


July 17. Resistant weeds and new technology impact. Langdon Field Day, Langdon, ND invited

July 29. Herbicide-resistant weeds – symptoms and expression as related to hail damage. Crop-Hail School. Fargo, ND invited

September 3. Using PREs and new technology. Grower Meeting. Arthur, ND invited

September 16. Using PREs and new technology. Grower Meeting. Page, ND invited

**Johnson**

July 29, 2014 - Hail research past and present NDSU studies. NDSU/NCIS Annual Summer Hail School Workshop. July 28-30

Fargo, ND. Attendees 120 to 140
Aug. 7, 2014 - Winter canola adaptation in North Dakota. NC7-RTAC Annual Meeting. 7-8 Aug. Purdue Univ., West Lafayette, IN. Attendees 15 to 20

Nov. 20, 2014 - Winter and sprinter canola research update. Northern Canola Growers Association Research Forum Meeting at the NDSU Alumni Center. Attendees 35 to 50

**Kalb**

Spring Fever Garden Forums. This educator hosted 12 presentations that were delivered to 43 Extension offices and hundreds of home computers across the state.

How to Destroy Bugs and Diseases in Gardens. April 8 in Hettinger; April 8 in Bowman; April 10 in Steele; April 30 in McClusky; June 26 in Bismarck

Ten Steps to a Fantastic Vegetable Garden. March 26 in Mandan, April 11 in Bismarck; October 31 statewide to Master Gardeners

Starting a Backyard Orchard. February 12 statewide in FAARMS webinar; May 2 in Tuttle; October 31 statewide to Master Gardeners.

Easy Lawn Care. April 30 in McClusky; May 1 in Ashley

Superior Vegetable Varieties for North Dakota, April 3 statewide via Spring Fever Garden Forums; April 12 in Bismarck.

Cool Berries for a Cold Climate, April 11 in Bismarck

Heritage Gardens, April 8 in Hettinger

Autumn Joy: Fall Yard Care, September 16 in Bismarck

**Kandel**

I presented six research talks with 186 attendees. Number between [ ] indicates number of participants


2013 National Sunflower Survey Results. 2014. 36th Sunflower Research Forum, Ramada Plaza, Fargo. January 8, 8:30-9 p.m. [155]

**2014 [38 meetings and 2528 participants]**

Black and Navy Bean Population Study Update. Walsh County Crop Improvement Association, Park River December 15, 7:30- 8 p.m. [54]
IDC: Causes and Effects. Prairie Grains Conference soybean reporting session. December 11, 8-8:30 a.m. [124]

Time to Look at Alternative Crops. Ryan Pederson (canola growers), Kevin Capistran (sunflower growers), Bob Sinner (conventional soybean) and Hans Kandel. Northern Ag Expo, December 3, 1:10-2 p.m. [53]

Why Producers are Interested in Tiling. The Tank, Hettinger county meeting. November 19, 9-10 a.m. [24]

Crop Management. Training for Ag agents. Loftsgard hall. October 22, 8-9:30 a.m. [8]

Soybean Production Research Update. Extension Annual Fall conference. October 3, 9:30-10 a.m. [25]

Soybean Research at NDSU. South East Asia buyers delegation NDSU campus greenhouse. September 25, 2014, 8:30-8:45 a.m. [19]

Soybean Cyst Nematode Tour, Trail County, near Galesburg. September 23, 10:30-10:50 a.m. [24]

Soybean Cyst Nematode Tour, Richland County, near Wyndmere. September 22, 10:25-10:45 a.m. [35]

Soybean variety selection. Steele County plot tour. September 18, 4-4:25: p.m. [27]

Soybean Cyst Nematode Tour, Cass County, near Hunter. September 18, 10:30-10:50 a.m. [51]

Extension Booth, Big Iron agricultural show, West Fargo. September 10 and 11 two hours each day. [25]

Pick the Right Soybean Variety for your Field. Plot Tour. Park River. September 8. 9:50-10 a.m. [5]

Dry bean seeding rate. Plot Tour. Park River. September 8. 9:10-9:25 a.m. [5]

Selection of Soybean Varieties. Carrington Row Crop Tour. September 3, 5-5:15 and 6:30-6:45 p.m. [55].

Soybean varieties, Ransom County Plot tour, August 28, 6-6:25 p.m. [14]

Planting Delay Effects on Crops. 2014 NCIS Crop-Hail School. Fargo campus, July 29. (9:30-10:15 a.m. [78]

Soybean on Raised Seedbeds. Plot tour Casselton seed farm. July 14, 6:6:20 p.m. [66]

Managing soil moisture to optimize production. Land Improvement Seminar. Agassiz Drain Tile, Hastings Landing, Drayton, March 25, 9:00-10:00 a.m. [9]

Managing soil moisture to optimize production. Land Improvement Seminar. Agassiz Drain Tile, Crookston Inn, Crookston, March 10, 9:00-10:00 a.m. [12]

Soybean Production Issues. Pioneer meeting, Courtyard by Marriott, Moorhead, March 7, 11-11:45. [24]

Agronomic and Economic Considerations of Drainage. Subsurface Drainage Design and Water Management Workshop. U of M Crookston Campus, March 6, 8-8:45 a.m. [56]
Sunflower Production. 2014 Western Crop and Pest Management School. Grand Hotel, Minot, March 4 9-9:30 a.m. [117]


Sunflower and Canola Production. Eastern Crop Scout School. Holiday Inn, Fargo, February 26 1:30-2 p.m. [102]


Subsurface Water Management: An Agronomists Perspective, Crop Connect Conference, Victoria Inn Convention Centre, Winnipeg, MB. February 19, 9:35-10:15 a.m. [77]

Agronomic and Economic Considerations of Drainage. Subsurface Drainage Design and Water Management Workshop. NDSCS, Wahpeton, February 12, 8-8:45 a.m. [51]

Crop Rotations. Eastern Ag Days. Double D’s, Hatton. 11:25-noon. [39]

Iron Chlorosis Deficiency in Soybean. Best of the Best in Soybean and Wheat Production. Courtyard by Marriott, Moorhead. February 6, 2:30-3 p.m. [154]

Subsurface Drainage and subsurface Irrigation. Best of the Best in Soybean and Wheat Production. Courtyard by Marriott, Moorhead. Hand on sessions (10x). February 6, 11:30- 1:30 p.m. [154]

Iron Chlorosis Deficiency in Soybean. Best of the Best in Soybean and Wheat Production. Alerus, Grand Forks. February 5, 1:30-2 p.m. [291]

Subsurface Drainage and subsurface Irrigation. Best of the Best in Soybean and Wheat Production. Alerus, Grand Forks. Hand on sessions (10x). February 5, 11:30-1:30 p.m. [291]

Soybean Variety and Management. Getting it Right in Soybean Production, American Legion, Wishek, January 28, 10:00-10:55 a.m. [36]

Soybean Variety and Management. Getting it Right in Soybean Production, Emergency Management building, Mohall. January 14, 10:00-10:55 a.m. [42]

Soybean Variety and Management. Getting it Right in Soybean Production, Senior Center, Velva. January 14, 10:00-10:55 a.m. [55]

Soybean Research Update. Lake Region Extension Roundup, Devils Lake. January 7, 11:00-11:25 a.m. [81]

**Six Plot Tours with 9 participants**
J. Johnson and J. Stich, Jemco Power Saver. NW22 water management via control structures and pump units. September 17, 2014, 10 -11:45 a.m. [2]


A. Hoppe, Land ‘O’ Lakes Plant Nutrition Research Specialist. NW22 tile project. August 21, 2014, 11:15-12:00 p.m. [1]

N. Kalwar and C. Augustin, area specialists, Langdon and Minot REC. NW22 tile project. August 20, 2014, 4:15-5:15 p.m. [2]

G. Endres, area specialist, Carrington REC. Prosper and NW22 tile project. August 20, 2014 1:30 p.m. – 4 p.m. [1]


Lee

March 10, 2014. “Vegetable grafting,” presented during the high tunnel workshop for home gardeners and commercial growers. NDSU Extension Service/Cass County, Casselton, ND.


Lym

Presented an invasive weed control update at the Wild World of Weeds in Fargo on 22 Jan 14


Manthey

April 11, 2014, Functional and Alternative Pasta Ingredients, Northern Crops Institute, Fargo, ND. Invited speaker as part of their Pasta Short Course.

May 15, 2014, Non-Traditional Pasta, Northern Crops Institute, Fargo, ND. Invited speaker

August 7, 2014, Durum Wheat Quality Program, Fargo, ND, Invited by Wheat Food Council as part of their Wheat Safari program for Food/nutrition reporters.

McClean


Mining Genes Controlling Agronomic and Quality Traits from the Common Bean Genome. Cargill Lectureship. Colorado State University. Fort Collins, CO. September 25, 2014. Invited


McGinnis

Fern Lecture. NDSU Architecture Class 789-04. February 12 [8]

The Mystery of Flowers, Keynote Speaker, North Dakota State Horticultural Society, Fargo, ND, August 8 [40]

McMullen

Invited presentation at American Oat Workers Conference. The Oat Newsletter and the AOWC: where we’ve been and where we’re Going (Charlene Wight, AAFC, Ottawa, ON, Canada; Mike McMullen, NDSU, USA

McPhee

Invited to present, “Pulse Crop Breeding,” at the 21st Annual Northern Pulse Growers Association Meeting, Minot, ND, January 27, 2014

Invited to present update on pulse crop breeding at: NCREC Pulse Day, Dickinson REC Field Day

Mergoum

I was invited and presented an oral presentation at The International Symposium on Genetics and Plant Breeding at the II Meeting of Genetics and Plant Breeding of the State of Rio de Janeiro, 04 November 04-06 – 2014, Universidade Estadual do Norte Fluminense Darcy Ribeiro-UENF, Brazil

I had numerous presentations for the International Trade Teams that visit ND for importing wheat from ND
Two poster presentations at the 2014 ASA-CSSA-SSSA annual meeting at Long Beach CA, USA (See Abstracts list)

Three posters at the National Fusarium Head Blight Forum, St. Louis, Missouri, December 7-9, 2014

I had also many presentations for ND wheat Commission, Country Rep., wheat growers in field days

**Osorno**


May 12, 2014: Genetic Improvement of Middle-American Climbing Beans in Guatemala. Global meeting of Feed the Future, Legume Innovation Lab. Athens, Greece. **Invited**


October 6-8, 2014: NDSU Dry Bean Breeding/Genetics Program. Baicheng Academy of Agricultural Sciences of Jilin Province. Baicheng, China, and also at Jiangsu Academy of Agricultural Sciences (JAAS), Nanjing, China. **Invited**

**Peters**

I have an Idea: Let’s Develop a New Biotech Trait, presentation at the 52nd International Sugarbeet Institute, Alerus Center, Grand Forks, North Dakota, March 12, 2014, 1:15-2:00 [165]

Weed Control in Sugarbeet, presentation to visitors from Kyrgyzstan, Walster Hall, March 28, 2014, 9:30-11:00 [9]

What is going on with sugarbeet? Presentation to the Granite Falls Kiwanis Club, Granite Falls, Minnesota, May 1, 2014, 12:00-1:00 [11]

1st lap Around the Track; the Journey Lies Ahead, Red River Valley Sugarbeet Growers Association, Hilton Garden Inn, Fargo, ND, October 28, 2014, 4:00-4:30 [18]

Soil-Applied Herbicides over Spring Seeded Cover Crops, Symposium: Cover Crops, North Central Weed Science Society, Minneapolis, MN, December, 3, 2014, 10:50-11:30 [38]

Roadmap to Managing Weed Resistance, Update to SBARE, Greenhouse Conference Room, North Dakota State Univ., December 17, 2014, 1:45 to 2:15, [24]
Weed resistance management in sugarbeet, American Crystal Sugar Company, Moorhead, MN, January 13, 2014, 11:30 to 12:00 [40]

Weed Control in Sugarbeet, Grand Forks Grower Seminar, Alerus Center, Grand Forks, February 11, 2014, 8:30-9:15 a.m. [175]

Weed Control in Sugarbeet, Fargo Growers Seminar, Holiday Inn, Fargo, ND, February 13, 2013, 8:30-9:15 a.m. [125]

Weed Control in Sugarbeet, Glendive Growers Seminar, Knights of Columbus Hall, Glendive, MT, March 4, 2014, 9:30-10:45 a.m. [15]

Weed Control in Sugarbeet, Sidney Growers Seminar, St. Matthew’s Elementary, Sidney, MT, March 5, 2014, 10:30-11:30 a.m. [35]

Waterhemp Control in Soybean, an Assessment of 2014 and Plan for 2015, Dakota Ag Cooperative, Kindred, ND, 2:30-5:00 [35]

A Systems Approach to Weeds Management in North Dakota, Fall Extension Conference, Doublewood Inn, Fargo, ND, October 1, 2014, 11:45-12:30 [27]

Brainstorming to Develop Weeds Management Programs in North Dakota Field, Fall Extension Conference, Doublewood Inn, Fargo, ND, October 2, 2014, 9:30-10:15 [35]

Rahman

Given an oral presentation at 8th Annual Canola Research Meeting organized by “Northern Canola Growers’ Association, USA” at Alumni Center, NDSU, Fargo, ND, USA on November 20, 2014

Given an oral presentation on “Genetic Analysis and Molecular Markers of Root morphology of Canola” at 2014 International Annual Meetings organized by ASA-CSSA-SSSA at Long Beach, CA, USA from Nov 02 – 06, 2014

Given an oral presentation on “NDSU modern canola breeding program” at 2014 International Annual Meetings organized by ASA-CSSA-SSSA at Long Beach, CA, USA from Nov 02 – 06, 2014

Ransom

Made 35 presentations at various meetings and field days. Most were invited except for the meetings that I organized. Total number addressed by these meetings was 2,546.

Robinson

Research report from 2014 potato trials. MN Area II Potato Council research meeting. 19 Nov. Alexandria, MN. [24]


Zidua herbicide 2014 research update. RDO, NDSU, Lamb Weston and BASF Potato Sustainability & Biologicals Field/Plant Tour and Discussion. 3 Sep. Park Rapids, MN. [20] Invited

Update and overview of potato production and research in 2014. NPPGA Field Day. 21 Aug. Larimore, ND. [150]

Controlling stem number with Rejuvenate and slow release phosphorous. NPPGA Field Day. 21 Aug. Inkster, ND. [200]

Red and yellow potato variety trial. 21 Aug. Hoople, ND. [150]


Potato variety trial and agronomic update in Minnesota Central Sands. 15 Jul. Becker, MN. [60]


Potato agronomy update: Summary of 2013. Minnesota Area II Potato Growers Short Course. 4 Mar. Duelm, MN. [70]

Question and answers about herbicides. Centrol Crop Consulting Agronomist meeting. 28 Feb. Fargo, ND. [40] Invited


Update on herbicide trials in potato – 2013. RD Offutt Agronomist meeting. 13 Feb. Park Rapids, MN. [50] Invited


Invited


Schwarz


and how we test, and interpreting results (Invited presentation)


(Invited presentation)

February 6, 2014. Minot ND. North Dakota Crop Improvement and Seed Association Conference. How much barley is in that

beer? (Invited presentation)

March 15, 2014. Rehoboth Beach, DE. MBAA Eastern Technical Conference. Malt Modification: A key to understanding

malt analyses. (Invited presentation)

October 24, 2014. Londrina Brazil. Federal University of Technology – Parana (Undergraduate Seminar) Introduction to North Dakota State University (Invited presentation)

October 25, 2014. Londrina Brazil. Federal University of Technology – Parana (Graduate Beverage Technology course). Craft

Brewing in the United States (Invited presentation)
Shetty

University of Pondicherry, India; Department of Food Science and Technology, January 2014, “Systems-Based Plant & Food Metabolic Innovations to Address Global Food Security & Health Challenges”

Prince of Songkla University at Phuket Campus, Thailand, January 2014 at Phuket Sustainability Conference, Plenary Seminar on “Systems-Based Innovations to Address Food Security, Health & Ecological Challenges”

University of Mysore, India: Center for Studies in Microbiology, March 2014 “Systems-Based Plant & Food Metabolic Innovations to address Global Food Security & Health Challenges”

Zhejiang University, Hangzhou, China; Fuli Institute of Food Science and Nutrition, May 2014 Plenary Invited Lecture on “Metabolic Biology of Bioactive Components of Traditional & Future Foods”.

Uttarkhand University of Horticulture and Forestry, Ranichuri, India, May 2014 “Systems-Based Innovations as Solutions to Global Food Security & Health Challenges”

American Council of Medicinally Active Plants (ACMAP) 5th Annual Conference at North Dakota State University, Fargo, ND, USA, June 2014 Forum on “Crops for Health as Solution to Chronic Diseases: Strategic Vision for Agriculture and Global Food Security”

Chile Tree Nuts Association Conference in Vina Del Mar, Chile, June 2014, Plenary Invited Lecture; “Food ecology and Food diversity as rationale to integrate bioactive and functional foods for advancing better human health and global environment”.

Kagoshima University, Japan at College of Agriculture, July 2014 “Systems Strategies for Solutions to Global Food Security: from Plant Biology to Human Health”.

Invited Plenary Lecture at 24th Brazilian Congress on Food Science and Technology and 4th Congress on National on Science and Technology of Tropical Fruits, Sergipe, Aracaju, Brazil "Metabolic Biology & Biotechnology of Tropical Fruit Phytochemicals for Functional Foods & Human Health"

Institute for Science for Global Policy (ISGP) and Cornell University, Ithaca, NY, October 2014 Plenary Invited Lecture “Systems Solutions to Global Food Security Challenges to Advance Human Health and Global Environment Based on Diverse Food Ecology”

Invited Plenary Lecture at the 6th International Congress on Food Science and Food Biotechnology in Monterrey, Mexico, October 2014 “Strategic Vision for Advancing Global Food Security: A New Initiative for International Partnerships and Collaboration at North Dakota State University”

Pennsylvania State University, State College, PA, November 2014, Invited Seminar “Metabolic and Systems Solutions to Global Food Security Challenges”.

Simsek

Mendis, M., Leclerc, E., Simsek, S. 2014. Arabinoxylan hydrolyzates as immunomodulators. AACC International Meeting. Providence, Rhode Island. *First placed winner of the “AACC-I 2014 Best Student Research Paper Competition”. M. Mendis is PhD degree student in Dr. Simsek’s program


Thompson


February 6, 2014. NDSU potato cultivar development – resistance breeding efforts. EARTH University, Costa Rica. **Invited**


March 4, 2014 Potato breeding, selection and cultivar development – potato breeding program management. Guest lecture in PLSC785 Plant Breeding Program Management. **Invited**


July 27-31, 2014. Adoption of a real-time PCR-based strategy for the quantification of Verticillium dahliae in potato stems for the breeding of Verticillium wilt resistance at North Dakota State University. Sabba, RP, AL Thompson, JS Pasche, R Taylor, and NC Gudmestad. 98th Annual Meeting of the Potato Association of America, Spokane, WA.


August 27, 2014. RDO Processing Field Event, Park Rapids, MN. **Invited**


November 19, 2014. MN Area II Potato Research & Promotion Council/NPPGA Research meeting; Alexandria, MN

December 8, 2014 Evaluation of parental genotypes for traits using marker assisted selection. NCCC215 Potato Genetics Technical Committee Meeting. Chicago, IL

December 9, 2014. From hybridizing to release – cultivar development for the northern plains 2013 summary. NCCC215 Potato Genetics Technical Committee Meeting. Chicago, IL.

**West**


27 January 2014 - **Invited** presentation at the 2014 North Dakota Urban and Community Forestry Association (NDUCFA) and ND Nursery and Greenhouse Association (NDNGA) Conference on ‘Woody Plant Observations at the NDSU Dale E. Herman Research Arboretum’ and ‘Precision Tree Felling’. My ‘Precision Tree Felling’ presentation was approved by the Midwest Chapter of the International Society of Arboriculture for continuing education credits for arborist certification. 200+ in attendance. Fargo, ND

19-20 February 2014 - **Invited** presentations at the 58th Annual Iowa State University Shade Tree Short Course on ‘NDSU Woody Plant Research Program’ and “Aesthetics of Ornamental Bark”. Presented at four different sessions with average attendance of 50 people per session. ISU, Ames, IA

**Zollinger**

In 2014, I gave 92 presentations of which 10 were invited

**Zuk**

Cass Co. Extension Gardening Saturday event at Loftsgard Hall, Turf Diseases, 4/8/14

2014 Horticulture Field Day, Herbicide trial update, 8/7/14
North Dakota State Horticultural Soc. annual conference in Fargo, Growing a great lawn in North Dakota (two presentations), 8/9/14

5. Books

McPhee

Pisum Genetics, 2013. Vol. 45. (Editor-in-Chief)

6. Book Chapters

Carena


McClean

DeRon AM, Papa R, Bitocchi E, Gonzalez AM, Debouck DG, Brick MA, Fourie D, Marsolais F, Beaver J, Geffroy V,


Mergoum

Kumar, Ajay, Filippo M. Bassi, Monika K. Michalak de Jimenez, Farhad Ghavami, Mona Mazaheri, Kristin Simons,


285-318. Springer Netherlands, 2014

7. Research Reports
**Berti**

Midwest Forage Association.

Midwest Cover Crops Council- ND representative

SUNRISE quarterly reports

SBARE –New Crops final report

SunGrant final report

NCIS – alfalfa multi-peril insurance report

**Carena**

Sharma, S., and N. Dong. EEVO Genetics, Inc. NDSU Research and Technology Park. Innovation challenge proposal on marketing NDSU corn hybrids. Fargo, ND.

Carena, M. J. Moving corn north for northern Minnesota (MN). MN Ag. Expo, MN.

Carena, M.J. NDSU corn breeding program and hybrid development. Fargo, ND

Carena, M.J. Applied corn breeding for a sustainable ND corn production. North Dakota State Board for Agriculture Research and Education and North Dakota Corn Utilization Council Progress and Final Reports.

Carena, M.J. Developing cold and drought tolerant NDSU corn products for ethanol utilization and high quality protein livestock feeds. North Dakota Department of Commerce, APUC Final Report

Carena, M.J. Identification of high quality corn under cold stress. Minnesota Research & Promotion Council, Progress and Final Reports

Carena, M.J. Developing the next generation of faster drier corn products for northern MN. Minnesota Research and Promotion Council, Progress and Final Reports

Carena, M.J. The NDSU corn-breeding program has developed and released 10 new short- season corn products in April 2014: ND2031, ND2032, ND2033, ND2034, ND2035, ND2036, ND2037, ND2038, ND2039, and ND2040. PVP protection will be completed by industry and names were re-coded by Foundation Seed Company to license them to retailer companies who sell hybrids to corn farmers

10 PVP Disclosure Forms and Breeding Agreements have been filled out

**Hatterman-Valenti**

Hatterman-Valenti, H. C. Auwarter, and A. Robinson. 2014. Glyphosate carryover effect to daughter tubers from simulated glyphosate drift to four potato processing cultivars. MN Area II Potato Research and Promotion Council and Northern Plains Potato Growers Ass. 2014 Research Reports, p. 99-104

Hatterman-Valenti, H. C. Auwarter, and A. Robinson. 2014. Effect of simulated glyphosate drift to four processing cultivars. MN Area II Potato Research and Promotion Council and Northern Plains Potato Growers Ass. 2014 Research Reports, p. 105-109

Hatterman-Valenti, H. and C. Auwarter. 2014. Russet Burbank in-furrow fertilizer trial. MN Area II Potato Research and Promotion Council and Northern Plains Potato Growers Ass. 2014 Research Reports, p. 110

Hatterman-Valenti, H. and C. Auwarter. 2014. Desiccation in Red Norland Potatoes. MN Area II Potato Research and Promotion Council and Northern Plains Potato Growers Ass. 2014 Research Reports, p. 111

Hatterman-Valenti, H. and C. Auwarter. 2014. Irrigated starter fertilizer trial. MN Area II Potato Research and Promotion Council and Northern Plains Potato Growers Ass. 2014 Research Reports, p. 112-113

Hatterman-Valenti, H. and C. Auwarter. 2014. Red Norland in-furrow fertilizer trial. MN Area II Potato Research and Promotion Council and Northern Plains Potato Growers Ass. 2014 Research Reports, p. 114


Howatt


Johnsen
Johnson, B.L., and P.J. Petersen. 2014. 2013 Hail Research Report – Plant growth stage and cutoff effects on field pea yield. Submitted to the National Crop Insurance Service (NCIS), Overland Park, KS

Kalb


Kandel


Lym


**Manthey**


**Marais**


Marais, GF (2014). Development of a winter wheat breeding program for the northern plains. Annual Report to the North Dakota Wheat Commission, Fargo

**Robinson**


Robinson, A. Evaluation of Stoller USA Production on potato yield and quality. Stoller.

Robinson, A. Improving the economic and environmental sustainable production of potatoes with Arbuscular Mycorrhizal Fungi. Mycorrhizal Applications.

H. Hatterman-Valenti, C. Auwarter, and A. Robinson. Effects of simulated glyphosate drift to four potato processing cultivars.

NPPGA / MN Area II Potato Growers Research Report

H. Hatterman-Valenti, C. Auwarter, and A. Robinson. Glyphosate carryover effect to daughter tubers from simulated glyphosate drift to four potato processing cultivars. NPPGA / MN Area II Potato Growers Research Report

A. Robinson. Effects of Linex as a preemergence herbicide on Russet Burbank potato. NPPGA / MN Area II Potato Growers Research Report
A. Robinson and A. Thompson. Fresh market potato variety testing. NPPGA / MN Area II Potato Growers Research Report

A. Robinson, R. Larsen, A. Thompson, and N. Gudmestad. Sustainable production of Dakota Trailblazer. NPPGA / MN Area II Potato Growers Research Report

A. Robinson and H. Hatterman-Valenti. Using reduced herbicide rates to control buckwheat and nightshade in potatoes. NPPGA / MN Area II Potato Growers Research Report

A. Robinson. Effects of linex as a preemergence herbicide on russet burbank potato. North Dakota Weed Control Research.


Thompson


Zollinger


2 in Res. Prog. Rep. ND Soybean Growers Assoc.

49 in 2013 North Dakota Weed Control Research, NDSU, Fargo, ND

8. Popular Press articles

Carena - Media Interviews


Carena, M.J. Release of NDSU corn inbreds. Farm Broadcaster, Red River Farm Network National Association of Farm Broadcasting, West Region Vice President
**Helms - Media Interviews**

I was interviewed by a reporter for the Fargo Forum and an article was published. I was interviewed by a reporter from ‘Corn and Soybean’ magazine and my research results will be included in a magazine article

**Kandel**


**Kandel - News Releases**


Kandel - Service to Print Media


Jamee Larson. Crop roundup for the Promotor Newspaper in Hendrum, October 27, 2014

Luann Dart, (Dart Communications) Soybean production. Bayer CropScience website. 22 October 2014


Journalist from the Minot paper on research on alternative crops. 3 October 2014

Peg Boyles. Article ‘International Year of Pulses: Superfoods to Nourish the World’ for the 2016 Old Farmer’s Almanac. (end Sept, 2014)

D. Hildebrant. Occasionally Extension Service serves outside the state’s borders. Farm and Ranch Guide. Interview, August 1. 2014


E. Crawford. NDSU Evaluating Unmanned Aircraft System Technology
(UAS project at the Carrington REC). News release for NDSU. May 15, 2014

D. Hildebrant. Student Trip to Nepal published in Farm and Ranch Guide, April, 2014


Kandel Radio / T.V. Interviews

Mr. Ristvedt. KFGO radio. Canola variety selection. November 20, 2014

M. Kjar, Ag News 890, 1:50:10-2:00 p.m. Live. Soybean research and Getting it Right program. October 28, 2014

Cliff KFYR TV. First killing frost effect on soybean. September, 12 2014

K. Morgan, Interstate Farm Network. Soybean damage potential with frost. September 11, 2014

M. Kjar, KVLY Valley News Live. Soybean under stress due to dry conditions and cover crop planting after wheat harvest. August 12, 2014


Danielle Webster. MPR reporter. Trip to Ethiopia. July 10, 2014

M. Kjar, KQLX, 2:10-2:20 p.m. Live. IDC on soybean, research update and nodulation on dry bean. July 8, 2014


K. Morgan, Interstate Farm Network. Soybean growth and development and IDC. June 25, 2014


K. Morgan, Interstate Farm Network. Crop Response to Tile Drainage. Tile design school, Crookston, March 5, 2014


M. Kjar, KVLY Valley News Live. Soybean IDC. February 6, 2014

R. Koenen, Red River Farm Network, 10:00-10:10 p.m. Water management control structures. January 16, 2014

Lym

Interview with Lon Tonneson concerning Houndstongue control and new invasive weeds found in North Dakota for Farm Progress and Dakota Farmer. June 14

Manthey


Marais

McGinnis


Ready, Set, Garden. Valley City Times. May 15, 2014


NDSU Horticulture Field Day. KVLY. July 23, 2014


KVLY North Dakota Today Gardening Segments

Starting a Patio Garden. June 3, 2014 (9:55) https://www.youtube.com/watch?v=PniSoPfc4fA&list=PL8wBnMvewAnavItYcFz9MS9deDqwRNfIQ&index=2

Starting a Container Garden. June 10, 2014 (Part I and II, 10:00) https://www.youtube.com/watch?v=udmw6sJDyJc&list=PL8wBnMvewAnavItYcFz9MS9deDqwRNfIQ&index=3

Home Garden Remedies. June 19, 2014 (9:30) https://www.youtube.com/watch?v=6-HRIE2i3f0&index=5&list=PL8wBnMvewAnavItYcFz9MS9deDqwRNfIQ

NDSU Research and Demonstration Gardens. July 23, 2014 (4:02)

Fall Gardening Advice. September 18, 2014 (8:13)

Pumpkins and Gourds. October 7, 2014 (4:32)

Planting Bulbs, October 7, 2014 (4:34)

McMullen

Interview with AgWeek reporter regarding oat production

Osorno


**Peters - Media interviews**

Magazine Interview, Ag-Week, March 13, 2014, following presentation at the International Sugarbeet Institute, Grand Forks, ND


Radio Interview, Red River Farm Network, May 27, 2014, planting progress

Radio Interview, Red River Farm Network, June 9, 2014, options for controlling emerged weeds in sugarbeet

Radio Interview, Three Eagles Farm Network June 11, 2014, options for controlling emerged weeds in sugarbeet


Radio Interview, June 25, 2014, weed control update


Radio Interview, K Morgan, Interstate Farm Network, July 16, 2014, update on weed control from Crookston Field Day

Radio Interview, KFGO, August 28, summary of field season, weed control

Radio Interview, Rick Ristvedt, KFGO, September 1, 2014 project the start of sugarbeet harvest

Radio Interview, Red River Farm Network, September 5, 2014, preharvest weeds assessment from Peterson Seeds Field Day

Radio Interview, Rick Ristvedt, KFGO, October 12, 2014, sugarbeet harvest progress

**Ransom**

Media interviews, 15 including t.v. and radio

Created a new website for the corn hybrid testing program. Maintain the small grain page

Robinson

North Dakota Crop and Pest Report Newsletter

Robinson, A. P. Keep a close eye out for late blight. Issue 9, page 7


Robinson, A. P. Heat stress of emerging potato plants. Issue 6, page 6-7


Robinson, A. P. Internal blackheart and heat stress in seed potato. Issue 3, page 5

Valley Potato Grower Magazine


Robinson, A. P. Fresh market potato cultivar testing. Vol. 79:231, p. 15

Robinson, A. P. MN Area II Potato Growers field day. Vol. 79:231, p. 20-23

Robinson, A. P. Herbicide carryover in the soil, what does it all mean? Vol. 79:230 p. 10


Robinson, A. P. Results of intended herbicide injury at the winter test. Vol. 79:228 p.22-23

Robinson, A. P. NPPGA Research Reporting Conference. Vol. 79:227 p.16

Robinson, A. P. Insights from Israel. Vol. 79:227 p.18-19

Media interviews: 2 video interviews, 2 news article interviews, 18 radio interviews

Webpage / Social Media: Potato Extension webpage had 12,345 pageviews in 2014 with 8,572 unique pageviews. 77% of visitors are from the USA with the others are from around the world. I made 65 posts on the webpage this past year.

I made 248 posts on social media. This includes Facebook, Twitter, Google+, and LinkedIn. I have 82 Facebook likes, 69 new followers on Twitter, 7,065 views to the Google+ page, and 361 connections on LinkedIn.

Also I maintain the NDSU-Potato Listserv which has 192 members

Schwarz


Thompson


Cultivar Corner. 2014. Palisade Russet. Spudman 52(4):30

Cultivar Corner. 2014. Manistee. Spudman 52(5):34

Cultivar Corner. 2014. Runestone Gold. Spudman 52(8):38


West


Zuk

Taped a 10-minute segment on Valley News Live about lawn care. 8/4/14

Taped a short segment with WDAY reporter Becky Parker on lawn winterization. 10/1/14
9. Reviewed Extension Publications

**Berti**


Midwest Cover Crops Council. 2014. Cover Crops Field Guide 2nd ed. **Berti, M.T.**, among the contributors of this edition. *(North Dakota was added to this new edition)*

Berti, M.T. 2014. What to do if there is a forage shortage this spring? Forage Focus. March 2014. p. 4-5. Midwest Forage Association, St. Paul., MN

**Christoffers**


**Hatterman-Valenti**


**Howatt**


**Kalb**

NDSU Yard & Garden Report. These reports were published and distributed to NDSU Extension Agriculture and Natural Resource educators every week from June 9 to September 22, and monthly thereafter (20 updates, each approximately 6 pages in length). Recent issues of the NDSU Yard & Garden Report are posted online at http://www.ag.ndsu.edu/yardandgardenreport/. Over 1,100 gardeners subscribe to the NDSU Yard & Garden Report. Several hundred more gardeners download it off the website.

**Kandel**


Contributions to the North Dakota Crop and Pest Report Newsletter. 15-17 issues per year during the growing season.


Kandel. H. SARE Research Grants for Producers August 11, No17:5-6


Kandel, H. Soybean Root Nodules. July 24, No 12:5

165

Kandel, H. Cover and Or Green Manure Crops. July 10, No 10:5-6


Kandel, H. Dry Bean Seeding Rates. May 29, No 4:5-6


Kandel, H. Canola Yield Potential. May 22, No 3:3-4

Kandel, H. Soybean Yield Trends in NDSU Variety Trials. May 15, No 2:3-6

G. Endres, and H. Kandel. Soybean Row Spacing and Seeding Rage. May 8, No 1:4-5

Lym

Lym, Rodney G. 2014. A guide to North Dakota Noxious and Troublesome Weeds. North Dakota State Univ. Ext. Ser. Cir. W-1691. This publication was voted one of three notable North Dakota State documents at the North Dakota Library Association (NDLA) annual conference


Manthey


McGinnis


McPhee
Wunsch, M., J. Pasche, J. Knodel, K. McPhee, S. Markell, V. Chapera and S. Pederson. 2014. Pea Seed-borne Mosaic Virus (PSbMV) in Field Peas and Lentils, PP1704

Mergoum

Ransom, J.K., S. Simsek, and M. Mergoum. 2014. North Dakota hard red spring wheat variety trials results for 2013 and


Rahman


Ransom

Revised five variety trial selection guides, NDSU Extension Service

Articles in the Crop and Pest Report (issue):

No. 1. May 8. Evaluating winter wheat plant stands
No. 2. May 16. Late-planting small grains and corn in 2014
No 3. May 22. Imbibitional chilling injury of corn
No. 5 June 5 Early growth staging small grains
No. 7 June 19 Early corn development in 2014 compared
No. 8 June 26. Timing of fungicides for scab control in wheat and barley
No. 9 July 3. Too much rain?
No. 10 July 10. Scab damage significant on susceptible winter wheat varieties in eastern North Dakota.
No. 10 July 10. Tillering in corn common this year?
No. 11 July 17. Glyphosate as a pre-harvest aid in small-grains
No. 13 July 31. Establishing a residue crop for winter wheat planting this fall
No. 15 August 14. Lodging and green snap in corn
No. 15 Aug. 14. Will the corn crop reach maturity before a killing frost?

No. 16 Aug. 28 Tips for planting winter wheat in 2014

No. 17 Sept. 11. Pre-harvest sprouting and falling numbers

Robinson

Robinson, Andrew P. and Gary A. Secor. Internal physiological disorders: internal heat necrosis and blackheart.: [Online]

NDSU Extension

Service publication no. A1738.

Zollinger, R, G. Endres, G. Gramig, K. Howatt, B. Jenks, R. Lym, M. Ostlie, A. Robinson, A. Thostenson, H. Hatterman-


Zollinger

2014 North Dakota Weed Control Guide, W-253 (Revised)

2014 Herbicide Compendium. NDSU Extension Circular (Revised)

2014 NDSU Adjuvant Compendium. NDSU Extension Circular (Revised)

North Dakota Herbicide Mode of Action Chart (Revised)

10. Videos

Kalb

Dakota Growing videos. Nine videos were published through our Dakota Garden Expo and my collaboration with Dakota Media Access: These videos were broadcast locally on the Dakota Growing show on local cable television throughout the year. The videos were downloaded on demand at http://www.dakotamediaaccess.org/dakota-growing/. The Production Manager of Dakota Media Access states that our videos are clearly the most popular videos on their television station and on their website.

Spring Fever Garden Forums videos. Twelve videos were published through our Spring Fever Garden Forums and my collaboration with NDSU Ag Communications. These videos were posted online and viewed by over 2,600 persons during 2014
McClean - Animations

The Citric Acid Cycle: The Reactions:
http://vcell.ndsu.nodak.edu/animations/citricacid_reactions/index.htm;
https://www.youtube.com/watch?v=_cXVeFtzeE

McGinnis

Master Gardener Reporting Requirements

Schwarz


11. Intellectual Property

Helms

I provided the PVP application form for ND1406HP

Thompson

Application 201400310 April 25, 2014 Dakota Ruby

PVP Certificate 201100304 issued March 11, 2014 Dakota Trailblazer

West

Two Horticulture Disclosure Forms were approved for new cultivar release in 2014

- Northern Empress™ Japanese Elm – *Ulmus davidiana var. japonica* ‘Burgundy Glow’
- Cinnamon Curls™ Dwarf Korean Birch – *Betula costata* ‘CinnDak’

Both trademark names have been approved by the US Patent and Trademark Office. Both plants have been undergoing extensive propagation trials and distribution to commercial nurseries for evaluation.
Department of Plant Pathology 2014 Annual Report

Publications and presentations (use format that is common for the discipline)

Refereed Journal articles


Bolton, MD, R deJonge, P Inderbitzin, Z Liu, K Birla, Y VandePeer, KV Subbaro, BPHJ Thomma and GA Secor. 2014. The heterothallic sugarbeet pathogen Cercospora beticola contains exon fragments of both MAT genes that are homogenized by concerted evolution. Fungal Genetics and Biology 62: 432-54


Chittam, K., Mathew, F., Gregoire, M., Lamppa, R., Chang, Y. W., Barasubiya, T., Markell, S., Bradley, C., and Goswami, R. S. Identification and characterization of Fusarium spp. associated with root rots of field pea in North Dakota. (Accepted 3/11/15 European Journal of Plant Pathology EJPP-D-14-00704)


Zurn, J. D., Dugyala, S., Borowicz, P., Brueggeman, R., and Acevedo, M. 2015. Dissecting the Infection Process of the Wheat Stem Rust Pathogen on Barley through Relative qPCR and Fluorescence Microscopy. Phytopathology (Accepted)


Abstracts

Abraham N.D., Acevedo M., Chitrampal P., LeBoldus J.M. 2014. Quantification of Sphaereulina musiva in infected Populus clones using qPCR. Phytopathology 104: S2.2


Brueggeman, R. S. 2014. rpg4-mediated Stem Rust Resistance in Barley:Solving a Complex Puzzle. International Plant and Animal Genome Conference XXII, San Diego, CA


Chitrampalam, P., and Nelson Jr., B. D. 2014. Pathogenicity of Fusarium tricinctum on soybean under field conditions. Phytopathology 104:S3.27

del Río Mendoza, L. E. 2014. Effect of timing of application of azoxystrobin and pyraclostrobin on control of blackleg of canola. Phytopathology 104:S3.31


Ebert, MT Friesen, G Secor, and MD Bolton. Characterization of novel Cercospora beticola effector proteins. 2015 APS Annual Meeting, Minneapolis, MN


Friesen, T. L., Liu, Z.H., Kim, Y. M., Gao, Y., De Wit, P. J., and Faris, J. D. 2014. Investigations of how the necrotrophic specialist Parastagonospora nodorum is using the dual function necrotrophic effector
SnTox1 to infect wheat. Phytopathology 104(Suppl. 3):S3.154


Jain, S., Chittem, K., Richards, J., Brueggeman, R., Nelson, B. D. 2014. Characterization of dry bean transcriptome in response to soybean cyst nematode infection. Phytopathology 104:S3.54


Khan, M. F. 2014. History of extension and land-grant universities. American Phytopathological Society annual meeting, Minneapolis, MN

Khan, M. F. R. 2014. Effect of simulated hail on yield of sugar beet. IIRB Congress, Dresden, Germany
Khan, M. F. R. 2014. How to combine basic and applied research in plant protection to make an impact on farmers lives. 11th Arab Congress of Plant Protection, Amman, Jordan

Khan, M. F. R. 2014. Strategies in using fungicides to successfully control Cercospora beticola in sugar beet in the USA. European Foundation of Plant Pathology, Krakow, Poland


Kim, Y. M., Liu, Z. H., Faris, J. D., and Friesen, T. L. 2014. Site-directed mutagenesis and immunolocalization of SnTox1, a necrotrophic effector produced by the wheat pathogen Parastagonospora nodorum. Phytopathology 104(Suppl.3):S3.60


Liu, Y., and Khan, M. F. 2014. At what age sugar beet is resistant to Rhizoctonia solani? American Phytopathological Society annual meeting, Minneapolis, MN


Munoz, C. L. and L. E. del Río Mendoza. 2014. Effect of SHAM and azoxystrobin on germination of Sclerotinia sclerotiorum ascospores. Phytopathology 104:S3.84


Rivera, V, G Secor, D Christ, M Khan M Varrelman and MD Bolton. Characterization of Fusarium secorum, a new species causing Fusarium yellowing decline of sugar beet in north central USA. International Institute for Beet Research Congress, Dresden, Germany


Secor, G, V Rivera and C Higgins. Screening USPB potato clines for resistance to bacterial soft rot. Potato Expo, Orlando, FL


Proceedings papers


Odom, J., and Pasche, J.S. Comparison of Fusarium solani and F. avenaceum Inoculation Methods in Dry Pea. Proceedings of 6th International Food Legumes Research Conference (IFLRC VI) and 7th International Conference on Legume Genetics and Genomics (ICLGG VII). Saskatoon, SK, Canada; June 2014

Salgado, J.D., Ames, K., Bergstrom, G., Bradley, C., Byamukama, E., Cummings, J., Dill-Macky, R.,


National or International Invited Presentations


Del Rio, L. Epidemiology of Sclerotinia stem rot of canola. South Dakota State University, Brookings, SD

Del Rio, L. XI Brazilian Bean Congress (11o Congresso nacional de pesquisa de feijão). 2014. Epidemiology and management of white mold. Londrina, Brazil.

Khan, M. How to combine basic and applied research in plant protection to make an impact on farmers’ lives. 11th Arab Congress of Plant Protection, Amman, Jordan

Knodel, J. Pest management of the wheat stem sawfly in North Dakota. SDSU Plant Science, Brookings, SD

Markell, S. G. Development of Management Strategies for Sunflower Rust. Department of Botany and Plant Pathology, Purdue University, West Lafayette, IN

Markell, S. G., and Humann, R., M. Sunflower Downy Mildew and Oxathiopiprolin Development. Dupont Pioneer internal development meeting, Johnston, IA.

Pasche, J. S. Applications for Molecular Quantification of Phytopathogenic Fungi. Department of Plant Sciences and Plant Pathology, Montana State University, Bozeman, MT

Secor, GA. Best Management Practices for Liquid Seed Treatments. Manitoba Potato Production Days,
Secor, G.A. Important Potato Diseases. EARTH University, Guacimo, Costa Rica

Secor, G.A. Silver Scurf Management Trials. Minnesota Area II Potato Growers Educational Workshop. Duelm, MN.


Secor, G.A. Maximising Production with Seed Management. Potato Industry Conference. Mount Gambier, Australia

Secor, G.A. Potato Disease Research in North Dakota. Inner Mongolia University, Hohot, China. August 14, 2014

Secor, G.A. Potato Diseases. Black Gold Farms University. Grand Forks, ND

Zhong, S. Molecular mechanisms of barley-Cochliobolus sativus Interaction. College of Agriculture, Anhui Science and Technology University, Fengyang, China

Book Chapters


Research Reports


Beauzay, P. and J. Knodel. 2014. Final Report for Winfield Solutions: Efficacy of Adjuvants in Combination with a Reduced Rate of Grizzly Z Insecticide for Soybean Aphid Control 5 pp


Secor, G.A. Sensitivity of Cercospora beticola to foliar fungicides in 2014. Annual Sugarbeet Research Reporting Session, Fargo, ND

Secor, G.A. Silver scurf management trials. Northern Plains Potato Growers Association 2014 Research Reporting Conference, Grand Forks, ND

Secor, G.A. Why was bacterial soft rot a problem in 2013? International Crop Expo. Grand Forks, ND

Popular Press articles


Knodel, J.J. 2014 Another Successful Year of Pest Scouting – 2014 Annual Highlights, ND Agriculture Experiment Station and NDSU Extension Service, 1 page.


Markell, S. 2014. 2014 SCN soil testing program. The North Dakota Soybean Grower Magazine. 3:15


Reviewed Extension publications


soybean. Published by the Extension Network team for the USDA-NIFA Project No. 2011-68004-30104.


Videos

Pest Management App Intro Instructional video (https://www.youtube.com/watch?v=3JKhiZCHE0Y)

Weed Control in Corn – Pest Management App Instructional Video (https://www.youtube.com/watch?v=w2X_zH0cwT8)

Disease Control in Wheat – Pest Management App (https://www.youtube.com/watch?v=jR34GBilFRc)

Exploring the NDSU Extension Pest Management App (https://www.youtube.com/watch?v=2E4WIYpUBM4)
School of Natural Resource Sciences – 2014 Annual Report

Publications and presentations (use format that is common for the discipline)

Refereed Journal Articles - 72


He Y., DeSutter T., Casey F., Clay D., Franzen D., Steele D. Field capacity water as influenced by Na and EC: Implications for subsurface drainage. Geoderma 245–246:83-88. DOI: http://dx.doi.org/10.1016/j.geoderma.2015.01.020. (Accepted for publication.)

He, Y., T.M. DeSutter, D.G. Hopkins, D. Wysocki, D. Clay. The relationship between SAR1:5 and SARE of soil to water extract. Soil Sci. Soc. Am. J. (Accepted for publication.)


Sharma, L.K., H. Bu, and D.W. Franzen. COMPARISON OF TWO GROUND-BASED ACTIVE-OPTICAL SENSORS FOR IN-SEASON ESTIMATION OF CORN (ZEA MAYS, L.) YIELD. Journal of Plant Nutrition. (Accepted for publication, October, 2014.)


Yarwood, S., A.F. Wick, M. Williams, W.L. Daniels. Parent Material and Vegetation Influence on Soil Microbial Community Structure following 30-years of Rock Weathering and Pedogenesis. *Microbial Ecology*. (Accepted for publication.)


Abstracts - 63


Calderon, F.J., A.-M. Fortuna, H. Matthes-Dose, L.J. Cihacek, K.A. Anderson, T.M. DeSutter and J. Bell. 2014. Soil Health in sodic soils is determined by a suite of indicators that include several chemical, physical, and biological properties. SSSA, Long Beach, CA


Creuzer, J., C.L.M. Hargiss, J.E. Norland, T.E. DeSutter, E.S. DeKeyser, and F. Casey. 2014. Road Dust: Impacts of Increased Travel from Energy Development in Western North Dakota. Sustaining the Blue Planet Conference. Bozeman, MT.

Creuzer, J., C.L.M. Hargiss, J.E. Norland, T.E. DeSutter, E.S. DeKeyser, and F. Casey. 2014. Increased Travel and Energy Development: What is the Effect on Wetlands in Western North Dakota? Northern Plains Biological Symposium. Fargo, ND


Creuzer, J., C.L.M. Hargiss, J.E. Norland, T.E. DeSutter, E.S. DeKeyser, and F. Casey. 2014. The Impacts of Increased Road Use and Dust on Wetlands in Western North Dakota. ND Water Quality Monitoring Conference. Bismarck, ND.


Franzen, D. 2014. Active optical sensor algorithms for corn yield prediction and in-season N application in North Dakota. International Conference on Precision Agriculture, Sacramento, CA. July 20-23

Franzen, D.W., L. Sharma, H. Bu. 2014. Ground-based active-optical sensor algorithms for corn (Zea mays L.) in North Dakota. ASA-SSSA-CSSA meetings, Nov. 2-5, Long Beach, CA

Hargiss, C.L.M. 2014. Inspired Environmental Education. Sustaining the Blue Planet Conference. Bozeman, MT


Orndorff, Z.W., W.L. Daniels, M.S. Reiter, A.F. Wick. 2014. Prime farmland crop yields from four soil reconstruction treatments following mineral sands mining: A 9 year summary. Presentation. American Society of Mining and Reclamation meeting, June 14-20, Oklahoma City, OK. Abstract published by ASMR

Osvaldo, T., A. Aponte, L.J. Cihacek, E.L. Deckard, B.L. Johnson, D. Samarappuli, K. Sedivec, and M.T. Berti. 2014. Performance and Production of Brassicas Cover Crops in North Dakota. ASA, CSSA, CCCS international Meeting, Long Beach, CA


Sedivec, K. 2014. Intensified Grazing Management in the Northern Plains – Improving the Harvest Efficiency of Our Rangelands. ASA, CSSA, CCCS international Meeting, Long Beach, CA

Shelver, W., and T. DeSutter. 2014. Ractopamine uptake from soil by alfalfa (Medicago sativa) and wheat (Triticum aestivum). Presented at the ACS National Meeting. San Francisco, CA. August 10-14


Soils. Presented at the 2014 ASABE Intersectional Meeting, 28-29 March, Brookings, South Dakota, USA


Wolters, B., D.P. Collins, A-M Fortuna, C.G. Cogger, and A.I. Bary. Greenhouse Gas Emissions in No-till Vegetable Production. ASA, Long Beach, CA. (Role: Aided in the original design of the experiment my lab processed all soil samples and took all measurements other than CO₂ evolved. This research is from my PI grant proposal)


Proceedings Papers - 11


200


National or International Invited Presentations - 20


Daigh, A. 2014. Surviving and Thriving Your First Year. Panelist and breakout group leader of for current or interning first year graduate students at the 2014 ASA, CSSA, and SSSA International Annual Meeting, Long Beach, CA, Nov. 3rd, 2014

DeSutter, T. 2014. Saline and Sodic Soils. Presented to faculty at the Coastal Agricultural Research Institute, Hebei Academy of Agricultural Sciences. Tanghai, Hebei. August

DeSutter, T., and D. Franzen. 2014. Soil Conservation and Fertility of Soybeans. Presented two times to local farmers and government officials in Heilongjiang Province. August


Goos, R.J. 2014. Some effects of climate change and technological change on agriculture in North Dakota, USA. Ege University, Izmir, Turkey. 26 September 2014.


Harris, M.O., Steven Xu, T. Friesen, D. Giron, and J.J. Stuart. 2014. Pivoting from Arabidopsis to wheat to understand how agricultural plants integrate responses to biotic stress. Special Symposium, Mechanisms of Plant-Insect Interactions, Northwest Agriculture and Forestry University, Yangling, China, 27th October 2014.


Book Chapters - 5

Franzen, D. and D. Mulla. History of Precision Agriculture. Submitted, accepted for publication

Franzen, D. Crop Specific Nutrient Management. Submitted, accepted for publication


**Research Reports - 40**


DeKeyser, E.S. 2014. Annual Report: Increasing biological functions and integrity of wetlands while ensuring the utilization of long-term easements


DeKeyser, E.S., K. Sedivec, J. Norland, and J. Zeleznik. 2014. Final Report: Maintenance of Natural Sustainable Riparian Communities Located within the Middle Sheyenne Watershed

DeKeyser, E.S., S. Travers, and A. Ganguli. 2014. Annual Report: The role of Poa pratensis genetics in current private, state, non-profit, and federal management efforts. U.S. Fish and Wildlife Service

DeSutter, T., A. Chatterjee, A. Wick. 2014. Improving Soil Health and Productivity of Sodic Soils, ND Soybean Council Mid-Term Report (6 mo)


Hargiss, C.L.M., J.E. Norland, T.E. DeSutter, E.S. DeKeyser, and F. Casey. 2014. Final Report: Estimating the Impact to Wetlands in Western North Dakota from Dust and Road Use Increases due to Energy Development. ND Dept. of Health/EPA Region VIII


Wick, A.F., F.X.M. Casey, D. Ripplinger. 2014. Research and Extension Efforts at the SHARE Farm, ND Soybean Council Mid-Term Report (6 mo)


Popular Press Articles - 13


Hopkins, D. 2014. Advised Prof. Deborah Blum, Univ of Wisconsin and New York Times writer (The Poison Pen) on background levels of cadmium in North Dakota soils and discussed my research on naturally elevated soil Cd levels along the Pembina Escarpment, 4/14/14 (her article was shortened by her editor, and the Cd story was not included)


Wick, A.F. 2014. Summary of the Annual Soil Health Field Day


**Reviewed Extension Publications - 11**


Sedivec, K., C. Piper, J. Printz, A. Wick, A. Daigh, R. Limb. 2014. Successful Reclamation of Lands Disturbed by Oil and Gas Development and Infrastructure Construction. NDSU Extension Publication, R1728


**Videos – 10**


Webinars - 5

Fortuna, A. 2014. Why the Concern about Nitrous Oxide Emissions? February 25, 2014 75 minutes over 100 people

Fortuna, A. 2014. Management to Reduce N₂O Emissions in Organic Vegetable Production Systems February 27, 2014 75 minutes over 80 people


Franzen, D. 2014. Soil erosion effects on soil health, NC soil health network, September 17, 2014

Department of Veterinary and Microbiological Sciences Annual Report (2015)

Publications and presentations

Refereed Journal articles


Lynnes, T., S.M. Horne, and B.M. Prüß. 2014. 8-phenylethylamine as a novel nutrient treatment to reduce bacterial contamination due to Escherichia coli O157:H7 on beef meat. Meat Science

Irsfeld, M., B.M. Prüß, and S.J. Stafslien. 2014. Screening the mechanical stability of Escherichia coli biofilms through exposure to external, hydrodynamic shear forces. J. Basic Microbiol. 54:1–8


Review


Abstracts


Allison Goldenstein, Penelope Gibbs, Heather Vinson. “*Moraxella bovis.*” McNair Scholar Program oral presentation meeting, NDSU, Fargo, ND. Spring 2014

Allison Goldenstein, Penelope Gibbs, Heather Vinson. “Epidemiology of *Moraxella bovis* in North Dakota” NDSU EXPLORE Fall 2014, Fargo, ND 58102 (Ms. Goldenstein won honorable mention.)

Proceedings papers

National or International Invited Presentations

Edwinson, A. and McEvoy, J. 2014. Glycoproteins and Gal/GalNAc glycans as trigger *Cryptosporidium* development *in vitro*. Annual Meeting of the North Central Branch of the American Society for Microbiology, Superior, Wisconsin October, 2014. **Mr. Edwinson was awarded best student oral presentation**

Tyagi, D., J. Sherwood, K. Sanders, and T. M. Bergholz. Differences in survival among Enterohemorrhagic *E. coli* and *Salmonella* on pre-harvest lettuce. American Society for Microbiology General Meeting, Boston, Massachusetts. 2014

Kang, J., M. Wiedmann, and T. M. Bergholz. The role of VirR in resistance to antimicrobials used in foods and cross-protection induced by exposure to organic acids. International Association for Food Protection Annual Meeting, Indianapolis, Indiana. 2014


Bergholz, PW, GT Ryan, S Warchocki, LK Strawn and M Wiedmann. (2014). Landscape scale factors influencing the overland dispersal of *Escherichia coli* in agricultural areas: connectivity models and landscape genetics. *15th International Symposium on Microbial Ecology*. Seoul, South Korea

**Role:** Speaker


Samanta, P., S.M. Horne, and B.M. Prüß. 2014. Regulation of *flhD* expression in *E. coli* biofilm by IS insertion and OmpR. General Meeting of the American Society for Microbiology (ASM) in Boston, MA

Ferreira, E., S. Smith, S.M. Horne, and B.M. Prüß. 2014. Osmolarity as an inhibitor of *E. coli* biofilm. STEM Internship Symposium in Fargo, ND

Smith, S.J., S.M. Horne, and B.M. Prüß. 2014. Effects of PEA on Salmonella growth and biofilm formation. American Society for Microbiology, North Central Branch (ASM-NCB) meeting in Duluth, MN

Pruess TM’s 3<sup>rd</sup> World Molecular and Cell Biology Online Conference. 2014

Bacteriology-2014 by the OMICS Group. Chicago, IL. 2014
Veterinary Diagnostic Services Department

Publications and presentations (use format that is common for the discipline)

**Refereed Journal articles**


**Abstracts**


**National or International Invited Presentations**

Claire Miller, American Association of Veterinary Laboratory Diagnosticians (AAVLD), Kansas City, MO, Use of Matrix-Assisted Laser Desorption Ionization Time of Flight Mass Spectrometry (MALDI-TOF MS) for the Speciation of Pathogenic *Vibrio* in Fish - Best Oral Presentation AAVLD


Dyer, NW, Update on rabies, Annual Continuing Education for Veterinarians, NDSU-VDL, May 2014

**Book Chapters**

Michelle Mostrom, Chapter 000478 Mycotoxins: Classification; Chapter Mycotoxins: Toxicology in *Encyclopedia of Food and Health*, edited by Caballero, Finglas and Tolder, Elsevier