

Basic Information

- **Project No. and Title:** NC1100: Land Grant University Innovation Diffusion Enhancement
- **Period Covered:** 10/01/2018 to 09/30/2019
- **Date of Report:** 12/02/2019
- **Annual Meeting Dates:** None

Participants

NC1100: Mann, John (mannjoh3@msu.edu) Michigan State University; Loveridge, Scott (loverid2@msu.edu) Michigan State University; Kenney, Martin (mfkenney@ucdavis.edu) University of California, Davis; Ladisch, Michael (ladisch@purdue.edu) Purdue University; Goe, Richard (goe@ksu.edu) Kansas State University; Thomas, Jerold (thomas.69@osu.edu) Ohio State University

Other: Barry, Terry (tpbarry@wisc.edu) University of Wisconsin; Qiao, Qiquan “Quinn” (Quinn.Qiao@sdsu.edu) South Dakota State University; Lin, Chung-Ho (LinChu@missouri.edu) University of Missouri

Accomplishments

Short-term Outcomes:

There were four sets of short-term outcomes. First, the project continued to connect small businesses to new innovation that developed at North Central (NC) land grant universities (LGU). Second, Mann provided coaching for two NC faculty-entrepreneurs in development of phase I Small Business Innovation grants as well as to one small business for a phase II award. Third, new research collaborations including journal and conferenced papers as well as new NIFA grant application. Fourth, Mann received guest researcher status through USDA ERS to develop research on the Small Business Innovation Research program and rural firms.

Three “Innovations in Agriculture and Rural Development” webinars presented new water purification technology from U. of Missouri, precision agriculture technology from SDSU, and an effort to move toward renewable and clean energy from SDSU. Additionally, we held Michigan Extension presentation and discussion on future impacts of automation and artificial intelligence (AI) on agriculture. Discussions with Michigan Extension professionals regarding automation and AI in agriculture is part of an exploratory effort to develop a framework for conducting research into advanced agriculture innovations (such as robotics and AI). These technologies may greatly alter the agri-food landscape and our interest is on potential impacts to rural economies. Fifty-three small firms/entrepreneurs participated in live presentations and there were 1370 new views of these recorded Innovations in Agriculture and Rural Development webinars. To date, there is over 8,000 views since the NC1100 was renewed for 2016.

Next, in the prior year Startup Food Biz, received a phase I SBIR award due to Mann’s coaching and aid in proposal development, and this year received notification of a phase II SBIR award (\$600,000). Mann also provided SBIR coaching for Dr. Barry at UW-Madison and helped Dr. Qiao at SDSU develop and submit a phase I SBIR grant to USDA for his precision ag innovation. Finally, a collaboration between College of Menominee and Michigan State University emerged from the 1994/1862 intuition matching/networking effort. One potential outcome of this activity is to incorporate 1994 TCUs into the “Innovations in Agriculture and

Rural Development” series. The collaboration led to a project proposal that was successfully submitted to the NIFA/AFRI Foundation grant program which is designed to explore the influence and use of broadband internet on rural and tribal area firms, as well as study the impact of policies impacting broadband access and adoption.

Outputs:

- Mann: Innovation in Agriculture and Rural Development series:
 1. NSF IUCRC: Center for Solid-State Green Electric Power Generation and Storage. Presented by: Dr. Qiquan Qiao, South Dakota State University.
 2. Precision Agriculture Sensing Systems. Presenter: Dr. Qiquan Qiao, South Dakota State University
 3. Removing Emerging Contaminants in the Drinking Water by a Novel Carbon-based Enzymatic Reactor. Presenter: Dr. Chung-Ho Lin, University of Missouri
 4. Photoelectrocatalytic Oxidation (PECO): A new and advanced water treatment technology. Presenter: Dr. Terence Barry, University of Wisconsin-Madison
- Mann: Coached/help facilitate new startup that was awarded a phase II SBIR grant (\$600,000); new firm is Startup Food Biz.
- Mann: Coached/help facilitate Dr. Qiquan Qiao’s phase I SBIR grant application for precision agriculture.
- Mann: Cleaned and developed new firm/SBIR data based using Duns & Bradstreet firm observations.
- Mann & Loveridge: Collaborated with College of Menominee Nation and Mack (MSU Dept. of Geography) on NIFA grant submission.

Activities:

- Mann & Loveridge: Discussion/meeting with Michigan Extension professionals regarding automation and AI in agriculture.
- Mann: Discussion/meeting with 1862 and 1994 LGU/TCU on research collaboration.

Milestones:

- Mann: will continue new coaching/facilitation of faculty-entrepreneurs for phase I, and potentially, phase II USDA SBIR grants in FY 2020.

- Mann & Loveridge: continue to pursue new external funding as well as publish research on innovation and the SBIR program.

Impacts

1. Activities: Mann and Loveridge, continued to lead team who was granted special access to explore the 2014 Rural Enterprise Innovation Survey. Selected key findings this year include the following. First, there are differences between the innovative activities of rural and urban firms, such that while standard metrics like patents may be good indicators for urban areas, they do not work as well for rural areas. Second, mobile/cellular internet access appears to positively impact innovation creation by rural firms, which implies these technologies may help facilitate innovation spillovers from urban areas. Combined with prior findings, the use of ICT's by universities, including extension professional, can provide important resources for rural firms in terms of innovation creation. Additionally, a multi-state collaboration led to a new NIFA grant application (\$500,000). Finally, Mann's guest research status allowed for access to and development of new data to measure rural innovation.
2. Milestones: NC1100 team will develop at least two new grant proposals in FY 20. One will be the continuing effort to establish a multi-disciplinary network of academics and extension, and will include private sector and NGOs. The goal is a collaborative platform that focuses on cutting edge and emerging issues impacting innovation creation and rural areas. The second will be focused on rural innovation commercialization and SBIR. Mann: will continue effort to maintain/expand firm-level databases that includes rural and agricultural firms, as well as potential faculty-entrepreneurs.
3. Indicators: There were 3 Innovations in Agriculture and Rural Development presentations, with 53 small firms/entrepreneurs who participated live, 1370 new views of the recorded posting of these webinars—over 8,000 views since 2016. One firm received a phase II SBIR award through USDA (\$600,000), and we anticipate to coach faculty/firms on new phase I and II USDA SBIR proposal for FY 20.

Publications

- Aryal, G., Mann, J., Loveridge, S., & Joshi, S. (2019). Drivers of difference in Inventiveness across urban and rural regions. *Journal of Urban Affairs*, forthcoming.
- Mann, J., & Loveridge, S. (2019). Measuring Urban and Rural Firm Innovation in the United States. *Economics of Innovation and New Technology*, revise/resubmit.
- Mann, J., Miller, S., & Loveridge, S., (2019). Exploring Innovative Firms in Urban and Rural Areas. *Research Policy*, in review.
- Carpenter, Craig, and Scott Loveridge. 2019. "Factors Associated with Latino-Owned Business Survival in the United States." *Review of Regional Studies*. 49(1):73-97.
- Aryal, Giri, John Mann, Scott Loveridge, and Satish Joshi. 2018. Exploring Innovation Creation Across Rural and Urban Firms: Analysis of the National Survey of Business Competitiveness. *J. Entrep & Pub Policy*. 7(4):357-376. DOI 10.1108/JEPP-D-18-00026.
- Loveridge, Scott, and Dusan Paredes. 2018. Are Rural Costs of Living Lower? Evidence from a Big Mac Index Approach." *International Regional Science Review*. 41(3): 364-382. DOI: 10.1177/0160017616650488.

- Paredes, Dusan, and Scott Loveridge. 2018. "Rural Electric Cooperatives and Economic Development." *Energy Policy* 117: 49-57.
- Goe, W. R., & Kenney, M. (2019). The Postwar Development of US Agriculture. The Future Of Rural America: Anticipating Policies For Constructive Change.