**Project/Activity Number:** NC-1100

**Project/Activity Title:** Land Grant University Innovation Diffusion Enhancement

**Period Covered:** October 1, 2017 to September 30, 2018

**Date of This Report:** July 30, 2018

**Annual Meeting Date(s):** June 1, 2018

**Participants:**

The annual meeting was held virtually via Zoom video conference, and the meeting was recorded. The following URL is for the recorded meeting: [https://mediaspace.msu.edu/media/NC-1100+meeting+June+1%2C+2018/1\_k81izf7b](https://mediaspace.msu.edu/media/NC-1100%2Bmeeting%2BJune%2B1%2C%2B2018/1_k81izf7b)

A list of project participants follows: 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; Wang, C.Y. (Cy.Wang@sdstate.edu) North Dakota State University; Ladisch, Michael (ladisch@purdue.edu) Purdue University; Goe, Richard (goe@ksu.edu) Kansas State University; Thomas, Jerold (thomas.69@osu.edu) Ohio State University

**Brief summary of minutes of annual meeting**:

The meeting opened with brief introductions, and attendance included John Mann, Scott Loveridge, Martin Kenney, Brent Elrod the (NIFA representative), and Patrick Cudney (administrative advisor). The meeting discussion was led by Mann who updated the “Innovations in Agriculture and Rural Development” matching program which presents new university developed innovations and virtually matches faculty, rural firms, and encourages SBIR applications. Related to this, a Mann led an informational discussion on gaps in university technology transfer offices relating specifically to agricultural innovations.

Mann led the discussion on an NSF grant proposal that was submitted last year, and rejected. Feedback from reviewers and a plan for revisions and resubmission to a new agency were discussed. Kenney proposed considering USDA/NIFA, EDA, or the Kellogg’s foundation, and Mann indicated he would inquire about these and follow up with the group. There was also a discussion in refocusing the topic; Kenney suggested that the group consider artificial intelligence (AI) and automation application to agriculture as not much in the academic economic or research policy literature has been done. Mann suggested that the grant revision could be paired with the development of a white paper concept related to the next generation of NC1100—with a focus on AI and automation. The group agreed to have follow-up conversations about both ideas once new information was available.

Finally, the group discussed NC-1100 recruitment for both the matching program and the group itself. Standard approach to communication and outreach of faculty-entrepreneurs was suggested as the way to continue. In terms of group recruitment, moving in the direction of AI and automation is believed to be one way to potentially attract new members. As the groups develops the grant and white paper, new information can be disseminated to potential participants. Additionally, Elrod said he could also help disseminate information about the NC1100 group.

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**Accomplishments:**

**Short-term Outcomes:**

The project helped connected small businesses to new innovation developed by faculty-entrepreneurs at North Central (NC) land grant universities (LGU), with the goal of further developing the innovations for broader adoption. For example, two different rural businesses matched up with NC LGU faculty and pursued new R&D funding through SBIR. This funding can allow for the innovations to be further developed, with the long-term goal of innovation commercialization, thus, leading to broader innovation adoption. One small business, Startup Food Biz, received an SBIR award due to Mann’s coaching and aid in proposal development. The innovation is a new virtual platform that provides important legal and regulatory information relevant to new and existing food manufacturing firms. Food startups experience a high level of failure due, in part, to lack of compliance to regulations. The loss of established food manufactures in rural areas, also due in part of lack of regulatory compliance, can be devastating to rural economies. MSU is providing valuable marketing research for this project. The second firm/faculty pair (University Wisconsin-Madison faculty and North Carolina aquaculture producer) intends to submit a revised proposal in FY 2019 to the USDA SBIR program, where Mann will provide additional coaching. The innovation provides a new tools for aquaculture producers, increasing caged fish survival and reducing production costs. The small, rural firms and faculty-entrepreneur will jointly pursue a phase I USDA SBIR grant to further develop the innovation.

Additionally, there were 92 small firms/entrepreneurs who participated live in innovation presentations, and 1522 new views of these recorded presentations. New presentations/coaching resulted to two additional faculty-entrepreneurs interested in pursuing SBIR for FY 2019/2020. Finally, Mann presented about USDA SBIR funding, and the inventor-investor-firm matching model at the 2018 NACDEP conference, providing extension professionals with a new tool to help facilitate economic development in their communities. The model not only has the potential to match firms with university developed innovations, but also to extension services not considered by small firms in the past, for example, to help develop and conduct marketing research during the proof of concept stage of a phase I SBIR project.

**Outputs:**

* Kenney: Produced a cleaned a database of all licensed technology startups from the University of California research that includes the entrepreneurs, the grant, whether they received venture capital or an SBIR, and the founders.
* Mann: Innovation in Agriculture and Rural Development series:
	1. Solving key biological problems limiting the expansion of the yellow perch aquaculture industry (5/22/18), Dr. Terry Barry, University of Wisconsin-Madison
	2. A new weapon for farmers: Inter-row mowing for problem weeds in row crops (5/15/18), Dr. Kerry Clark, University of Missouri
	3. NVision Ag: Increasing corn yield and saving nitrogen fertilizer (5/8/18), Dr. Peter Scharf, University of Missouri
	4. Dietary preen oil as an anti-stress feed additive for aquaculture species (5/1/18), Dr. Jake Olson, University of Wisconsin-Madison
* Mann: Coached/help facilitate new startup that was awarded a phase I SBIR grant ($100,000); new firm is Startup Food Biz.

**Activities:**

* Kenney: co-organized an NSF funded event entitled Workshop on Exploring the Complexity of the Contribution of Research Universities to Society.” University of California, Davis. He is also a co-organizer of a conference at UC Berkeley entitled "The Future of Higher Education."

**Milestones:**

* Mann: Will provide new coaching/facilitation of two faculty-entrepreneurs, one from University of Missouri and one from University of Wisconsin who will apply for phase I USDA SBIR grants in FY 2019.

**Impacts:**

**Activities:**

* Mann and Loveridge, worked closely with a PhD student who constructed a new secondary data set, which is being used to explore innovation creation at the regional level to include both rural and urban areas. Additionally, Mann and Loveridge led a team who was granted special access and explored the 2014 Rural Enterprise Innovation Survey. Some of the key finding include the following. First, rural firms appear to benefit from university relationships, but the firms do not necessarily recognize these benefits. Second, for rural firms, innovation spillovers (likely from urban areas) and information and communication technologies (ICT) appear more important for rural innovation creation compared to urban firms. Thus, universities, including extension professional, provide important resources for rural firms and some of these resources could be directed through ICT’s to reach rural firms.

**Milestones:**

* NC1100 team will revise grant proposal to establish a multi-disciplinary network of academics and extension, and will include private sector and NGOs. The goal is to establish a collaboration platform that focuses on cutting edge and emerging issues related to innovation creation and adoption in agricultural and rural areas.
* Mann: continued effort to expand and maintain database of rural and agricultural firms, as well as potential faculty-entrepreneurs.

**Indicators:**

* There were 4 Innovations in Agriculture and Rural Development presentations, with 92 small firms/entrepreneurs who participated live, 1522 new views of the recorded posting of these webinars, and 176 email inquiries about the presentations. One firm received a phase I SBIR award through USDA ($100,000), and we anticipate to coach faculty/firms on 3 phase I USDA SBIR proposal for FY 19 (one revised from the previous year and two new proposal).

**Publications:**

Giri Aryal, John Mann, Scott Loveridge, and Satish Joshi. 2018. “Exploring Innovation Creation Across Rural and Urban Firms: Analysis of the National Survey of Business Competitiveness.” *Journal of Entrepreneurship and Public Policy,* Forthcoming.

Giri Aryal, John Mann, Scott Loveridge, and Satish Joshi. 2018. “Innovation Creation and the

Rural-Urban Divide in the United States.” *Journal of Urban Affairs*, In review.

Lyons, Tom, Steve Miller, and John Mann. 2019. “A New Role for Land Grant Universities in the Rural Innovation Ecosystem?” *Journal of Regional Analysis and Policy*, Forthcoming.

Paredes, Dusan, and Scott Loveridge. 2018. “Rural Electric Cooperatives and Economic Development.” *Energy Policy* 117: 49-57.

Lee, Gi-Eu, Scott Loveridge, and Julie Winkler. 2018. “The Influence of an Extreme Warm Spell on Public Support for Government Involvement in Climate Change Adaptation.” *Annals of the American Association of Geographers*. 108(3): 718-738.

Lee, Gi-Eu, Scott Loveridge, and Satish Joshi. 2017. “Local Acceptance and Heterogeneous Externality of Biorefineries.” *Energy Economics* 67: 328-336. <https://doi.org/10.1016/j.eneco.2017.08.013>.

Lee, Gi-Eu, Steven R. Miller and Scott Loveridge. 2017. “Modelling Local Food Policy and Greenhouse Gas Emission due to Transportation.” *J. Regional Analysis and Policy* 47(1): 75-87.

Breznitz, Shiri, and Martin Kenney. 2018. “Slouching Toward the Downton Abbey University System. *Issues in Science and Technology* 34(3): 74-82.