NC1100
FY 2017

Participants
John Mann

Target Audience
Our primary target group was faculty-entrepreneurs in biophysical disciplines, with industry representatives from 1) crop production and soil sciences and 2) aquaculture for the period October 1, 2016 to September 30, 2017. For the inventor-investing program an enhanced marketing strategy was directed towards industry representatives interested in: (1) collaboration with faculty; and (2) adoption/experimentation of faculty developed innovations. Additionally, a pilot "fast-pitch" collaboration strategy was employed to encourage faculty collaboration across disciplines for potential commercializable innovations.

Presentation Strategy
For the inventor-investor matching program, presentations of new innovations included three stages of (1) problem identification in scientific and laymen terms; 2) the solution identification (university developed innovation); and 3) the next stage of research including the opportunity for firm-faculty collaboration. The approach encouraged in-depth two-way communication between the faculty-entrepreneurs and firm owners and facilitated follow-up dialog. For the fast-pitch session, faculty-entrepreneurs pitched an innovation and then received feedback on "hidden gems" from other faculty in different disciplines. Each presenter had 5 minutes to make their pitch.

Extension Activities
1. Innovation Collaboration Pilot:
    - Chris Chase, Om Perumal, Padu Krishnan, Bill Gibbons, and Will Aylor (South Dakota State University) "Peer-to-Peer Solutions: Fast Pitch Innovation Collaboration" Pilot. October, 2016.
2. Webinars:
    - Kaustubh Bhalerao (University of Illinois) "Soil diagnostics, Helping growers protect their most valuable asset: Soil." October, 2016
    - John Mann, Jason Parker and Scott Loveridge (Michigan State University) "Urban First: Impact of USDA R&D Expenditures." April, 2017.
    - Jake Olson and Terry Barry (University of Wisconsin) "Cosajaba Oil: A Promoter of Growth and Stress-Tolerance for Aquaculture Species." May, 2017.
3. Coaching and outreach:
    - Provided consulting, innovation assessment, and letter of support for Terry Barry (UW) on aquaculture research grant and coaching and development support for an SBIR proposal. The SBIR proposal involved a new connection to a rural producers made by the inventor-investing matching program. This effort was a qualitative marketing, training, and support pilot idea to directly connect university technology to rural firms.
    - Mann and Phillips (American Indian Higher Education Consortium) launched a new project using the fast pitch collaboration concept to connect researchers at 1994 land

grant institutions to other researchers at 1962 land grants, and then develop new collaborations including submitting funding proposals.

Papers and Conferences:

- Kenney, Martin. 2017. "The Chicago Handbook of University Technology Transfer and Academic Entrepreneurship." Academy of Management Learning & Education 16 (1), 167-169.
- Kenney, Martin. 2017. "Comment Upon History and the Debate Over Intellectual Property." Management and Organization Review 13 (1), 49-56.
- Lyons, Tom, Steve Miller, and John Mann. 2017. "A New Role for Land Grant Universities in the Rural Innovation Ecosystem?" *Journal of Regional Analysis and Policy*, forthcoming.
- Aryal, Giri, John Mann, Scott Loveridge and Satish Joshi. 2017. "Exploring Rural and Urban Firm Innovation: Analysis of the National Survey of Business Competitiveness." Paper presentation at the North American Regional Science Council meeting, Vancouver, BC, CA, November 8-11, 2017.
- Aryal, Giri, John Mann, Scott Loveridge and Satish Joshi. 2017. "The Rural-Urban Divide in County-Level Patent Awards." Paper presentation at the Annual Agricultural and Applied Economics Association Meeting, Chicago, IL, July 31-August 2, 2017.
- Parker, Jason, John Mann, Scott Loveridge. 2017. "Rural v. Urban: Exploring the Determinants of the Firm-level Innovation Gap." Paper presentation at the Mid-Continent Regional Science Association Meeting, Oregon, OH, June 7-9, 2017.
- Aryal, Giri, John Mann, Scott Loveridge and Satish Joshi. 2017. "Innovation Creation and the Rural-Urban Divide." Paper presentation at the Mid-Continent Regional Science Association Meeting, Oregon, OH, June 7-9, 2017.
- Parker, Jason, John Mann, and Scott Loveridge. 2017. "Rural V. Urban: A National Survey on Determinants of Business Innovation Activities." Presentation at the Midwest Economics Association, March 31-April 2, 2017 in Cincinnati, Ohio.

Grants:

- Developed NSF Research Coordination Network proposal (Kenney, Ladisch, Loveridge, Wang, Mann, and includes EPSCoR and 1890 institutions) to create new collaborations—and is based on the fast pitch collaboration pilot. A revised proposal will be resubmitted to NSF in 2018.
- Developed and submitted a new collaboration between Mann, Loveridge and Redman (SDSU) for USDA/NIFA proposal based on (1) directly connecting university tech and faculty-entrepreneurs, (2) rural and agricultural firms, and (3) new sources of R&D funding with the motivation to move the university technology to commercialization. This is based on the "qualitative marketing, training, and support" pilot.

Other Accomplishments

- NC1100 members John Mann, C. Y. Wang and Scott Loveridge experimented with a new way to connect research faculty working on innovations in agriculture. Using webinar technology, the team assembled a group of bench scientists from South Dakota State University (SDSU) to give brief overviews of their "ready to commercialize" work. Prof.

Christopher Chase shared his work on microbiome-immune interactions; Prof. Om Perumal talked about food protein-based delivery systems; Prof. Padu Krishnan discussed his efforts to advance human nutrition opportunities with distillers' grain; and Prof. Bill Gibbons shared his progress using plant based meal for aquaculture diets. The session helped establish new collaborative efforts between SDSU faculty-entrepreneurs, Profs. Chase, Perumal, and Krishnan, and identified new potential paths for innovations developed by Profs. Chase and Perumal. Feedback from group included (1) expanding sessions so faculty can interact with peers at other institutions; and (2) incorporating industry participation into future sessions.

- Another pilot idea expanded the level of marketing, training, and support provided to participants in the *Innovations in Agriculture and Rural Development.* First, a qualitative assessment was done to identify the relevant audience participants in the inventor-investing matching program. Second, new follow-up actions based on connections made at the time of the presentation were employed that encouraged new and expanded dialog between the technology inventor and rural firm. Third, further support was provided to this new relationship (collaboration) including encouragement to seek new R&D funding for the innovation. In our test case, University of Wisconsin aquaculture researchers connected to Blue Ridge fish hatchery in North Carolina. The UW team began experimental trials with Blue Ridge, and are developing a Small Business Innovation Research Proposal (SBIR) for which Mann provided additional coaching and a letter of support.
- Finally, NC1100 and related research was a significant part of activities. This effort included Mann and Loveridge mentoring a post-doctoral fellow (two papers) and PhD student (three papers) as we explored a new USDA ERS data set comprised of over 10,000 firm responses (75% rural and 25% urban) to innovation survey questions. Preliminary findings include: (1) patents, relative to 39 other potential innovation metrics, remain a reasonable measure for innovation creation; (2) once controlling for firm, industry, and state characteristics, the differences between innovative rural and urban firms with high-levels of innovation creation disappear; (3) university R&D expenditures positively influences rural firm innovations creation, though the rural firms may not recognize the value of the university; and (4) while California is the benchmark for urban firms in California, there are several states the appear to outpace California in terms of high-tech rural firms.

NC1100 Meeting(s):

- PD Mann conducted individual meetings with Kenney (UC Davis), Ladisch (Purdue), Loveridge (MSU), and Wang (SDSU), between October and February 2017 as part of the NSF RCN grant proposal.