Sustainable provision of food, energy and clean water requires understanding of the interdependencies among systems as well as the motivations and incentives of farmers and rural policy makers. Effective innovations at the nexus of these food, energy and water (FEW) systems require data-rich system modeling with analytic capabilities for diverse types of data. The project aims to prepare MS and PhD student trainees for multiple career paths such as research scientist, bioeconomy entrepreneur, agribusiness leader, policy maker, agriculture analytics specialist, and professor.

Open to MS and PhD students in agricultural and biosystems engineering, agronomy, industrial engineering, mechanical engineering and natural resources ecology and management. US citizens and permanent residents accepted to a relevant PhD program are eligible to apply for the DataFEWSion traineeship scholarship, which includes:

- $34,000 stipend for the first 12 months
- Tuition and health insurance for the first 12 months
- Competitive assistantships (stipend, tuition, health)

Students from groups traditionally under-represented in science and engineering are especially encouraged to apply.
**Components of the Traineeship**

- Certificate based on coursework in FEW nexus issues; communication; entrepreneurship; data analytics; systems modeling; and social science
- Interdisciplinary research on:
  - Technologies and best practices for improved FEW system operation
  - Data science to increase crop productivity within sustainability constraints
  - Decision science to manage tradeoffs among diverse stakeholders
- Graduate learning community with professional development workshops
- Small group experiences in collaboration and peer review

**Leadership Team**

- **Sarah Ryan, PI**
  - Industrial & Manufacturing Systems Engineering
  - Discipline: Operations research; data-driven decision models

- **Robert Brown, Co-PI**
  - Bioeconomy Institute
  - Discipline: Biomass energy

- **Amy Kaleita, Co-PI**
  - Agricultural & Biosystems Engineering
  - Discipline: Agricultural land and water resources conservation engineering

- **Sergio Lence, Co-PI**
  - Economics
  - Discipline: Agricultural economics, welfare and market analysis

- **Michelle Soupir, Co-PI**
  - Agricultural & Biosystems Engineering
  - Discipline: Water quality and watershed management

**Other Faculty Mentors**

- **Emily Heaton**
  - Agronomy
  - Discipline: Perennial plant management and landscape design

- **Gül E. Kremer**
  - Industrial & Manufacturing Systems Engineering
  - Discipline: Ecological indicators in engineering for sustainability

- **Leifur Leifsson**
  - Aerospace Engineering
  - Discipline: Complex systems modeling

- **David Peters**
  - Sociology
  - Discipline: Sociology of agriculture, rural communities, adoption and diffusion

- **Soumik Sarkar**
  - Mechanical Engineering
  - Discipline: Data analytics and machine learning for cyber-physical systems

- **Lisa Schulte Moore**
  - Natural Resource Ecology & Management
  - Discipline: Agroecology, human-landscape interactions, social-ecological systems

**ABOUT NSF**

The National Science Foundation Research Traineeship (NRT) is designed to encourage the development and implementation of bold, new, potentially transformative, and scalable models for STEM graduate education training. The NRT program also seeks to catalyze and advance cutting-edge interdisciplinary research, and prepare STEM graduate students more effectively for multiple research and research-related career paths.