Our project is multifaceted, rooted in the broader aim of understanding faculty collaboration at Boise State University (BSU), particularly in relation to the Grand Challenges investments made by the Department of Research and Economic Development (DRED). This effort is part of both my thesis and a long-term research agenda named the Social Network Analysis Project (SNAP).

### **Research Objectives and Questions**

#### For the Thesis:

**Research Objective**: The primary objective of my thesis is to analyze the historical grant proposal data to describe the initial network structures prior to the Grant Challenges investments at BSU.

**Research Questions**:

1. What is the overall topology of Boise State University's faculty collaboration network?
2. Who are the central nodes in the grant proposal and focus group networks?
3. What is the impact on the overall network if a central faculty member leaves Boise State University?
4. Given that we may have longitudinal datasets, I could also ask: Are faculty with more relationships able to be more productive? Faculty with a higher number of grant proposal connections one year will be a part of a higher number of grant proposals in future years.
5. To what extent are successful individuals collaborating with other successful individuals, and how does this change over time?

#### For SNAP at BSU (Long-term):

#### **Research Objective**: The long-term objective is to track changes in these initial networks over time to gauge the effectiveness of the Grand Challenges investments in fostering increased grant proposals and interdisciplinary collaboration. I aim to set the groundwork for future longitudinal analysis by examining the grant proposal network's structure and the historical network position of faculty members who are engaged with the Grand Challenges teams today. This will enable SNAP team members to ask:

#### **Research Questions**:

1. How does the faculty collaboration network structure evolve over time, particularly in response to BSU's Grand Challenges?
2. How does participating in the grand challenges change a faculty member’s position in the grant proposal network in subsequent years after joining?
3. What are the impacts of central faculty on the positioning of their Co-PIs in subsequent years? Do central faculty increase the flow of grant proposals in subsequent years?
4. Can we predict the spread of creative work associated with the grand challenges?
5. Are networks with more bridging ties thought to be more creative?

### **Contribution to DRED's SNAP Project**

My thesis work will serve as a foundational study for SNAP by providing a snapshot of the existing state of faculty collaboration networks. The metrics and analyses used in my thesis can serve as baseline data against which future changes can be compared. By focusing on key faculty members who serve as critical nodes in these networks, my work will also address several of DRED's project goals, including identifying faculty who would benefit from intervention or recognition.

Hypotheses for the long-term project posit that nodes with high-degree centrality within social networks have a positive impact on the success of sustainability initiatives and that network clusters are directly related to the effectiveness of local sustainability programs.

By aligning the research questions and methodologies of my thesis with those of DRED's broader objectives, I aim to create a robust and impactful study.