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, qualitative interview data, and targeted social network surveys to describe the initial research collaboration networks prior to/at the beginning of 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?
6. Does the psychology department have fewer interdepartmental ties than the biology department? Which departments have the most / least interdepartmental ties?

#### 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? Does it reduce, have no effect on, or exacerbate inequality?
2. How does participating in the grand challenges change a faculty member’s position in the grant proposal network in subsequent years after joining? What is the change in interdisciplinary grant proposal submission for people who participated in the IRA as opposed to the Grand Challenge Groups and random groups of other researchers? How did their networks change? How did the change in the network impact their measures of success (like number of proposals submissions, interdisciplinarity proposal submissions)?
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? Is the rate of proposal submissions spreading across the network? -> If you collaborate with someone who tends to be more successful, does that make you more successful moving forward? Does participating in the grand challenges increase your success rate on grant proposals?
5. Given that two faculty members are from different departments [or colleges], what is the probability of a tie occurring between those two faculty members? How does this probability change, given the interventions?
6. Are networks with more bridging ties thought to be more creative? Does the success rate of the proposal related to the degree of interdisciplinary?

### **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.