Intro to Literature Review Main Paper

A. A need for new discoveries:

* <https://sdgs.un.org/goals>
* Rittel & Webber 1973 Wicked problems

B. Scientific collaboration -> new discoveries, perspectives

* correlation between scientific productivity and collaboration (isfandyari 2023 #12)
* relation between scientific collaboration and favorable quality of work (isfandyari 2023 #27)
* "collaborative activity can add value and offer insights to key issues of concern, and address transnational or global problems" (isfandyari 2023 #34)
* "Increasing production of papers resulting from the collaborative approach in the compilation, conducting studies in the group" (isfandyari 2023 #49)

Define Scientific Collaboration: In collaboration, every group member participates in creating scientific creative work to generate novel ideas and innovations leveraging the full scope of group resources.

C. Boise State University Grand Challenges

* [to expand the innovative ecosystem](https://www.boisestate.edu/crca/2023/02/09/grand-challenges-vision/) -> Does this mean increasing creative research with a "healthy" collaboration network?
* Solve the most pressing issue of our time -> solving wicked problems

[Goals and Strategies - University Strategic Plan (boisestate.edu)](https://www.boisestate.edu/strategicplan/goals-strategies/)

* See Goals 3.3 & 5.3 for Why IRA and Grand Challenges Teams
* Social-ecological model?

Target Strategic Goal: To increase [creative flow](https://drive.google.com/file/d/1bKSt1-wVdy6w3SKdwtGdPmA_8GHcXe3S/view?usp=drive_link) (BSU's capacity for research and creative activity) through network interventions (LOVE Teams).

In alignment with this strategic goal, SNAP seeks to contribute to these Grand Challenges by

* To understand the impact of researcher collaboration networks on advancing research and creative activity
* To track the success of facilitated interdisciplinary teams and initiatives "Resource Nexus for Sustainability" and "Healthy Idaho."

D. Previous research on scientific collaboration

* started when? 1960s (isfandyari 2023 #4) [What is individual dynamism?]
* Interdepartmental collaboration papers examples
* What has been found?
* An increase in Interdepartmental collaboration over time?
* Advantages of Interdisciplinary Collaboration
* Disis & Slattery 2010

Interdepartmental collaboration is a sort of cooperation in which creative work is completed through the contributions made by faculty from different departments.

* knowledge sharing
* divide labor
* diverse perspectives and understanding

E. Science of Team Science

* equality/inequality in sharing
* connect interdisciplinarity and inequality

Scientific collaboration networks “channel the diffusion of knowledge and innovation across disciplines and organizations” (Okraku et al., 2017, p 178).

[@Okraku2017] emphasize the predominance of unidisciplinary collaborations in scientific research, influenced largely by organizational structures, training processes, and institutional reward systems. They note that single discipline collaborations offer significant advantages, such as the ability to rapidly build consensus within a discipline and produce results efficiently due to shared training and language [@Okraku2017]. This focus on unidisciplinary work often leads to the prioritization of these collaborations in tenure and promotion processes within departments, inadvertently fostering knowledge silos and fragmenting scientific research [@Okraku2017]. This fragmentation not only impedes the diffusion of knowledge and transfer of innovation across disciplines but also creates barriers to general awareness of parallel work in other disciplines [@Okraku2017].

F. Social network analysis and network ethnography allow us to understand interactions among faculty. These networks are developed by faculty working together for a common goal. Faculty are connected to each other by a common link to form a network.

* What is Network ethnography?
* What is Social Network Analysis (SNA) in the context of scientific collaboration?
* Who, what, when, where: Mali et al. (2012) delve into the complexities of scientific collaboration, highlighting that co-authorship is just one of several forms of collaboration. They emphasize the prevalence of various other collaborative activities, such as shared editorship, joint supervision of research projects, collaborative research proposal writing, participation in formal research programs, and the organization of scientific conferences (Mali et al., 2012). The modular structure of researcher networks operates across disciplinary, sectoral, and geographical boundaries. We aim to map out the interdisciplinary interactions and collaborative efforts within Boise State University's Grand Challenges initiative ("intramural-level" ).
* Dynamic, yearly intervals. The basic analyses typically involve time-series snapshots illustrating network characteristics and actor attributes over time. While this inclusion of time adds a dynamic component to the study of co-authorship networks, Mali et al. (2012) observe that such analyses often do not move beyond descriptive comparisons between different time points, making advances in this area somewhat scarce.
* How: Mali et al. (2012) highlight the foundational elements of modern social network analysis (SNA) as identified by Freeman (2004): a focus on structural analysis of actors within social relations, the use of systematic empirical data, extensive use of graphical imagery, and a foundation in formal, mathematical, and computational models. Mali et al. (2012) also acknowledge the complexities and challenges in fostering and measuring interdisciplinary research due to its demands for extensive networks, time, and mobility among researchers.
* Mali et al. (2012) delineate the evolutionary patterns and structures that define the complex web of co-authorship in the scientific community. They posit that collaboration within specific scientific disciplines often leads to the emergence of distinct clusters within knowledge-production networks, indicative of a *small-world* network structure marked by high local clustering and minimal steps between clusters. Conversely, networks formed through *preferential attachment* suggest a scale-free structure characterized by a power-law degree distribution where burgeoning scientists tend to collaborate with established 'scientific stars', reflecting the principle of cumulative advantage in science.
* The presence of clustering and fragmentation within our network could signify disciplinary grouping. At the same time, the degree distribution could reveal if the "rich get richer" phenomenon, a key aspect of mentorship activity, is at play. The small-world network structure suggests that our network may comprise numerous tightly-knit clusters connected by a few inter-cluster links. In contrast, a scale-free structure could indicate a hierarchical network dominated by a few highly connected individuals or "hubs."
* The concept of "gatekeepers" and "invisible colleges": Gatekeepers, with their control over resources and opportunities, play a crucial role in shaping the network's topology, while invisible colleges may drive the intellectual and creative output of the scientific community (Mali et al. 2012).

G. Why: A need for this research study

A review of the literature shows that no study has so far been conducted to explore \_\_\_\_. Numerous past studies limited to \_\_\_ or investigated \_\_\_ or just one particular field of study . . . or has not been done using \_\_\_ technique. (Gini?)

* This study intends to address these research gaps by first analyzing faculty interview data . . . .

&/OR

This study seeks to understand the structural and relational dynamics of faculty at Boise State University. These findings will help guide university interventions that allow for the optimization of interdisciplinary and solutions-oriented funding network interventions.