Case Study of Interdisciplinary Student Research Teams:

Factors, Outcomes, And Lessons Learned

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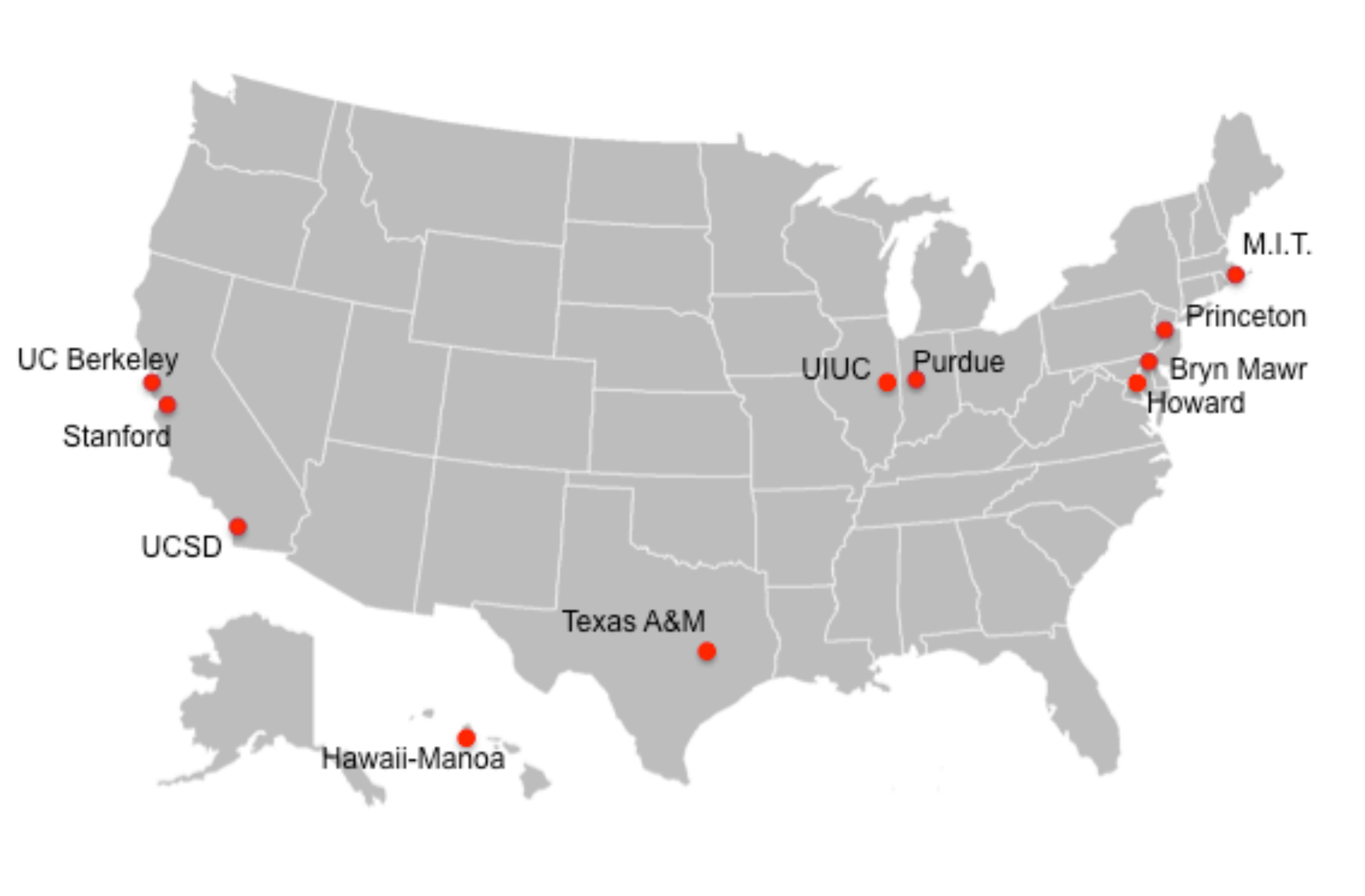
National Science Foundation
Science and Technology Center



Center for Science of Information

Create a Community of Practice of young scholars around the emerging field of Science of Information

Pathways for Student Collaboration

Informal

- CSoI Member in our Center Network
- Conferences (poster sessions)
- Summer Schools
- Annual Center Meetings

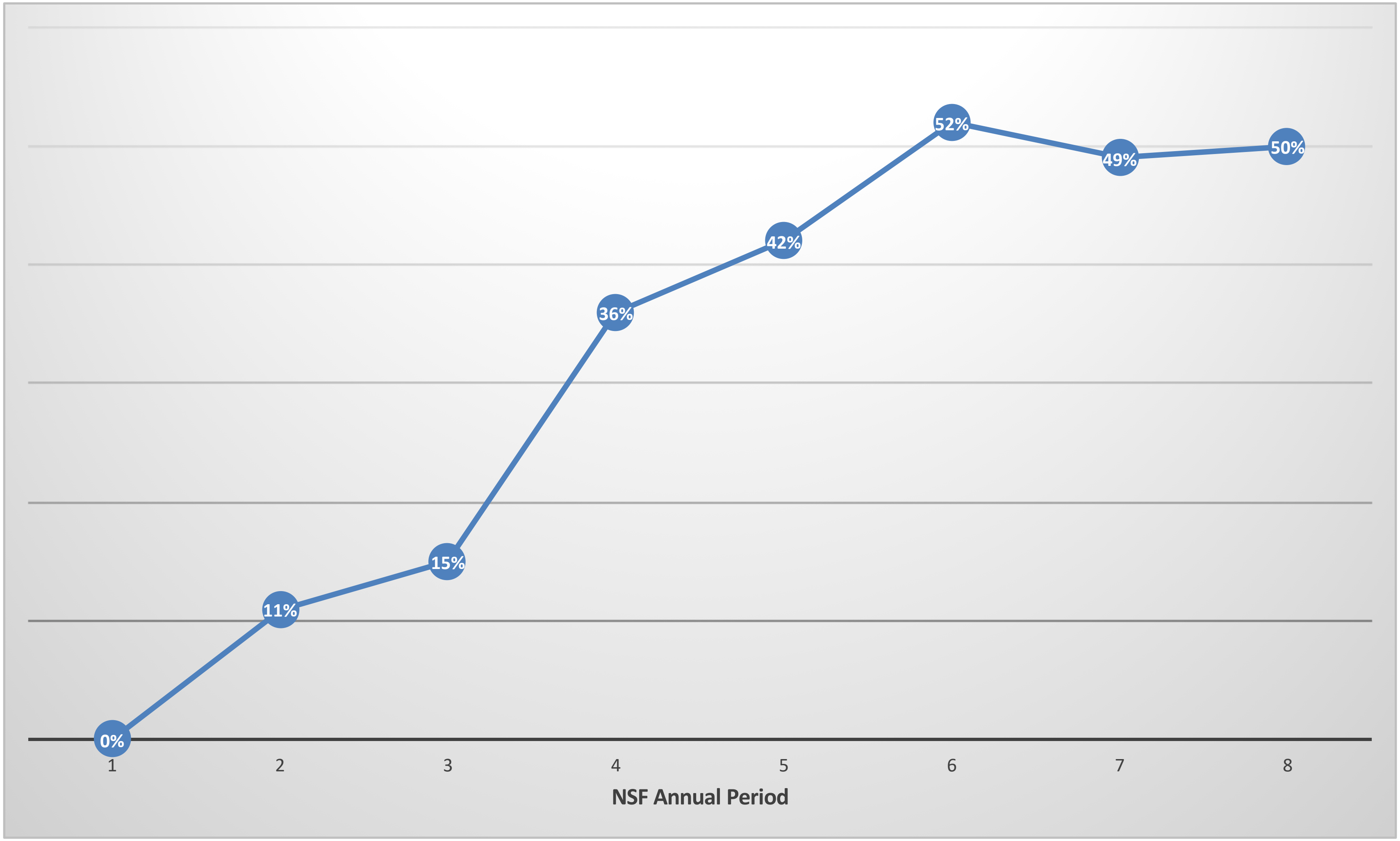
Formal

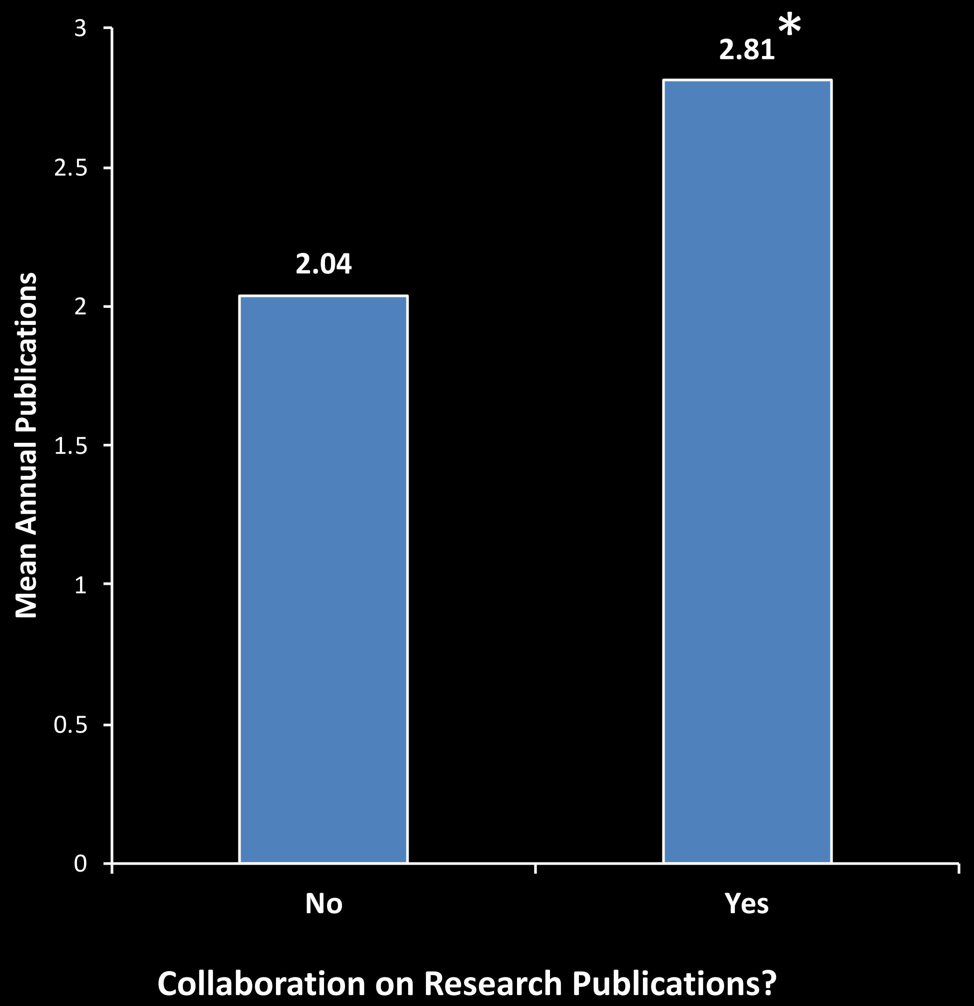
- Faculty Projects
- Co-Advisors
- Student Training Workshops
- Student-led Research Project Teams

Guiding Questions

- Is there a relationship between Center collaboration and scholarly outputs?
- Do factors of funding, university, gender, or length of Center membership influence scholarly outputs or rate of collaboration?
- What can be learned from student research team formation and interactions, and ability to address interdisciplinary questions?
- To what extent can a community of young scholars with large geographic distribution productively collaborate?

Percentage of Graduate Student Members Collaborating on Research with Center members





*n=256, F=11.89, $p < 0.001$

Factors measured that revealed NO influence on publications

- Funding – whether or not they received their PhD stipends from our Center
- Gender
- University
- Participation Level – number of Center events a student participated in (workshops, schools, seminars, etc.)

Collaboration as Dependent Factor

- None of the independent factors measured revealed any significance in the model

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Training Workshop: Data Science & Interdisciplinary Research Teams

- **Active Learning Based teaching R, other data methods**
- **Focus on their research data**


GREY
BLACK
1. R to G.
2. Fractions.
odwalla

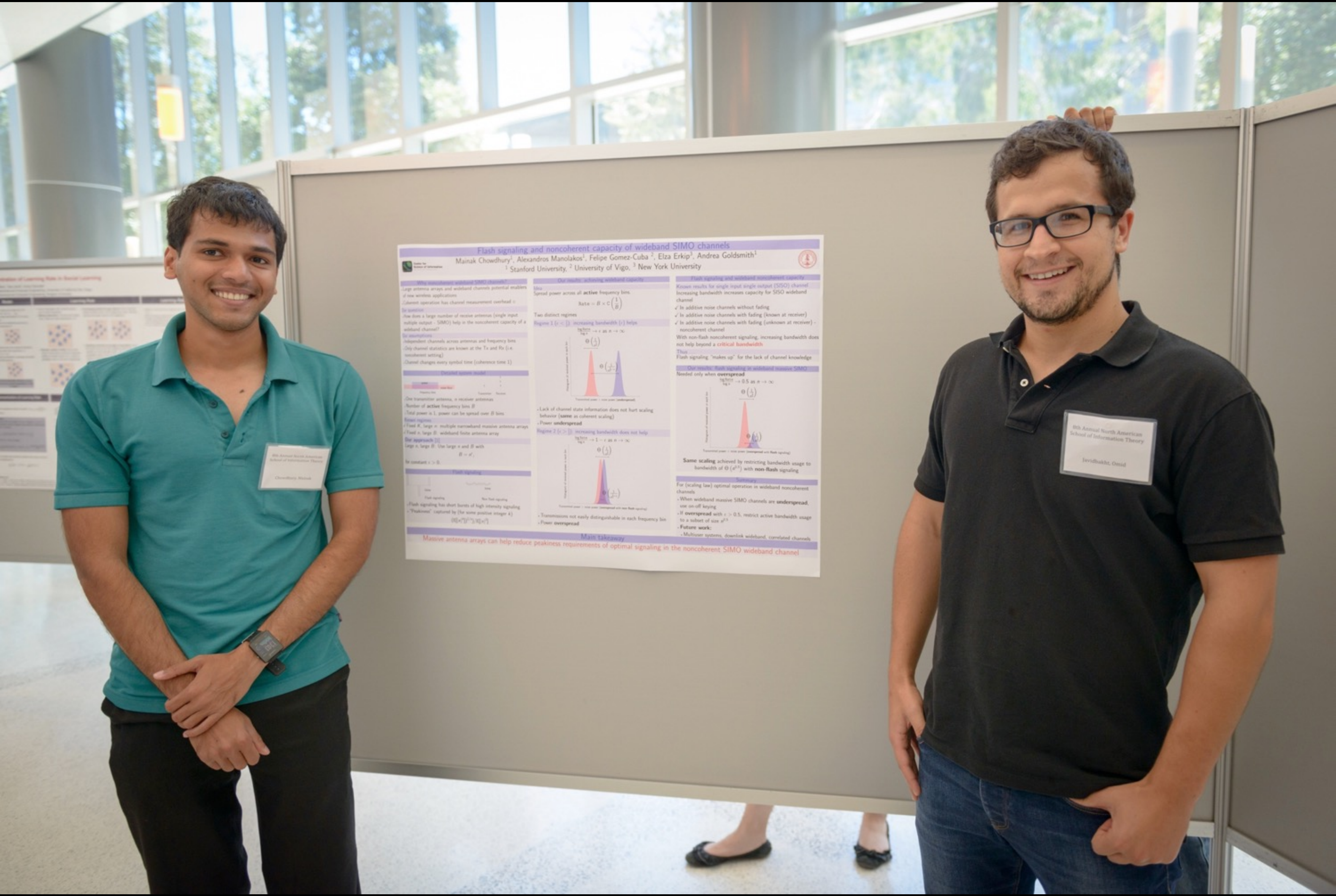
Professional Development Support

- NSF style proposal
- Roles of each participant
- How does it synergize with their graduate thesis goals
- Blessing and guidance of their respective major professors
- 6K per team for travel and meeting expenses per year

Year-Long Student-Led Teams

- 7 annual workshops
- 14 Student Research Teams
- 21 Universities
- 22 Departments
- 50/50 F/M ratio

Agronomy, Anthroplogy, Behavior and Brain Science, BioEngineering, Biology, Chemical Engineering, Civil Engineering, Computational Biology, Computer Engineering, Computer Science, Ecological Science and Engineering, Electrical and Computer Engineering, Electrical Engineering, Environmental Engineering, Forestry and Natural Resources, Geology, Languages, Mathematics, Medical, Physics, Sociology, Statistics



Flash signaling and noncoherent capacity of wideband SIMO channels
Mainak Chowdhury[1], Alexandros Manolakos[1], Felipe Gomez-Cuba [2], Elza Erkip[3], Andrea Goldsmith[1]
[1] Stanford University, [2] University of Vigo, [3] New York University
Main takeaway
Massive antenna arrays can help reduce peakiness requirements of optimal signaling in the noncoherent SIMO wideband channel

Student-Led Research Team Productivity

- 14 Student-Led Research Project Teams
- 44 Co-authored Conference Posters & Presentations
- 15 Co-authored Journal Papers

Conclusions

- Significant positive relationship exists between Center collaborations by graduate students and their scholarly publication productivity
- Given a range of informal and formal pathways that encourage collaboration – graduate students in our community demonstrate capacity to successfully engage in interdisciplinary research
- Given even small amounts of travel and professional development support, our graduate students have successfully formed a community of practice (despite being geographically dispersed)
- This collaborative approach developed during graduate study appears to continue as they matriculate to post-doctoral and faculty positions

Questions?

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Made possible by grant NSF CCF-0939370