Training and Development on Interdisciplinary Scientific Teams

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Exemplary Case Study

- 12 teams from the Catalyst for Innovative Partnership (CIP) Program
- 25 Pre-CIP Teams
- 1 CTSA
- 1 Team with 2 large NSF grants
  - ✶Exemplary - unusual and of general interest to the public, the issues are naturally important, or both (Yin 2017)

12-Year Team

Problem #1

“Teamwork is Hard”

Types of Evaluation

- **Developmental Evaluation –**
  - Are specific roles being fulfilled?
  - Are tasks being completed?
- **Process Evaluation –**
  - How is the team communicating
  - Are they having regular meetings?
  - Is there collaboration and engagement?
- **Outcome Evaluation –**
  - Includes agreed upon milestones and stage gates such as like publications and grants.

Problem #2

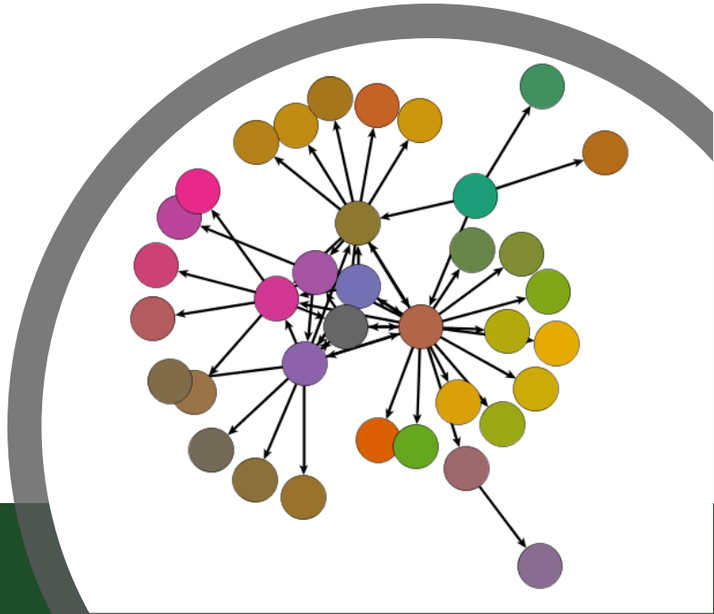
- 75% of studies use bibliometric data (Hall et. al. 2018)
  - In SciTS we know the most about successful teams that have published
  - Publications are a long-term outcome of a successful team
- Gaps in the literature about team process and development
- Gaps in the literature about teams who fail to publish

Research Questions

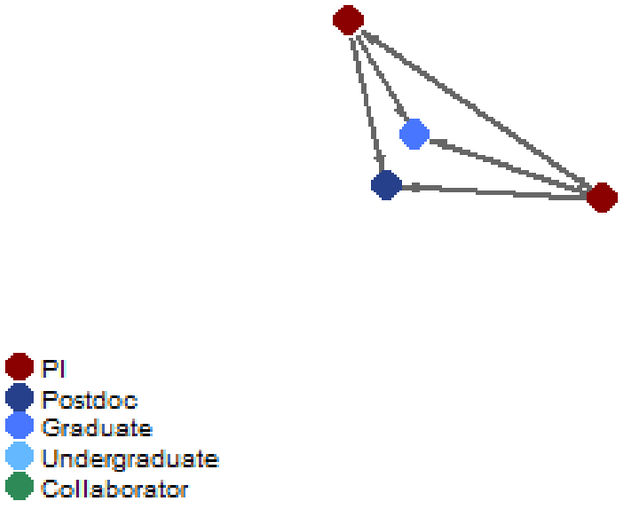
How do scientists develop through participation in transdisciplinary teams?

Mixed-Methods

- 2015-Present
- Participant observation
- Interviews and focus groups
- Turn-taking Data collection
- Social network data
  - Collaboration diagrams are a combination of: grant, publications, and new research
  - Advice networks
  - Mentoring networks

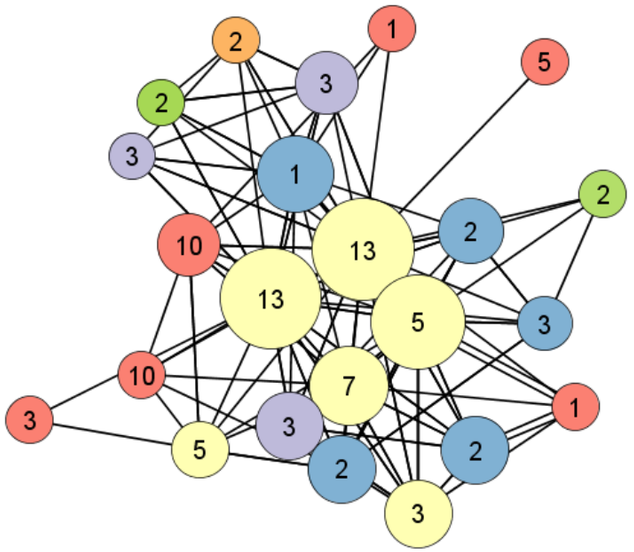


Team History



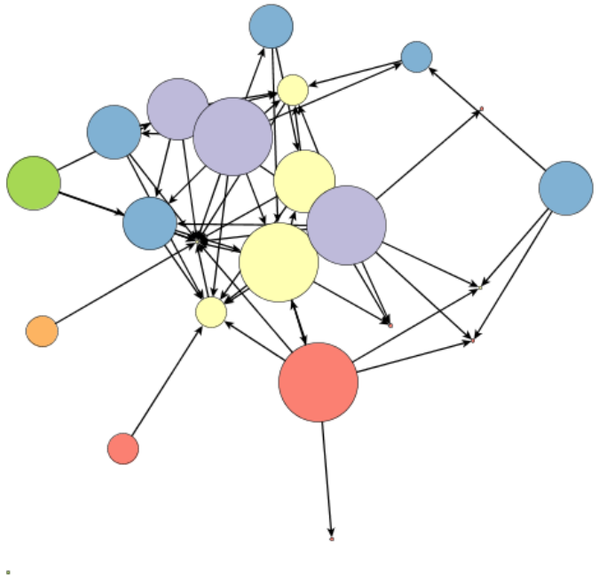
- Faculty
- PostDoc
- Graduate
- Undergraduate
- Collaborator
- Other

2016



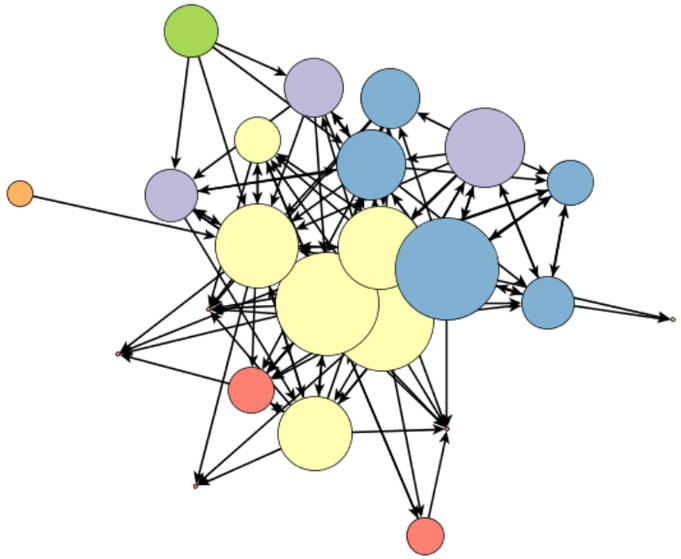
Scientific Collaboration

Average Degree 6.22



Mentor

Average Degree 2.4

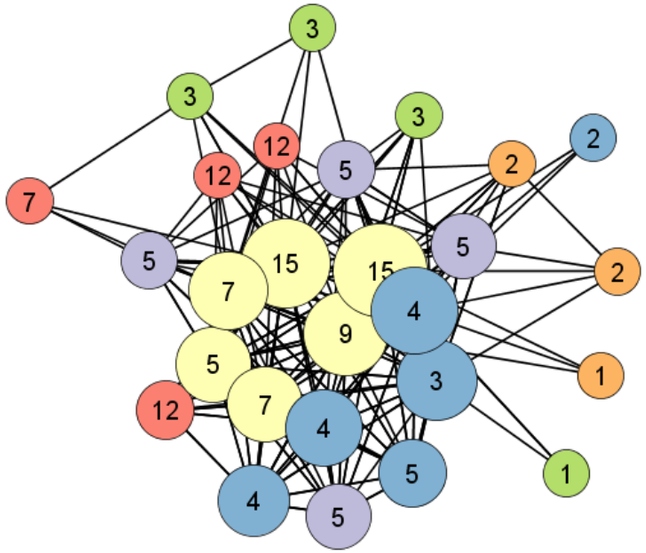


Advice

Average Degree 5.4

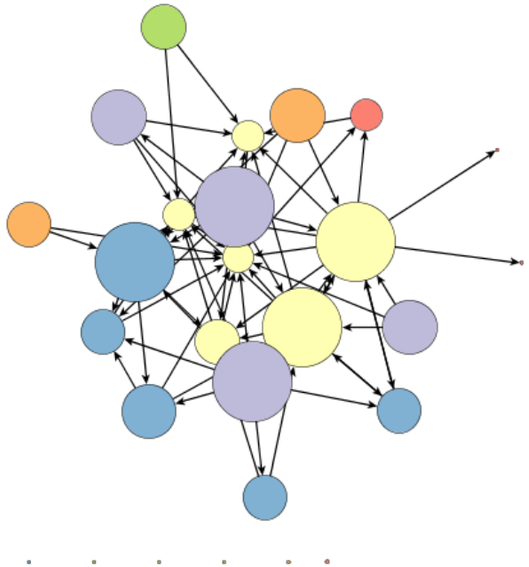
- Faculty
- PostDoc
- Graduate
- Undergraduate
- Collaborator
- Other

2018



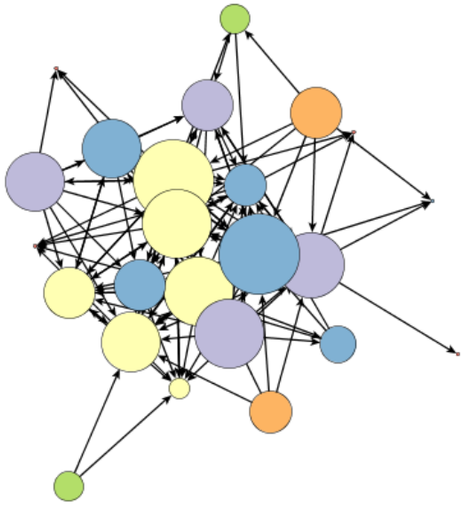
Scientific Collaboration

Average Degree 9.1



Mentor

Average Degree 2.5



Advice

Average Degree 5.1

Collaborative Capacity - building internal and external relationship

- Mentoring
- Advice
- Scientific Collaboration Network

Personal Mastery

A set of principles and practices necessary for team learning

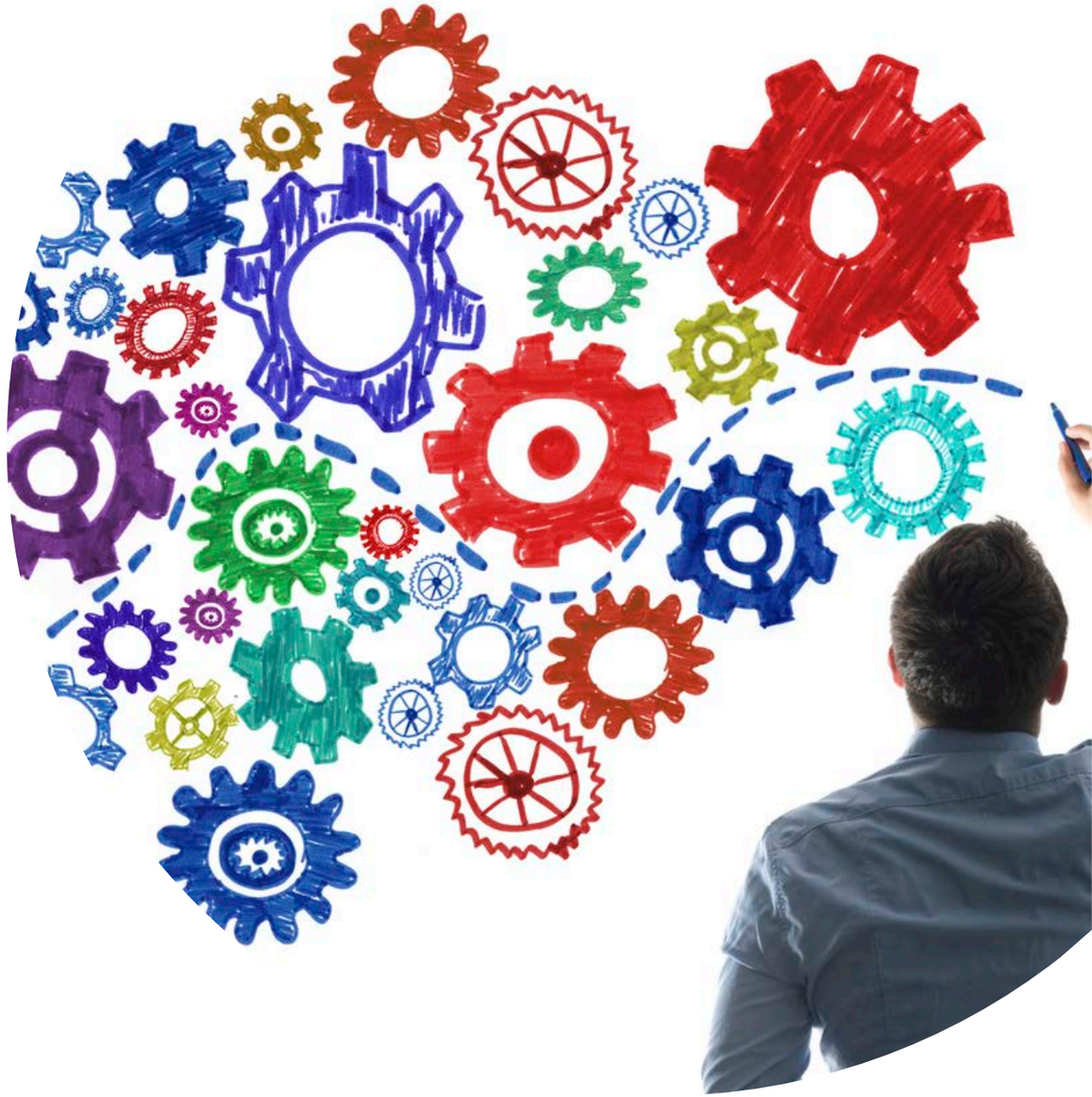
Personal Mastery

Male Postdoc: I have learned a great deal about disease dynamics, which is not my background or regular field of study. I have also learned better communication skills from working with such a large and diverse group.

Female Postdoc: Communication would be a major avenue in which I have gained skills. Also how to be a good leader and understand how to manage different personalities.

On the Ground Training

The team's routine interactions helped members develop both personal mastery and build collaborative capacity.



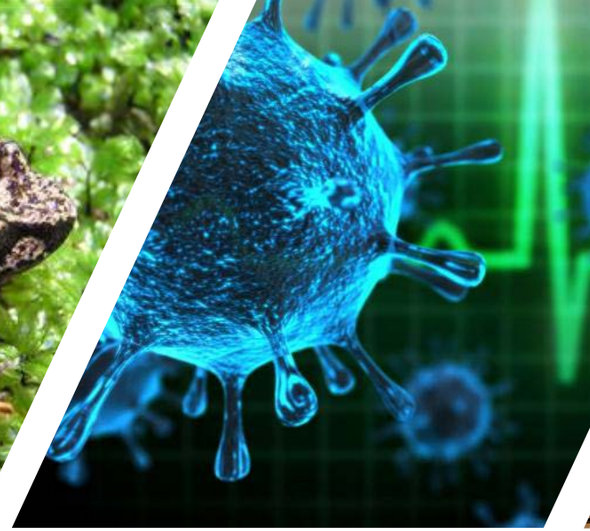
Correlation of Mentor and Advice Networks to Scientific Collaboration

	QAP Mentor to Collaboration		QAP Advice to Collaboration	
	Pearson Correlation	P-Value	Pearson Correlation	P-Value
2015	0.21	0.0020	0.29	0.0008
2016	0.93	0.0002	0.72	0.0002
2017	0.59	0.0002	0.57	0.0002
2018	0.86	0.0002	0.85	0.0002

What we learned….

Historically….

Single Investigator Problems…



To Solve Complex Problems….

New knowledge is created through building relationships.

PI Quote

“Its more like the team has become more of the thing then the science. The science drives it, but what really sustains it is the team”

Recommendations and Future Directions: Conflict

"It's really cool that students are part of the conversations that are both good/bad/ugly etc. It's not just good. It's not just one-on-one conversations. They hear it all."

"For me as I get older in this career and in this important. Collegiality is the number one factor that I'm looking for when we bring in faculty members and maybe postdocs and grad student re these people someone I want to work with. Spend much of my life hanging round. Life is way too short"

Recommendations and Future Directions

- Don’t try to “be” this team
- Everyday interactions impact team processes for scientists at all levels (undergraduate, pre/postdoc, senior scientists)
- Include graduate and undergraduate students

Questions?

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