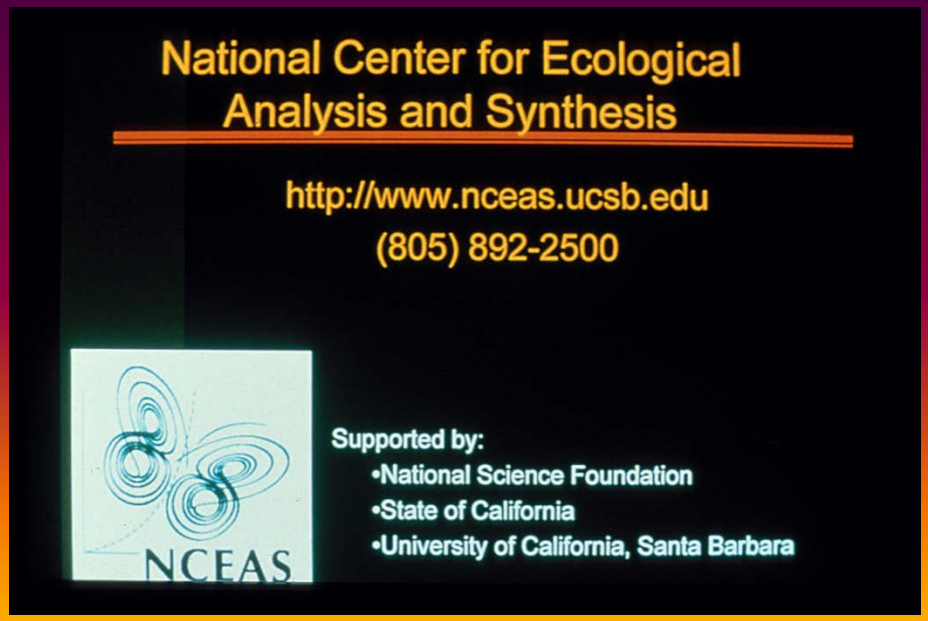
Social Dimensions of Collaboration in Synthesis Centers

or

3000 Years Among the Ecologists

John N. Parker

(*with contributions from Ed Hackett and Stephanie Hampton*)



Overview

- **Background**
- **Synthesis centers**
  - *Mobilizing Structures*
  - *Mode Two Research*
  - *Islands*
- **The Future…**

Scientific Synthesis

- Integrates research questions, theories, methodologies and data across disparate forms of expertise, scales and study systems to increase the generality, parsimony, applicability, or empirical soundness of scientific explanations and science-based innovations.

  - (*Hackett and Parker 2011*)

1) **Hyper-specialization**
2) **Data overload**
3) **Transformative/serendipitous research**
4) **Conceptualizing complex problems**
5) **Investment**

Methods

- Observations
- Interviews
- Surveys
- Network analysis
- Bibliometric analyses

Synthesis Centers as a Mobilizing Structures

- Organizational means for mobilizing collective action (**e.g.** N.O.W.)
- Key Insight: Social movements happen in science
- Disciplines, specialty areas also social movements
- Leaders, followers, opponents

(Frickel & Gross, 2005; Parker, 2006; Hess, 2007)

“Moist” transition

Field → **Analysis**

Molecular Biology →

Ecology →

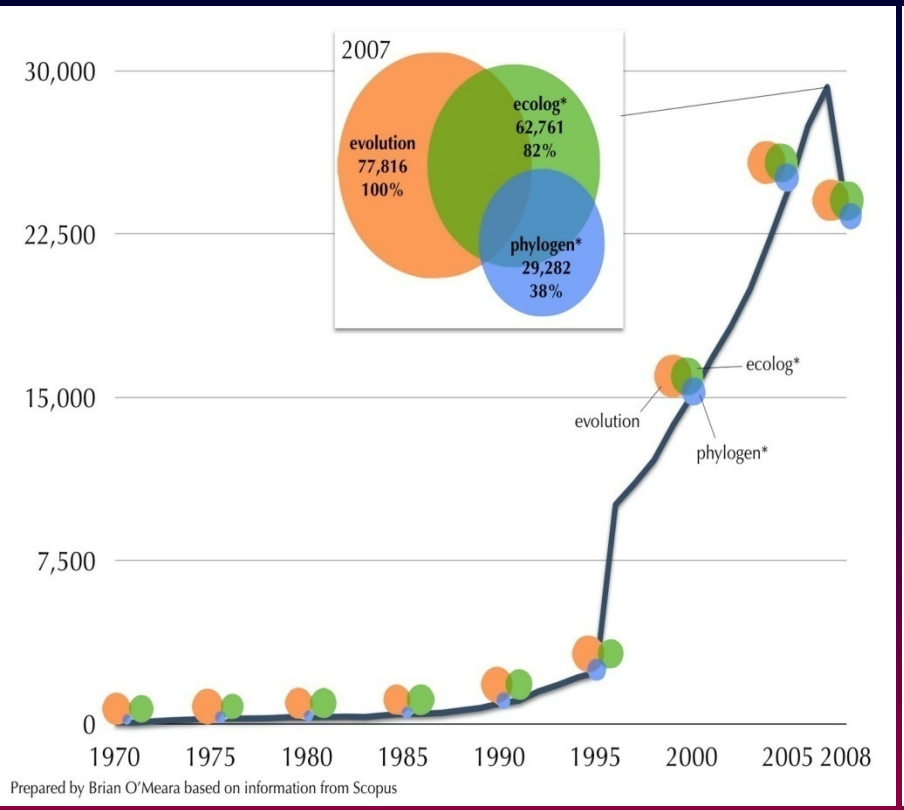
Wet
Primary

Dry
Secondary

NCEAS postdocs in a multivariate stats workshop at NCEAS

(Penders et al. 2008)

Life Cycles of Scientific Specialties



(O'Meara 2008)

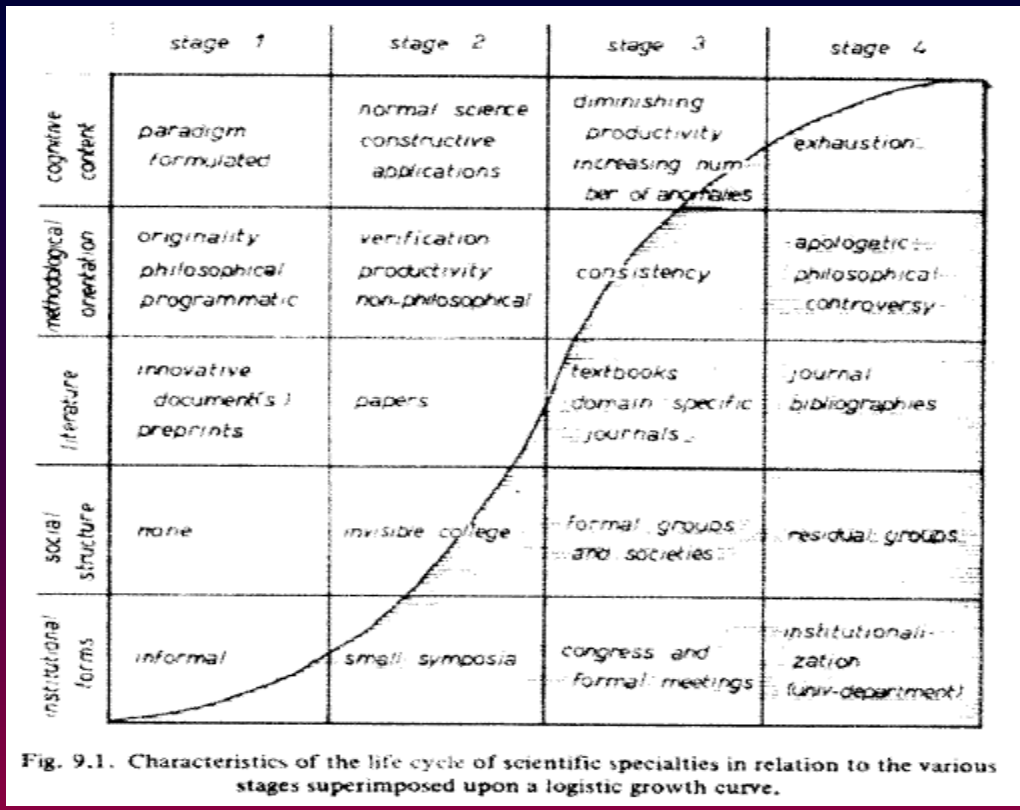


Fig. 9.1. Characteristics of the life cycle of scientific specialties in relation to the various stages superimposed upon a logistic growth curve.

(De May 1992)

More than an organization…

A Genealogy of Scientific Organizations

Disrupting Science
Moore, 2008

Many others…

Synthesis as Mode Two Research

Traditional Ecology	NCEAS Working Groups
• Field	• NCEAS
• 30 meter plots	• Huge areas of study
• Primary data	• Secondary data
• Few collaborators	• A few hundred
• Single discipline	• Multiple disciplines
• Single institution	• Multiple institutions
• Single nation	• Multiple nations
• Academic setting	• Nonacademic setting

(Hackett 1990; Gibbons et al., 1994; Etzkowitz and Leydesdorff, 2000**)**

Data Translation

- Analysis and synthesis divorced from local context
- **Result**: Temporary loss of local knowledge
- WG members travel ‘virtually’ to the field
- **Strategies**: 1)Social capital, 2) Field notes, 3) Expert knowledge, 4) Metadata
- Scientists adjust as ecology moves from traditional field sites

Take ecology out of the field…

In-Group Solidarity and Positioning

- Span disciplines, institutions, nations
- Leave local contexts and enter F2F at center
- **Result:** trust, leadership roles, division of labor
- Accomplished in two ways
  - Period of ritualized adjustment
  - Group symbols and rituals
- **Allows for**: trust, bridging of social groups, and operational division of labor
- **Trading zones, pidgin, Creole**

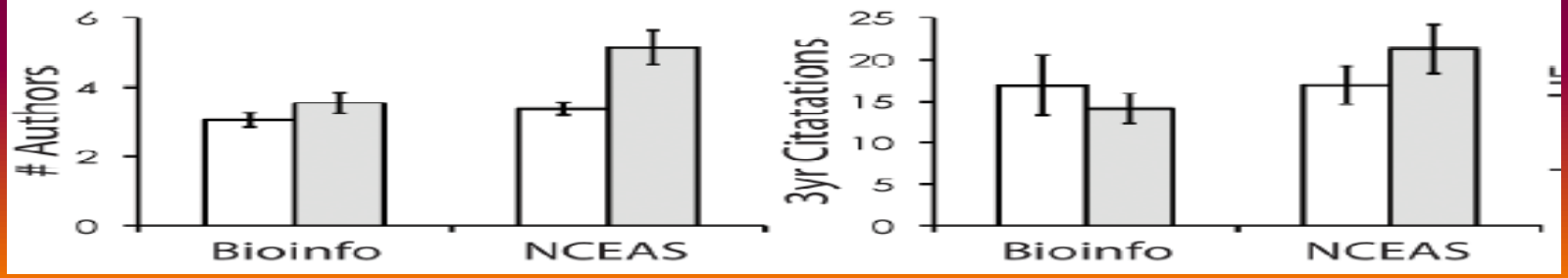
Age Structure and Interaction

- Distinct division of labor
- Essential tension (Kuhn, 1977)
- **Sr. Scientists**: socialization, networking, institutional memory, orientation in the field, asking important questions
- **Jr. Scientists**: fresh ideas and techniques, labor, energy, asking challenging questions

- However, not always harmonious…
- Striking the mother lode/essential tensions

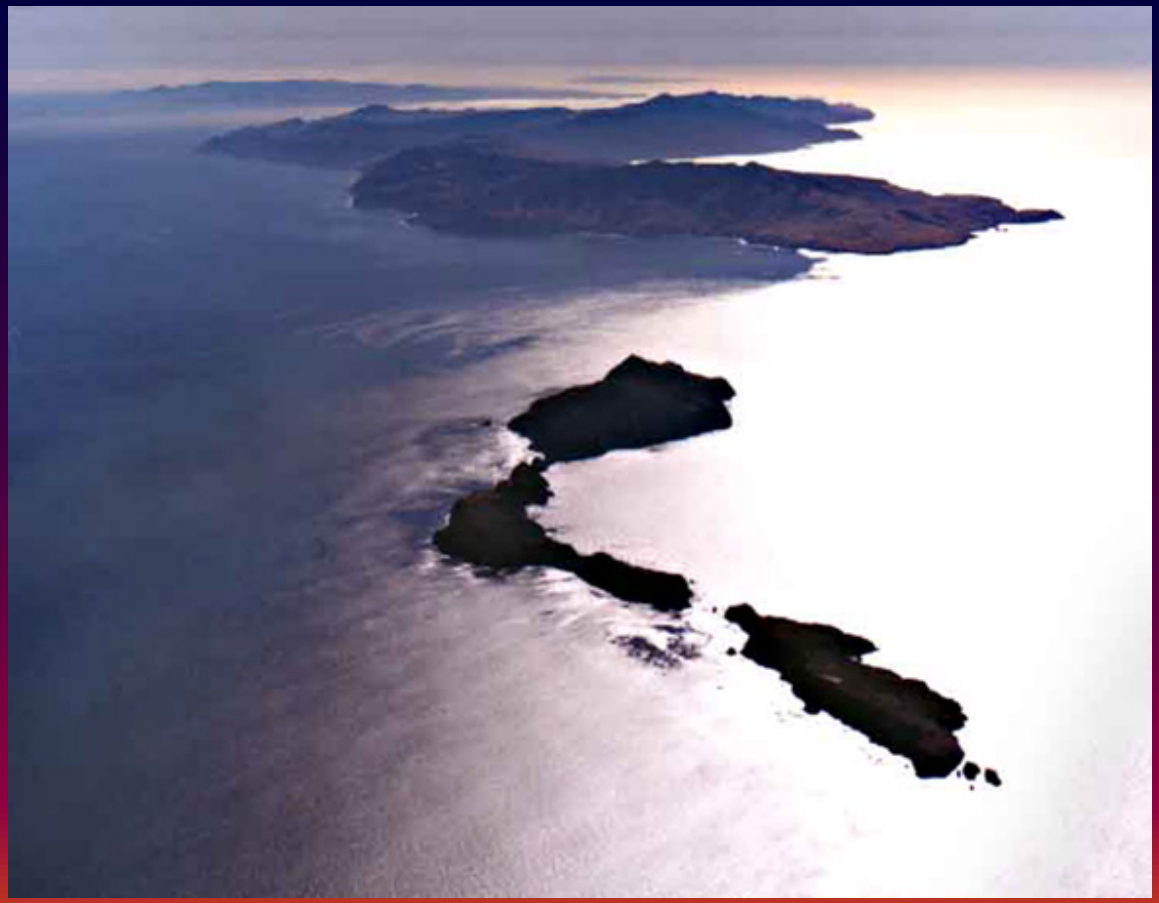
Success in Synthesis

		# Pubs	Avg 3yr Cites
	R^2	0.33	0.11
Time	Start Date	—	
	Total # Meetings	+	+
	Average Meeting Duration	0	
	Average Time Between WG Events		
	Total Days Together		
Size	Total # Participants	+	
	Average Meeting Size		
	Total # Meetings x Average Meeting Size		
	Total # Meetings x Total # Participants		
	Average Meeting Duration x Average Meeting Size		
	Average Meeting Duration x Total # Participants		
	Total # Residents	+	
	Institutions/participants	+	
Composition	Average % Total Participants at Meetings		+
	% Female		
	% Non-U.S.		
	% Leaders Among Participants		0
	Total # Meetings x Avg % Total Participants at Meetings		
	Total # Meetings x Total # Residents		
	Average Meeting Size x Total # Residents		



Hampton and Parker (revising) *Bioscience*

Synthesis Centers as Islands



Island Time

Combines:

- Extreme Isolation
- Personality Selectivity
- Intense F2F
- Expertise
- Rituals/Informality

Outcomes:

- Velocity
- Trust
- Commitment
- Overcome Barriers
- Collaborative Flow
- Energy/motivation
- Transformative research

Ideal microsociological conditions…

(Csikszentmihalyi, 1998; Collins, 2005; Sawyer, 2007)

New Models of Scientific Productivity

- Punctuated, “Bursty” form of collaboration
- Tradeoff *extensive* for *intensive* F2F
- E.g. Fusion reaction/Hot Spots and Moments
- New models of scientific productivity

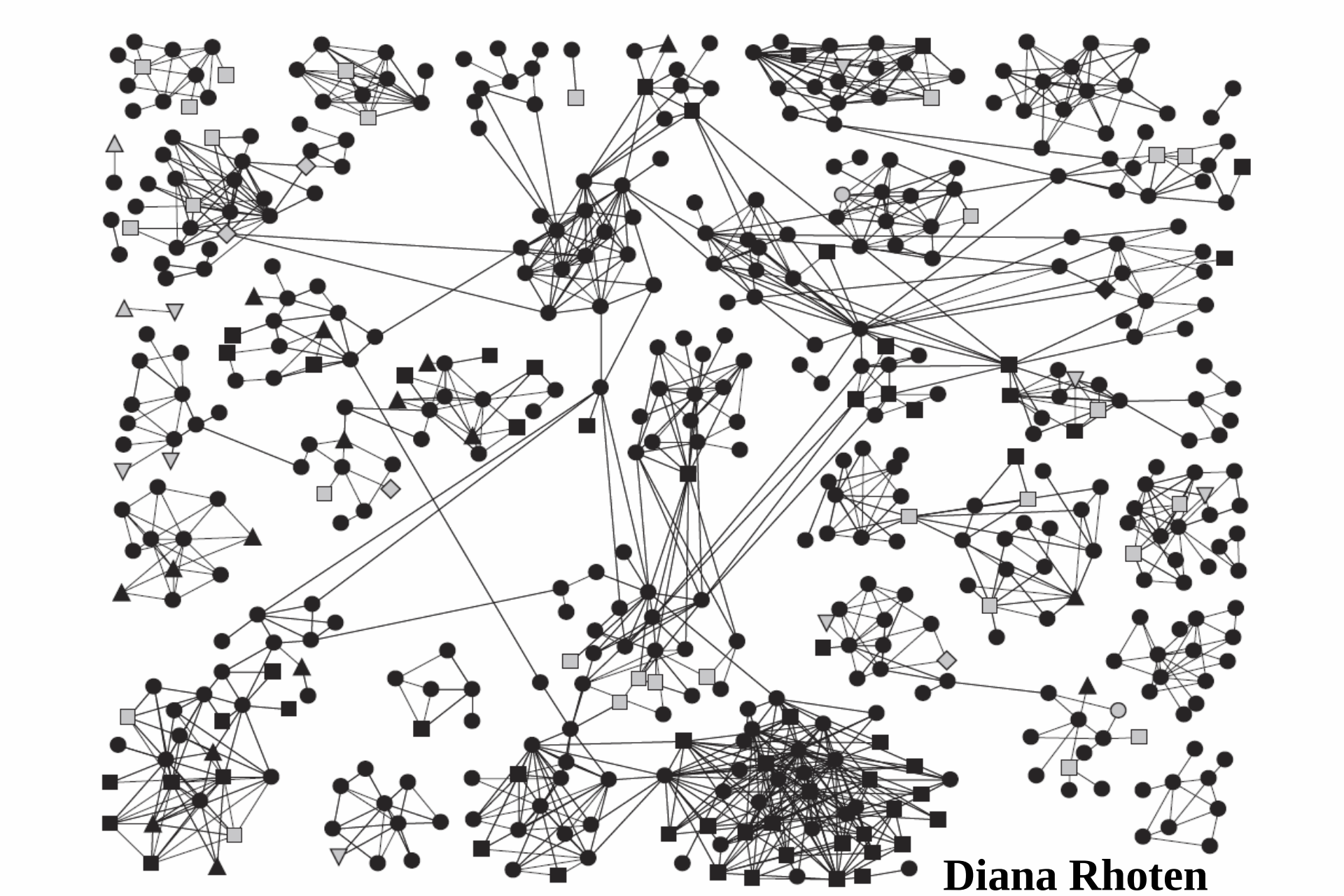
(**Parker and Hackett**, *American Sociological Review*, Forthcoming)

Opinions and Attitudes

As Result of NCEAS experience…

- 67% more willing to share data
- 99% more likely to collaborate with WG members
- 100% encourage others to participate in NCEAS WGs

N = 131


Diana Rhoten
Science field: ◆ = engineering; ■ = physical sciences; ● = life sciences; ▲ = social sciences; ◇ = computation and math sciences;
□ = environmental sciences; ○ = environmental social sciences; △ = information sciences; ▽ = unknown

For now, future lies in physical centers with virtual support

- Tacit knowledge transfer
- Role and identity formation
- Communication
- Trust, cohesion and commitment
- Technological support
- Gravitas

- Opportunities for natural experiment

THANKS!

- **Collaborators**
  - Edward J. Hackett
  - Stephanie Hampton
  - Diana Rhoten
  - Dave Conz