T206: Developing Large-Scale, Collaborative Grants

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University of Alaska

Who are we?

JULIE BENSON

- Program Administrator for Alaska INBRE
- Problem-Solver – I like to fix things!
- Completer not a competer
- Mother, Singer, Volunteer addict

Pips Veazey

Alaska NSF EPSCoR
Oceanographer
Sailor, skier
Mother
Researcher

Who Are You?

1. Pull out your phone.
2. Using your web browser, visit www.kahoot.it
3. Enter the Game Pin on the Screen

Learning Objectives

- Learning Objective 1: Define team science, collaboration, and interdisciplinary research.
- Learning Objective 2: Understand large applications and your role in them.
- Learning Objective 3: Understand the increased emphasis on team science in funding agencies.

What is a large-scale, competitive grant?

Characterized by integrated and strategic research team visions that leverage collaborative partnerships.

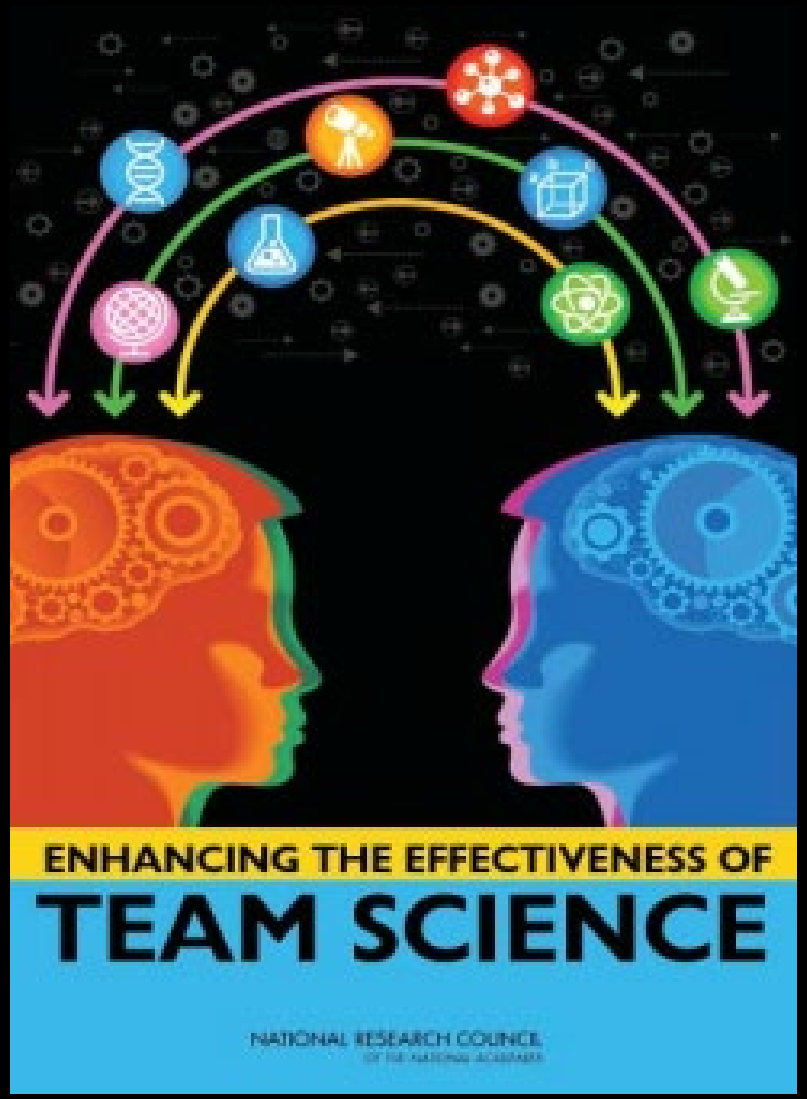
Examples: NIH U- & P- awards, NSF EPSCoR, STC, ERC, etc.

TICTOC for Large Proposal Management

- Team
- Institutional Support
- Communication & Competencies
- Time
- Organization
- Collaboration Agreement

WHAT IS TEAM SCIENCE?

A collaborative effort to address a scientific challenge that leverages the strengths and expertise of professionals trained in different fields.



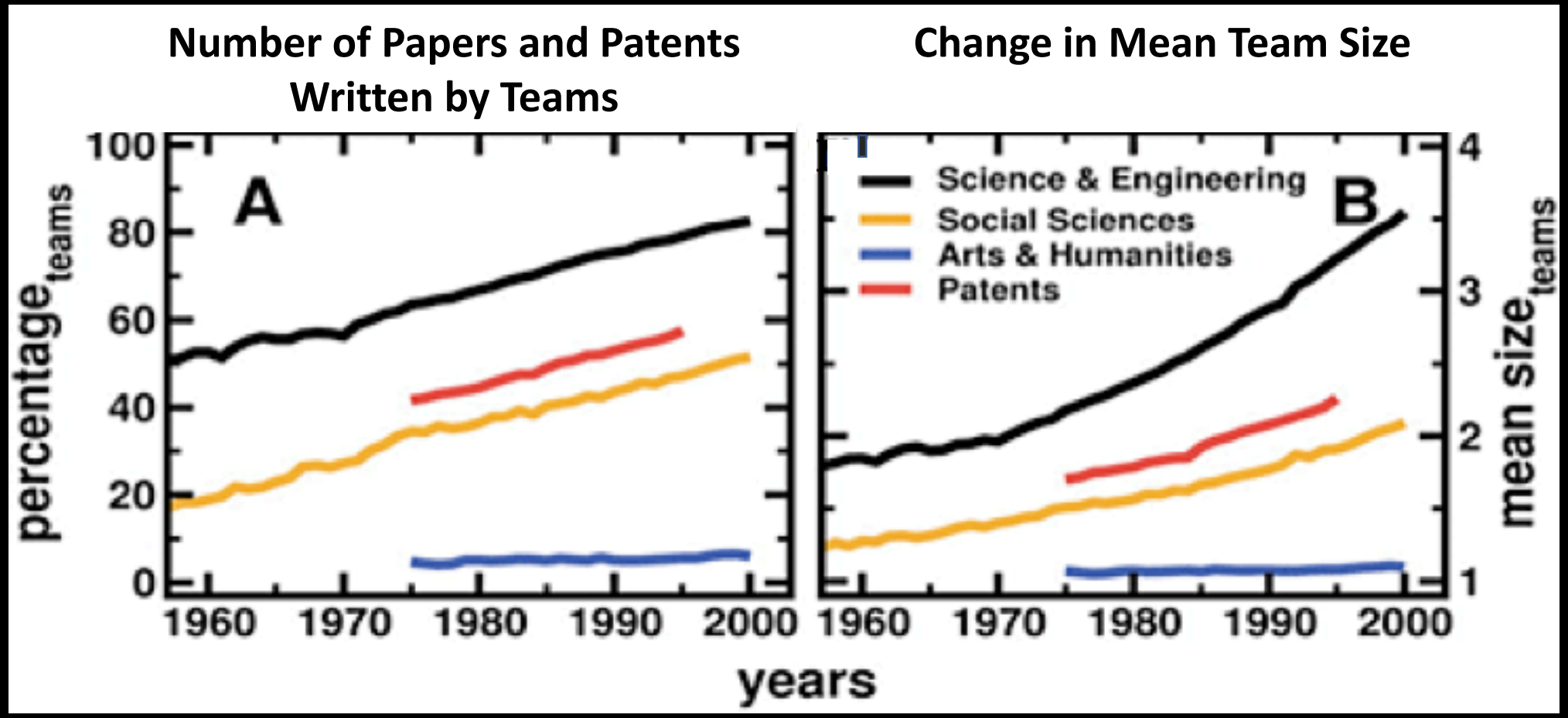
*National Research Council. 2015. Enhancing the Effectiveness of **Team Science**. Washington, DC: The National Academies Press. https://doi.org/10.17226/19007.*

WHY TEAM SCIENCE?

"…society's problems do not fit neatly into the University's departmental grid, nor are they rapidly divisible into subproblems…interdisciplinary research teams can readily respond to multi-discipline, problem-oriented research and public service opportunities."

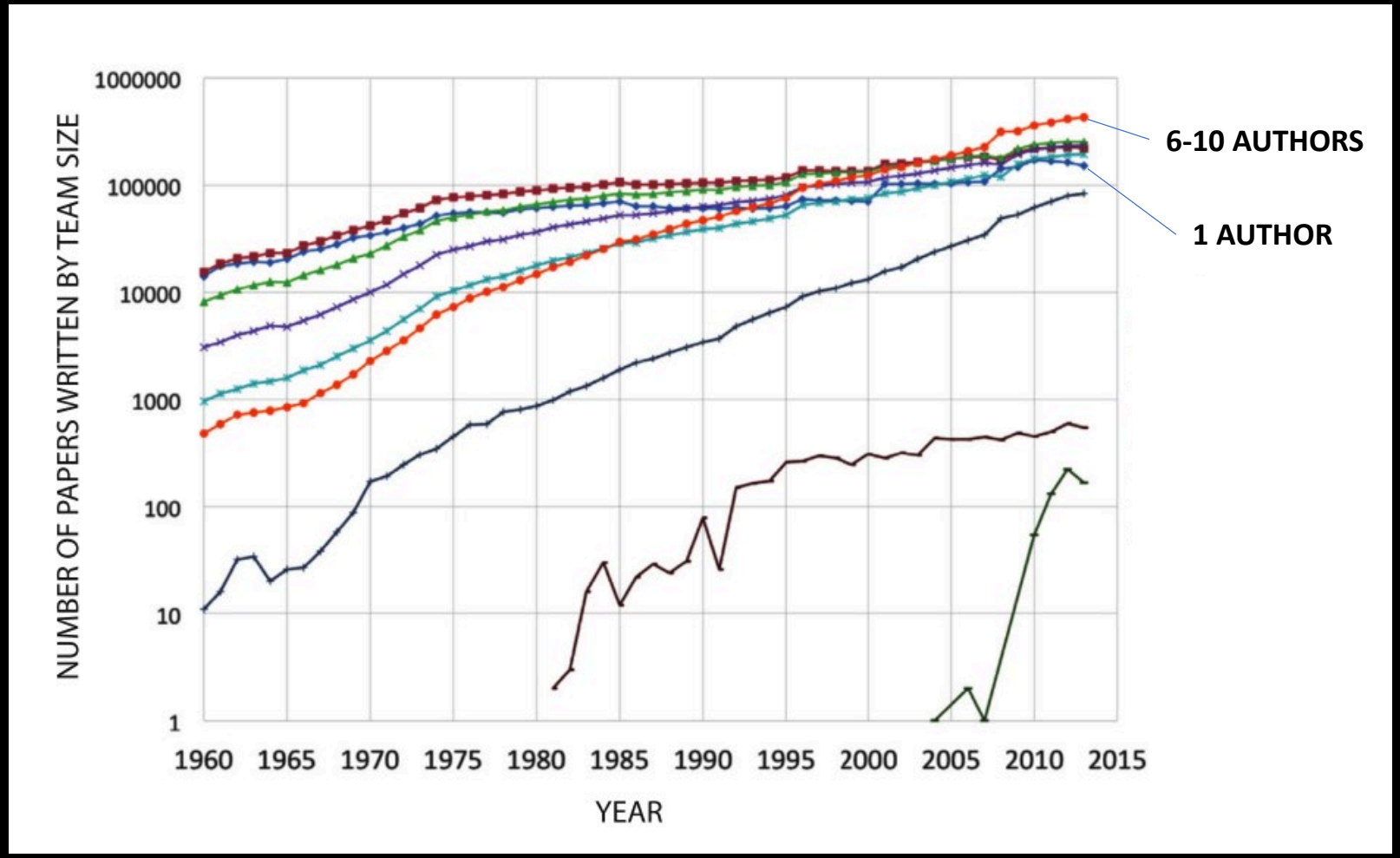
Remick, F. (2000). Barriers to Organized Interdisciplinary Research in a University Environment, in The Interdisciplinary Imperative: Interactive Research And Education, Still An Elusive Goal In Academia (Writers Club Press).

COLLABORATIVE SCIENCE IS INCREASING



Wuchty S, Jones BF, and Uzzi B. The increasing dominance of teams in the production of knowledge. (2007). *Science*, 316(5827), 1036-9.

TRENDS IN AUTHORSHIP



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WHY SHOULD WE EMBRACE TEAM SCIENCE?

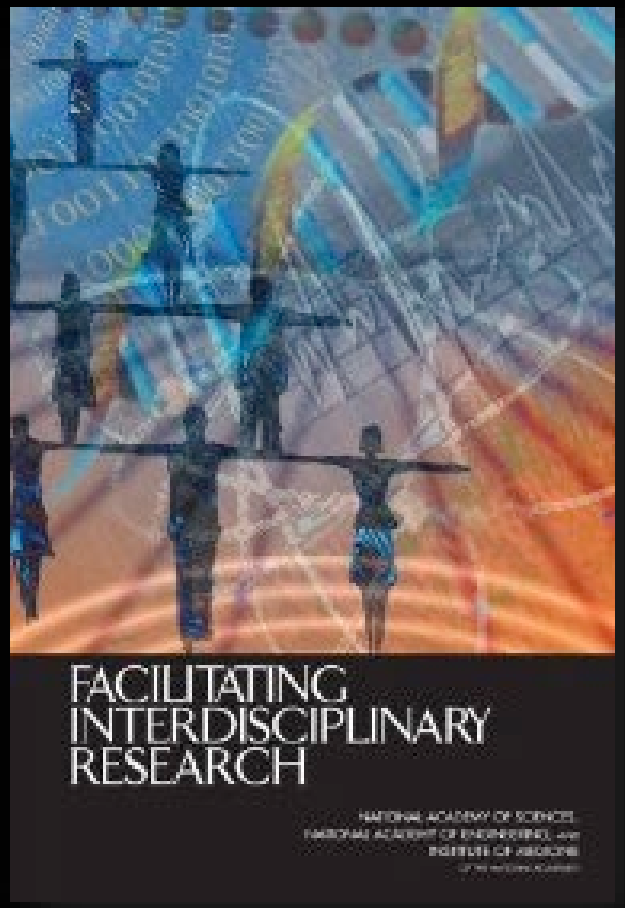
1:13

INTER-DISCIPLINARY RESEARCH

Demands more than just complementarity

- Team members combine or juxtapose concepts and methods from different disciplines
- Overarching goal is systematic integration of information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge

GOAL: to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or field of research practice.



YOU SHOULD BE SCARED

"…the most [significant] barrier to successful translational research: the inability to create and sustain dynamic and innovative interdisciplinary research teams."

M. L. Disis, J. T. Slattery, The road we must take: Multidisciplinary team science. Sci. Transl. Med. 2, 22cm9 (2010)

FEATURES OF TEAM COMPLEXITY

KEY FEATURES	LOW COMPLEXITY	HIGH COMPLEXITY
Size	Small (2)	Mega (1000s)
Task Interdependence	Low	High
Boundaries	Stable	Fluid
Goal Alignment	Aligned	Divergent or Misaligned
Integration	Unidisciplinary	Transdisciplinary
Diversity	Homogeneous	Heterogeneous
Proximity	Co-located	Geographically Distributed

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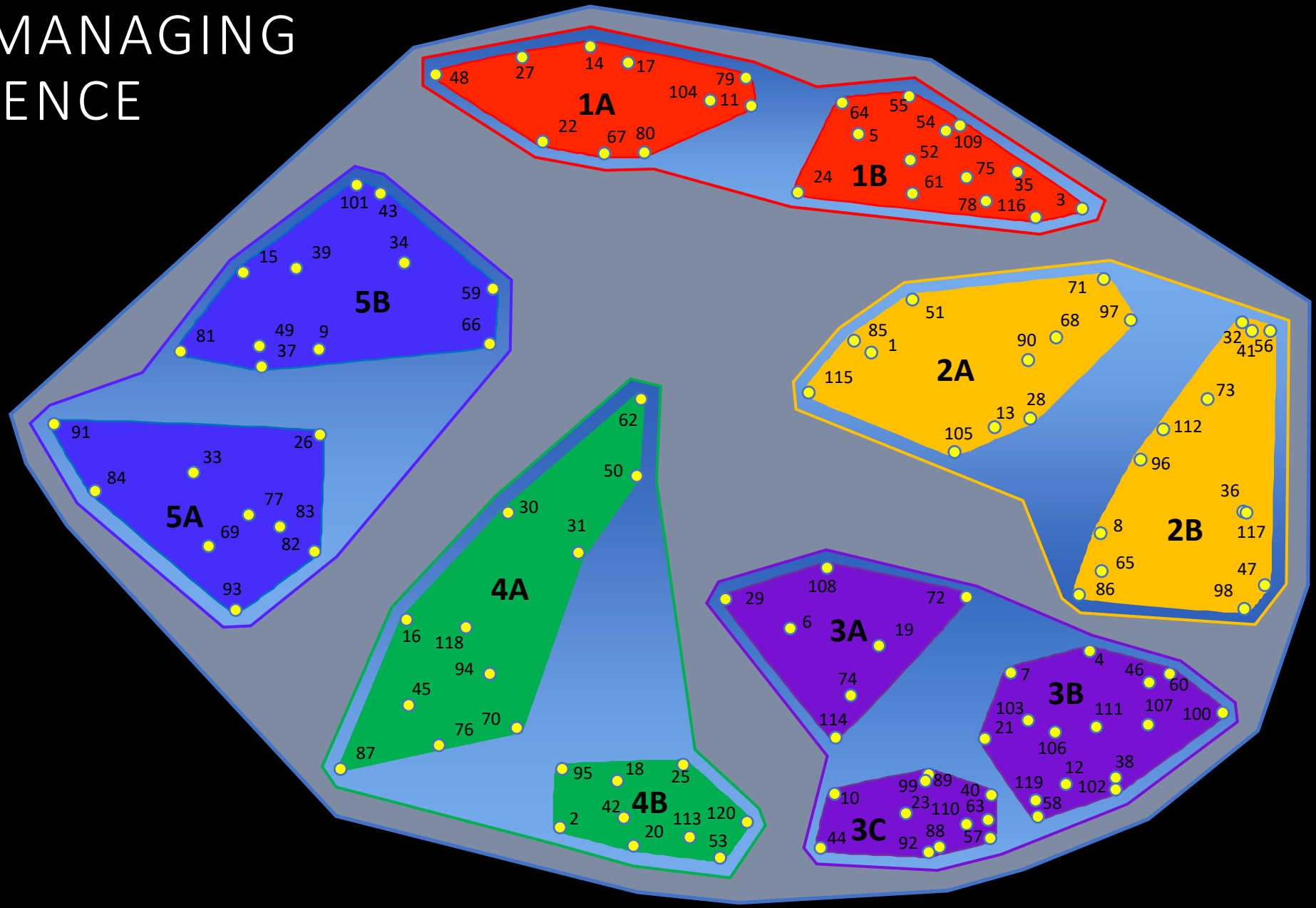
LEADING AND MANAGING TEAM SCIENCE

1. Project Management
   - A. Knowing
   - B. Doing
2. Shared Leadership
   - A. Organizational Management
   - B. Organizational
3. Personal Competence
   - A. Team Management
   - B. Self-management
   - C. Self-awareness
4. Social Competence
   - A. Relationship Management
   - B. Social Awareness
5. Communication
   - A. Internal to team
   - B. External to team



http://search.proquest.com/openview/4077d8f594272097f4611dfa9dd479b8/1?pq-origsite=gscholar&cbl=18750&diss=y.

CAPITALIZING ON TEAM SCIENCE RESEARCH

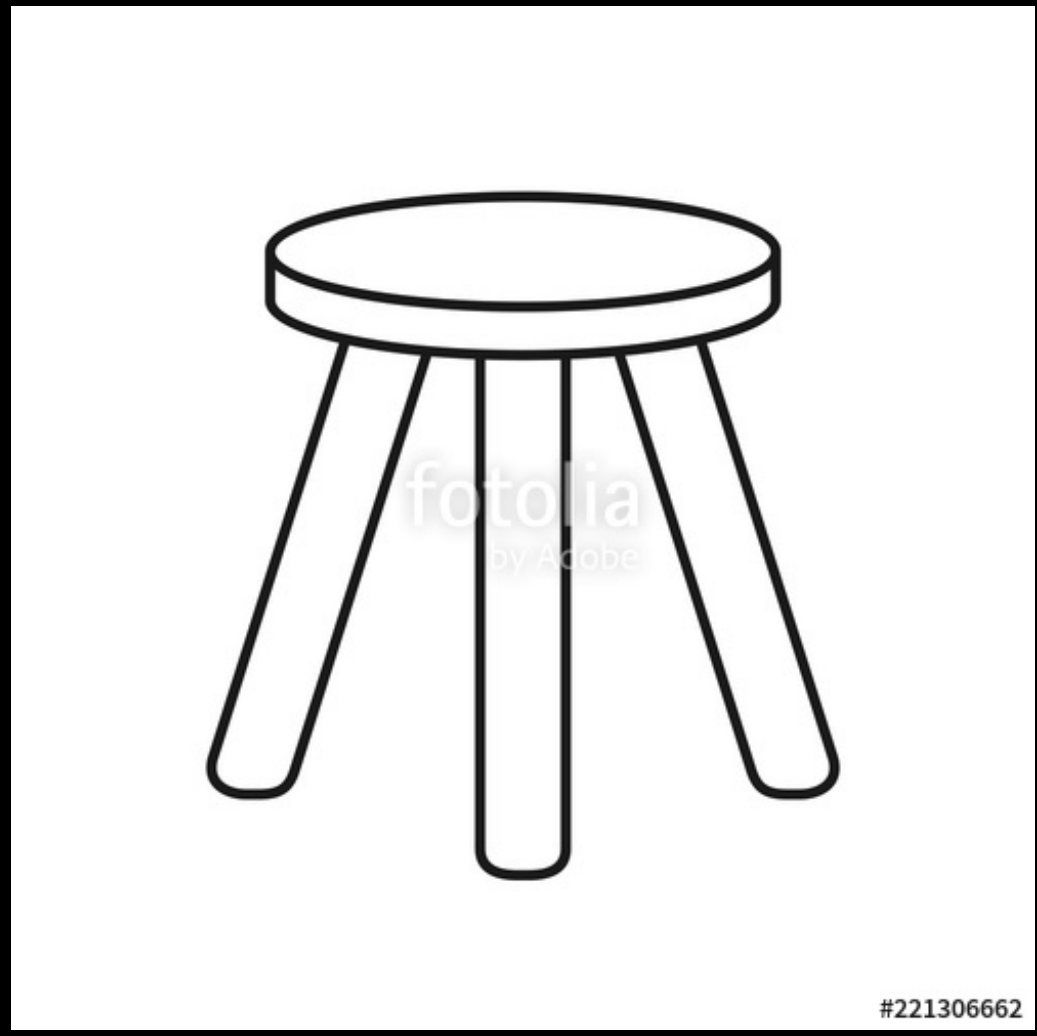
- How do we minimize the risks involved with team science?
- What can we do to set expectations?
- Who is responsible for supporting collaboration?
- What does authorship look like on our team?
- Is my team prepared to share data?

TICTOC for Large Proposal Management

- Team
- Institutional Support
- Communication & Compentencies
- Time
- Organization
- Collaboration Agreement

TEAM

1. Scientific Expertise
2. Budget
3. All the other stuff (letters of support, biosketch/CV, research environment, human subjects components, etc)



Institutional Support

Communication & Competencies

Communication

- Internal
- External

Competencies

- Social awareness
- Personal awareness

TIME

Sample Timeline for Large Applications

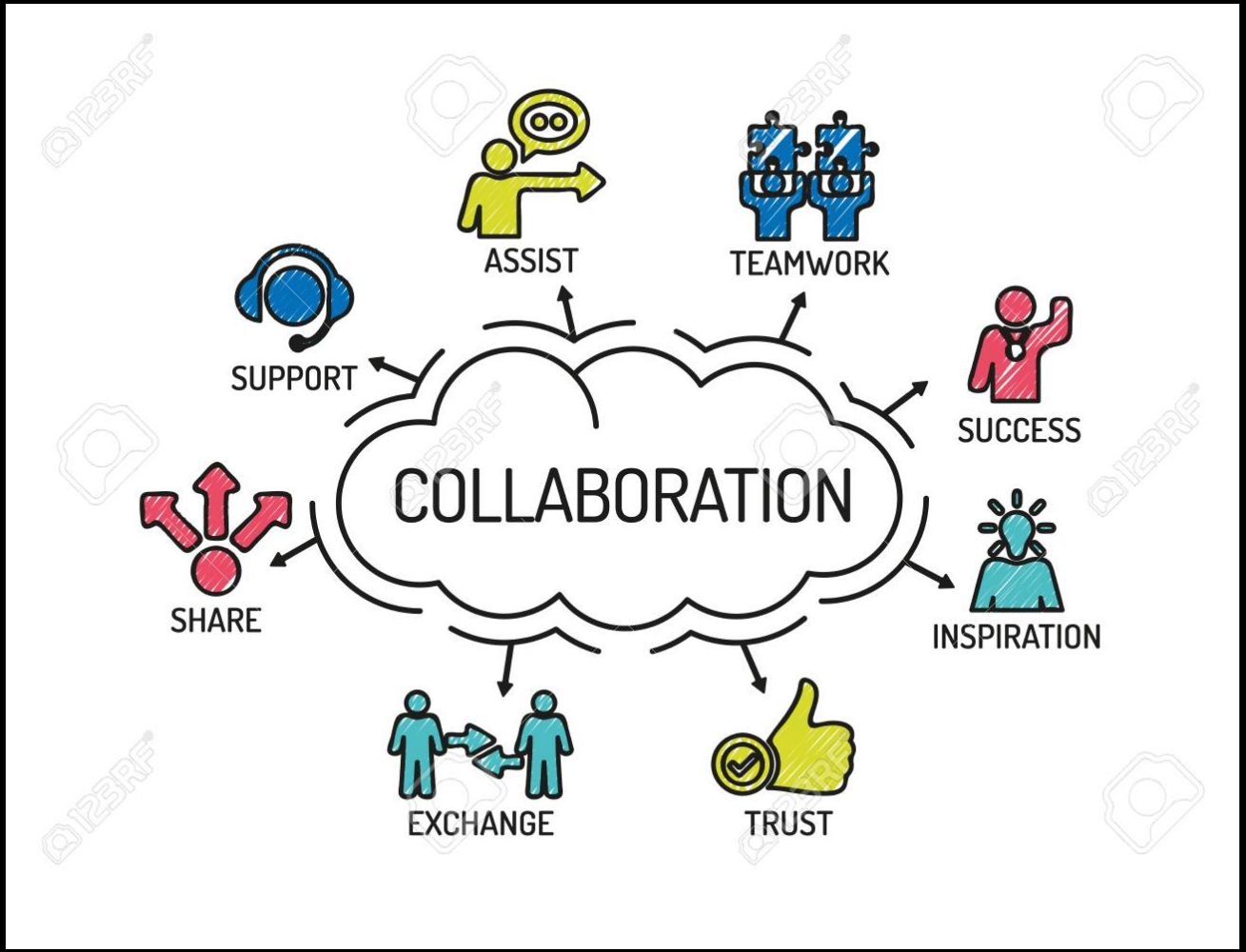
- Month 1 – Review the announcement, conduct a limited solicitation call and determine the PI. Consider team members to support the application submission. Utilize experts when available and appropriate.
- Month 2- Discuss institutional support and ICR distribution. Work with institutional leadership to ensure strategic integration and program coordination.
- Month 3 - Identify core leaders and writing team. Conceptualize the application & identify partnerships. Outline overall project including cores/project areas with an identified naming convention and layout, solicit A&R requests if allowable. Begin budget discussions.
- Month 4 - Contact partners and draft letters of support. F/U with core leaders for core plan/outline. Select A&R application and ask for details. Provide a draft budget to the core leads.
- Month 5 - Each core will submit a rough outline to the team for review & edits. Identify a consultant if using and engage them in the process.
- Month 6 - Submit drafts of all sections to external reviewers for scientific relevance & impact. Continue to refine the application while waiting for reviewer comments.
- Month 7 - Finalize and integrate reviewer comments. Obtain final letters of support. Finalize budget. Review all components for consistency, errors, and other coordination elements.
- Month 8 - Provide copies to grants office (AOR), VPR/institutional leadership for final review/approval. Continue to review and refine.
- Month 9 - SUBMISSION!

Organization

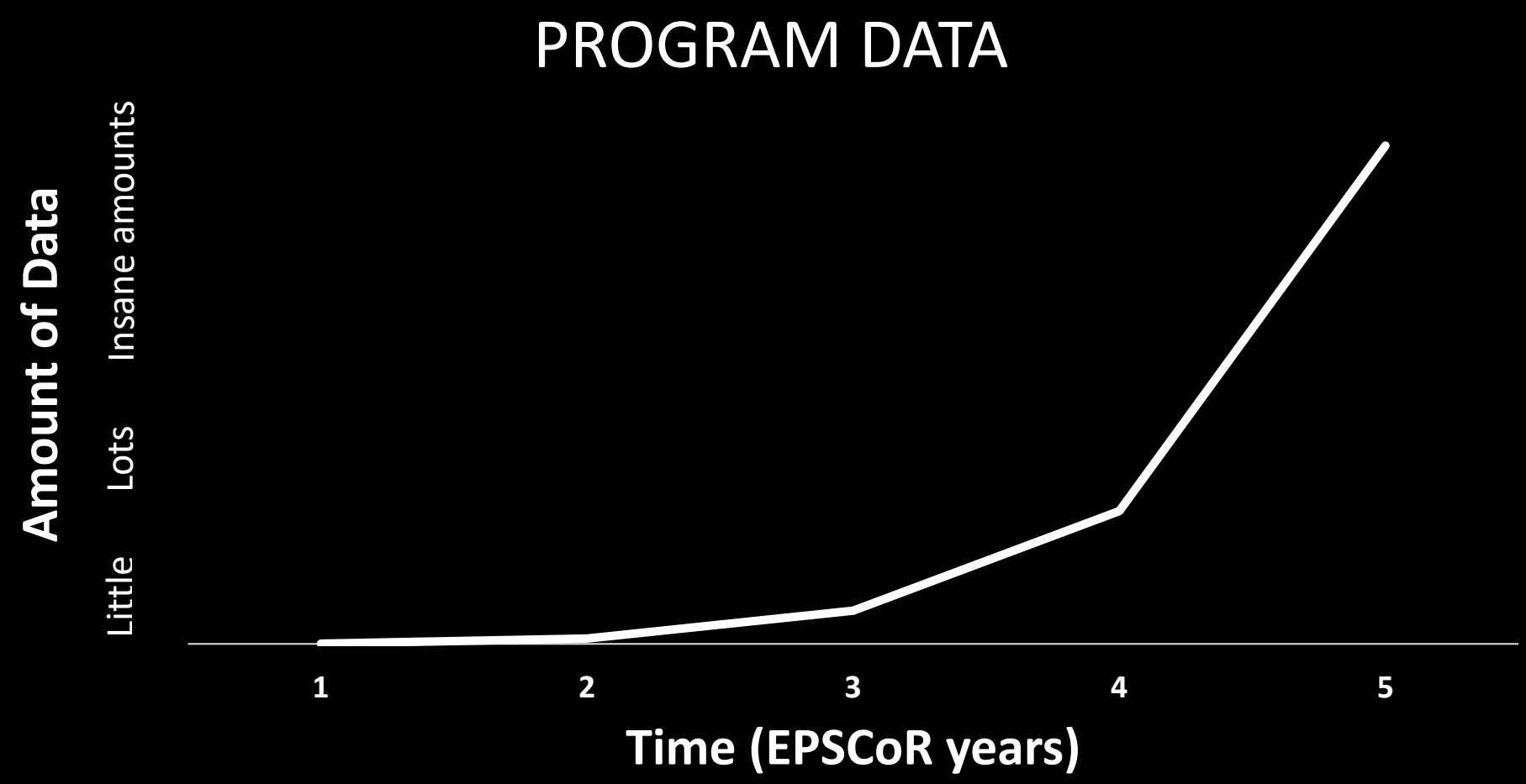
“The way one starts largely determines how one will continue. Get it wrong here and it is likely that the project will go wrong.”

(Morris, 1994)

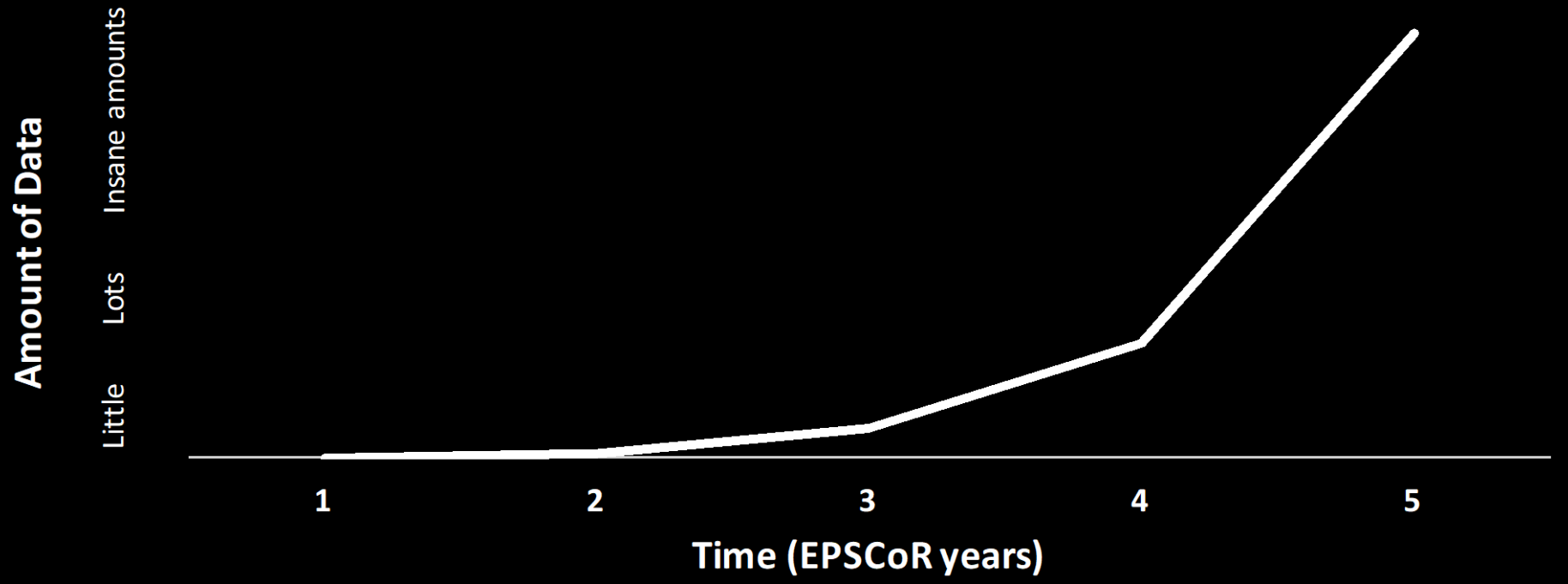
Collaboration Agreement



FACILITATING TEAM SCIENCE: DATA MANAGEMENT PLAN AS EXAMPLE



PROGRAM DATA



EMOTIONAL STATE

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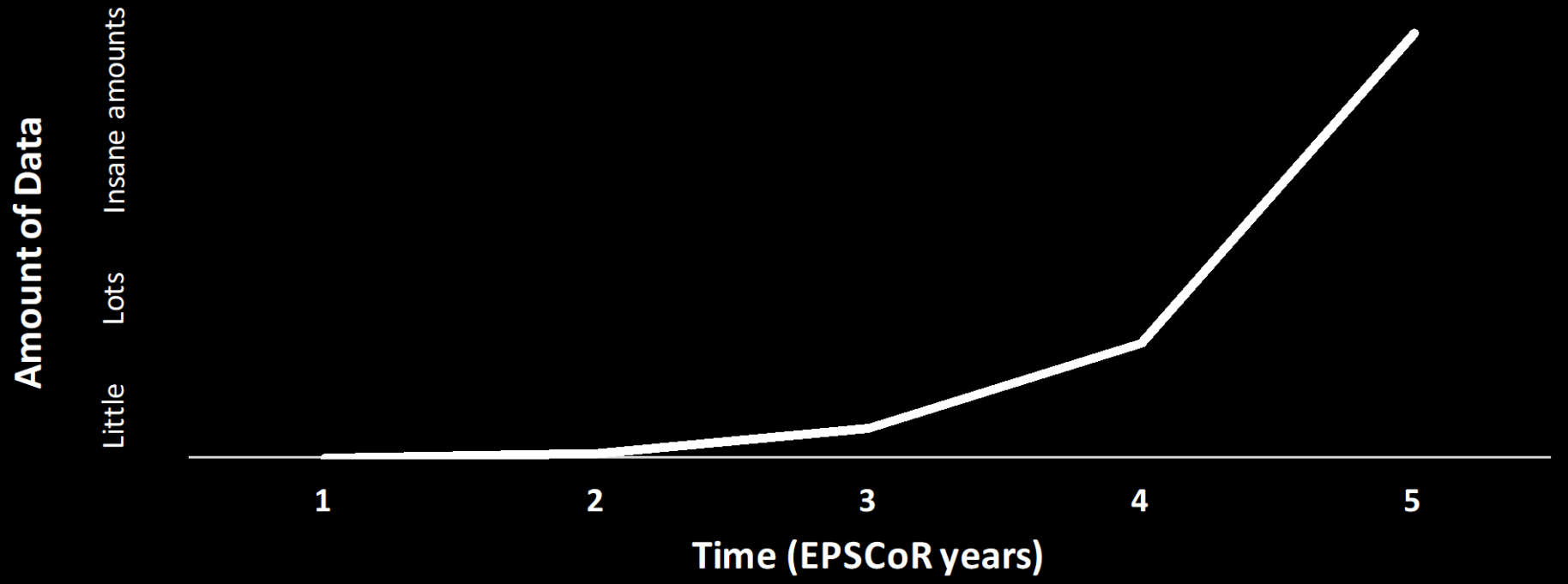

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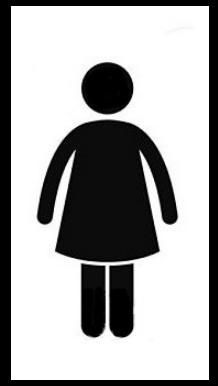

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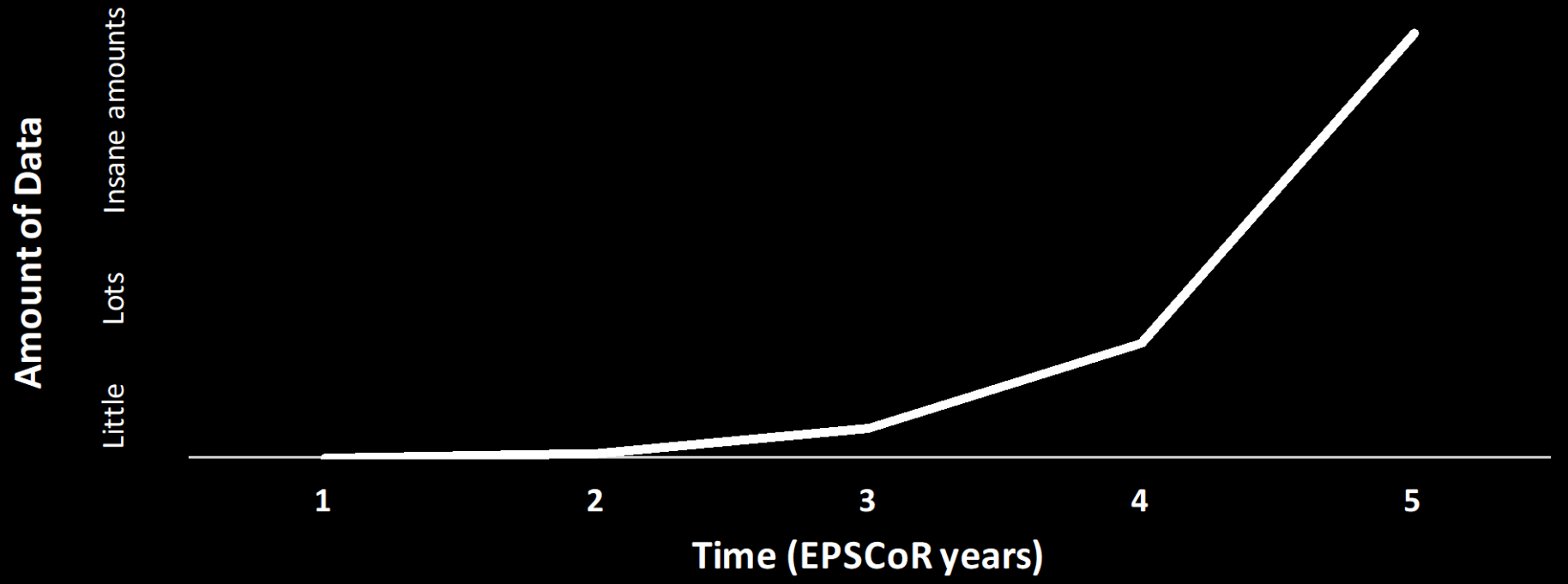

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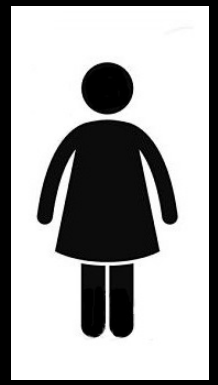

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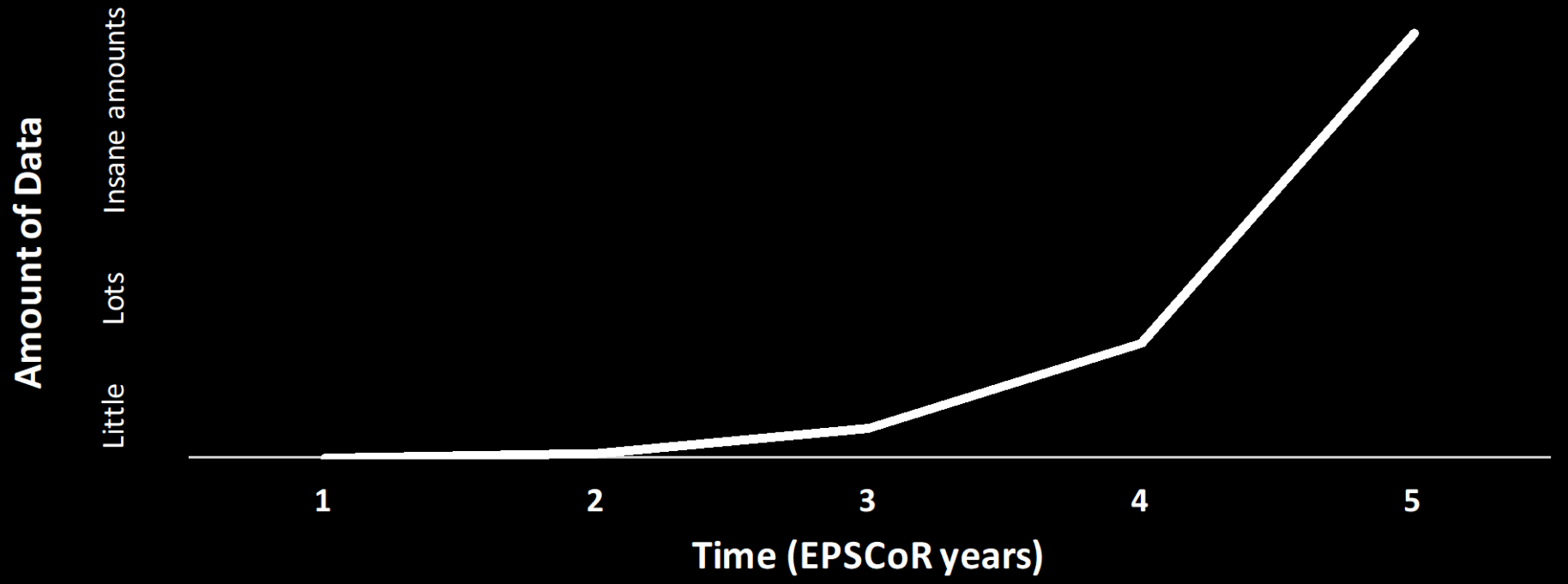

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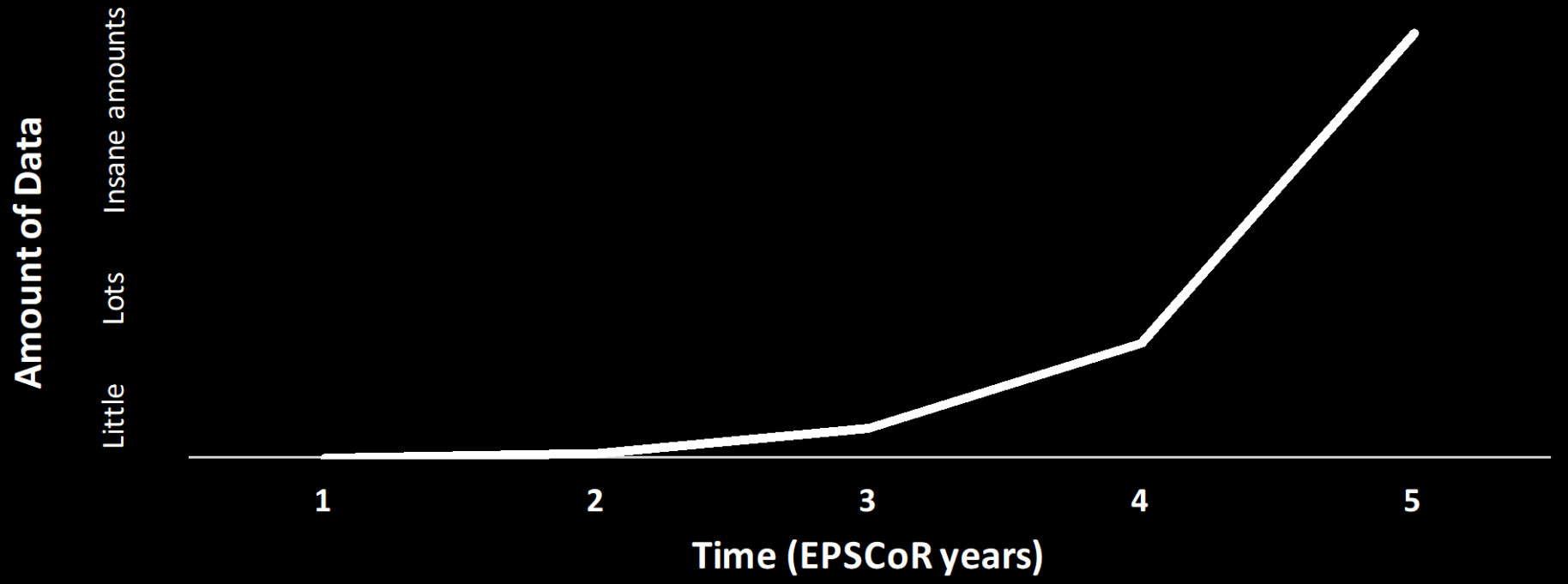
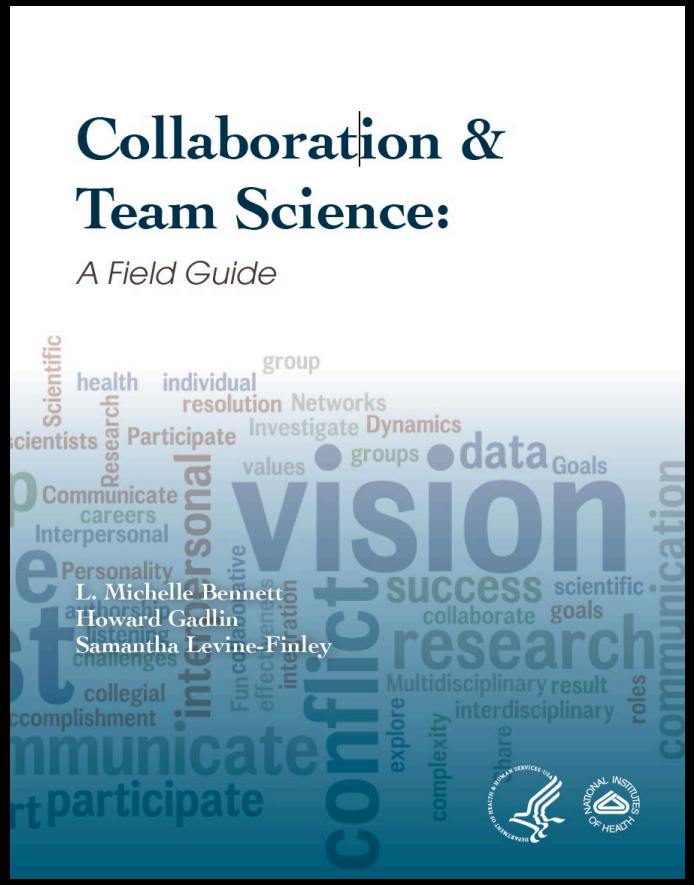


EMOTIONAL STATE

PREPARING FOR TEAM SCIENCE: TOOLS

NIH Field Guide's Scientific "Prenuptial Agreement"

- Begin to develop trust
- Lay the foundation for the continued relationship
- Explicitly and precisely state goals of the project
- Describe how each of the collaborators will contribute
- Delineate how to handle communications, data sharing, etc.
- Address administrative aspects of the collaboration
- Provide an opportunity to reflect on potential conflicts of interest

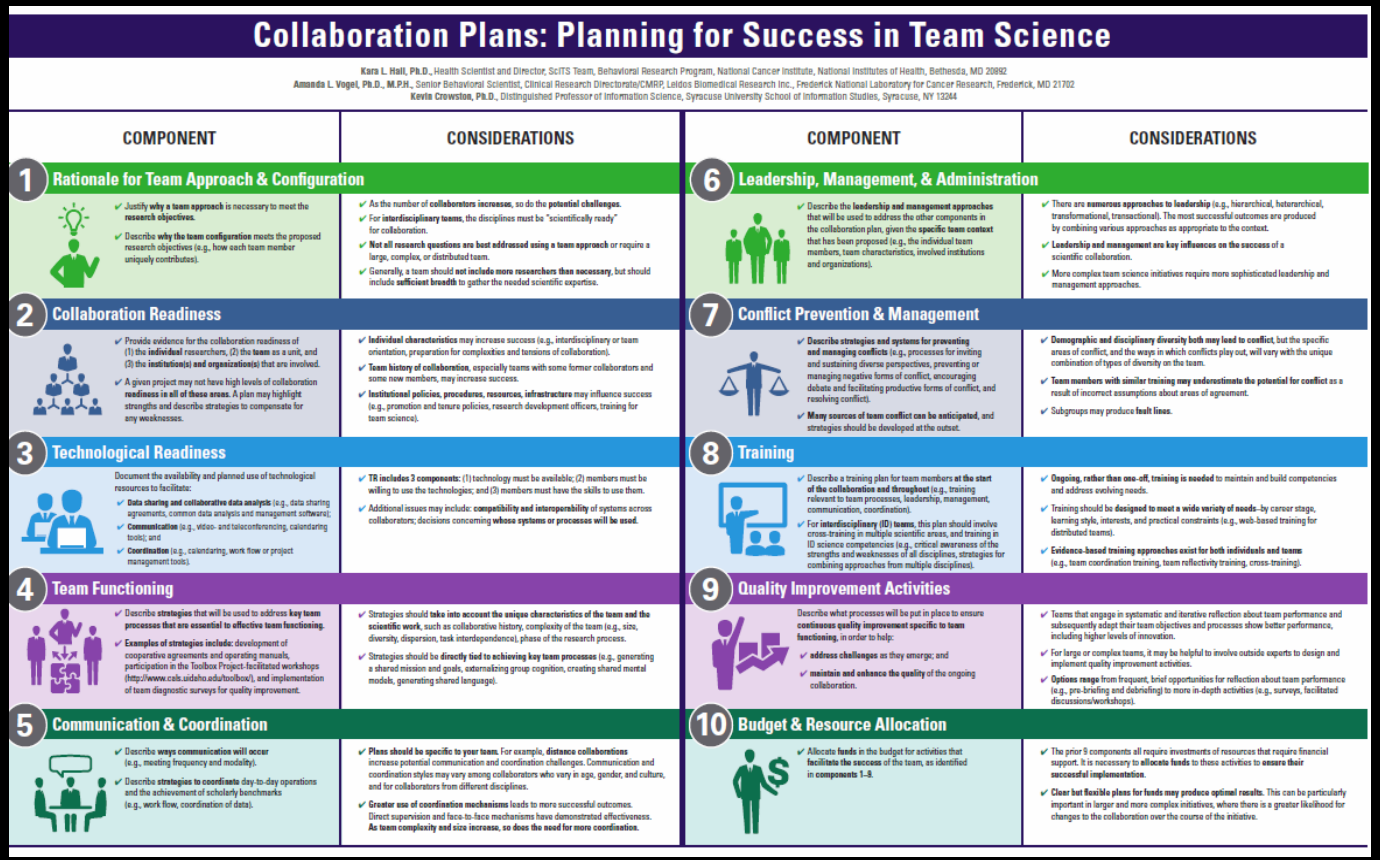


Bennett, L. M., Gadlin, H., & Levine-Finley, S. (2010). Collaboration & Team Science: A Field Guide. Bethesda, MD: National Institutes of Health.

PREPARING FOR TEAM SCIENCE: TOOLS

COLLABORATION PLAN

Detailed plan that describes multi level ways the group will plan for and support effective collaboration



Collaboration Plans: Planning for Success in Team Science

Kara L. Hall, Ph.D., Health Scientist and Director, SciTS Team, Behavioral Research Program, National Cancer Institute, National Institutes of Health, Bethesda, MD 20892
Amanda L. Vogel, Ph.D., M.P.H., Senior Behavioral Scientist, Clinical Research Directorate/CMRP, Leidos Biomedical Research Inc., Frederick National Laboratory for Cancer Research, Frederick, MD 21702
Kevin Crowston, Ph.D., Distinguished Professor of Information Science, Syracuse University School of Information Studies, Syracuse, NY 13244

COMPONENT	CONSIDERATIONS
1 Rationale for Team Approach & Configuration	
✔ Justify **why a team approach** is necessary to meet the **research objectives**. ✔ Describe **why the team configuration** meets the proposed research objectives (e.g., how each team member uniquely contributes).	✔ As the number of **collaborators increases**, so do the **potential challenges**. ✔ For **interdisciplinary teams**, the disciplines must be "scientifically ready" for collaboration. ✔ **Not all research questions are best addressed using a team approach** or require a large, complex, or distributed team. ✔ Generally, a team should **not include more researchers than necessary**, but should include **sufficient breadth** to gather the needed scientific expertise.
2 Collaboration Readiness	
✔ Provide evidence for the collaboration readiness of (1) the **individual** researchers, (2) the **team** as a unit, and (3) the **institution(s) and organization(s)** that are involved. ✔ A given project may not have high levels of collaboration **readiness in all of these areas.** A plan may highlight strengths and describe strategies to compensate for any weaknesses.	✔ **Individual characteristics** may increase success (e.g., interdisciplinary or team orientation, preparation for complexities and tensions of collaboration). ✔ **Team history of collaboration**, especially teams with some former collaborators and some new members, may increase success. ✔ **Institutional policies, procedures, resources, infrastructure** may influence success (e.g., promotion and tenure policies, research development officers, training for team science).
3 Technological Readiness	
Document the availability and planned use of technological resources to facilitate: ✔ **Data sharing and collaborative data analysis** (e.g., data sharing agreements, common data analysis and management software); ✔ **Communication** (e.g., video- and teleconferencing, calendaring tools); and ✔ **Coordination** (e.g., calendaring, work flow or project management tools).	✔ **TR includes 3 components:** (1) technology must be available; (2) members must be willing to use the technologies; and (3) members must have the skills to use them. ✔ Additional issues may include: **compatibility and interoperability** of systems across collaborators; decisions concerning **whose systems or processes will be used**.
4 Team Functioning	
✔ Describe **strategies** that will be used to address **key team processes that are essential to effective team functioning.** ✔ **Examples of strategies include:** development of cooperative agreements and operating manuals, participation in the Toolbox Project-facilitated workshops (http://www.cals.uidaho.edu/toolbox/), and implementation of team diagnostic surveys for quality improvement.	✔ Strategies should **take into account the unique characteristics of the team and the scientific work**, such as collaborative history, complexity of the team (e.g., size, diversity, dispersion, task interdependence), phase of the research process. ✔ Strategies should be **directly tied to achieving key team processes** (e.g., generating a shared mission and goals, externalizing group cognition, creating shared mental models, generating shared language).
5 Communication & Coordination	
✔ Describe **ways communication will occur** (e.g., meeting frequency and modality). ✔ Describe **strategies to coordinate** day-to-day operations and the achievement of scholarly benchmarks (e.g., work flow, coordination of data).	✔ **Plans should be specific to your team.** For example, **distance collaborations** increase potential communication and coordination challenges. Communication and coordination styles may vary among collaborators who vary in age, gender, and culture, and for collaborators from different disciplines. ✔ **Greater use of coordination mechanisms** leads to more successful outcomes. Direct supervision and face-to-face mechanisms have demonstrated effectiveness. **As team complexity and size increase, so does the need for more coordination.**

COMPONENT	CONSIDERATIONS
6 Leadership, Management, & Administration	
✔ Describe the **leadership and management approaches** that will be used to address the other components in the collaboration plan, given the **specific team context** that has been proposed (e.g., the individual team members, team characteristics, involved institutions and organizations).	✔ There are **numerous approaches to leadership** (e.g., hierarchical, heterarchical, transformational, transactional). The most successful outcomes are produced by combining various approaches as appropriate to the context. ✔ **Leadership and management are key influences on the success** of a scientific collaboration. ✔ More complex team science initiatives require more sophisticated leadership and management approaches.
7 Conflict Prevention & Management	
✔ **Describe strategies and systems for preventing and managing conflicts** (e.g., processes for inviting and sustaining diverse perspectives, preventing or managing negative forms of conflict, encouraging debate and facilitating productive forms of conflict, and resolving conflict). ✔ **Many sources of team conflict can be anticipated**, and strategies should be developed at the outset.	✔ **Demographic and disciplinary diversity both may lead to conflict**, but the specific areas of conflict, and the ways in which conflicts play out, will vary with the unique combination of types of diversity on the team. ✔ **Team members with similar training may underestimate the potential for conflict** as a result of incorrect assumptions about areas of agreement. ✔ Subgroups may produce **fault lines**.
8 Training	
✔ Describe a training plan for team members **at the start of the collaboration and throughout** (e.g., training relevant to team processes, leadership, management, communication, coordination). ✔ **For interdisciplinary (ID) teams**, this plan should involve cross-training in multiple scientific areas, and training in ID science competencies (e.g., critical awareness of the strengths and weaknesses of all disciplines, strategies for combining approaches from multiple disciplines).	✔ **Ongoing, rather than one-off, training is needed** to maintain and build competencies and address evolving needs. ✔ Training should be **designed to meet a wide variety of needs**–by career stage, learning style, interests, and practical constraints (e.g., web-based training for distributed teams). ✔ **Evidence-based training approaches exist for both individuals and teams** (e.g., team coordination training, team reflexivity training, cross-training).
9 Quality Improvement Activities	
Describe what processes will be put in place to ensure **continuous quality improvement specific to team functioning**, in order to help: ✔ **address challenges** as they emerge; and ✔ **maintain and enhance the quality** of the ongoing collaboration.	✔ Teams that engage in systematic and iterative reflection about team performance and subsequently adapt their team objectives and processes show better performance, including higher levels of innovation. ✔ For large or complex teams, it may be helpful to involve outside experts to design and implement quality improvement activities. ✔ **Options range** from frequent, brief opportunities for reflection about team performance (e.g., pre-briefing and debriefing) to more in-depth activities (e.g., surveys, facilitated discussions/workshops).
10 Budget & Resource Allocation	
✔ Allocate **funds** in the budget for activities that **facilitate the success** of the team, as identified in **components 1–9**.	✔ The prior 9 components all require investments of resources that require financial support. It is necessary to **allocate funds** to those activities to **ensure their successful implementation**. ✔ **Clear but flexible plans for funds may produce optimal results.** This can be particularly important in larger and more complex initiatives, where there is a greater likelihood for changes to the collaboration over the course of the initiative.

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EMERGING ROLES FOR TEAM SCIENCE

- FACILITATOR
- INTERDISCIPLINARY EXECUTIVE SCIENTIST
- INTEGRATION EXPERT

FACILITATING TEAM SCIENCE: SHARED MENTAL MODELS

team members' overlapping mental representation of key elements of the team's task environment

WHAT'S NEXT?

- Data visualization for collaborative science to promote co-development of ideas and shared mental models
- Team spaces for data-driven dialogue around complex problems
- Expansion of integration and team science roles
- Science of Team Science 2020 – Duke University
- INSciTS www.inscits.org

TEAM SCIENCE FOR PROPOSAL DEVELOPMENT

- Currently Team Science activities are focused on post-award project management
- Most large projects are a constant drumbeat of implementation and delivery:
  - Planning: Strategic planning, Logic Models, Output Timelines
  - Evaluation: Reverse Site Visits, Site Visits, External evaluation
- The time to plan for team science is **when the proposal is being written**:
  - Don’t wait until the award to figure out how things are going to work and who is going to do what

“Cooperative work is a social art and has to be practiced with patience.”

Science, 1944

Questions? Want to talk?

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