Supporting Responsible Research through Evidence Informed Research Initiatives

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Roundtable Discussion of Federal Research Funding and Resources for Leaders of Large Centers and Projects: What Is Needed?

On Leading a Lab: Strengthening Scientific Leadership in Responsible Research
December 4-5, 2023

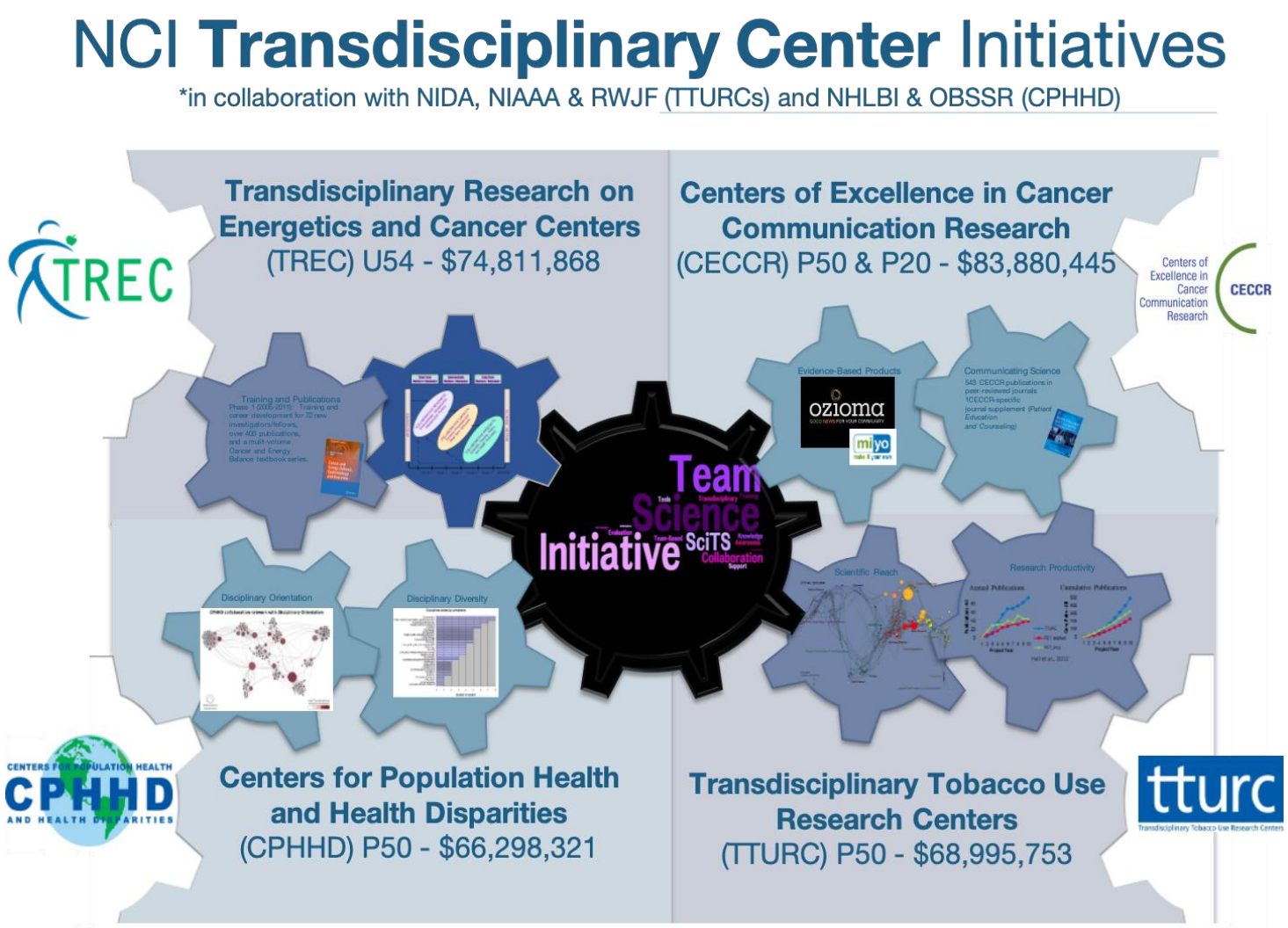
SciTS Studies:

Foci

- Integration
- Collaboration
- Productivity
- Impact
- Reach
- Research orientation
- Barriers/Facilitators
- P&T Policies
- Training

Methods

- Interview
- Survey
- Bibliometric
- Financial
- Science Mapping
- Written Products Protocol
- Social Network Analysis



SciTS | Building the knowledge base for effective team science

The Science of Team Science (SciTS) is a cross-disciplinary field of study that aims to:

1. Generate an evidence-base

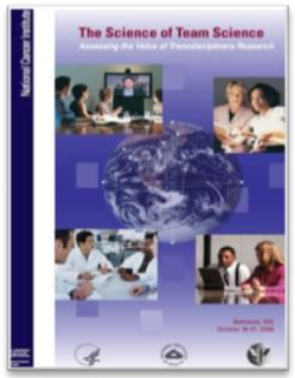
2. Develop translational applications

To help maximize the efficiency, effectiveness of team science.

Key SciTS Questions

- What is the added value of team science?
- What team processes (e.g., communication, coordination approaches) help maximize scientific innovation and productivity?
- What characteristics and skills of team leaders and team members facilitate successful team functioning?
- How can organizations (funding agencies, academia, industry) most effectively facilitate and support team science to advance discovery?
- What policies are needed?

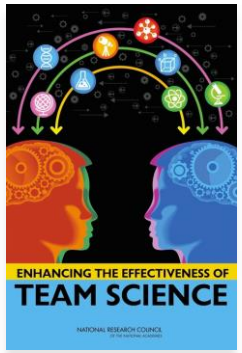
Building the SciTS Field



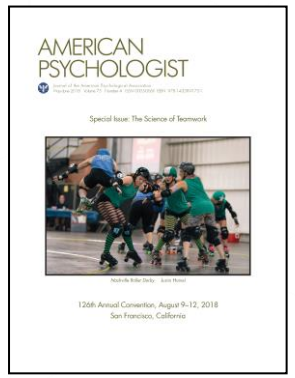
NCI SciTS/ Transdisciplinary Conference

Science of Teams Informing SciTS

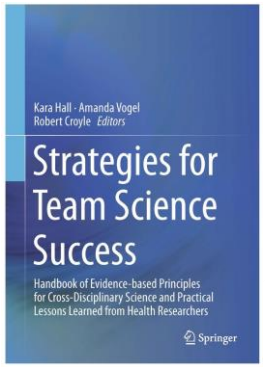
Team Approaches to Science, Practice, & Policy in Health



National Academies Consensus Study



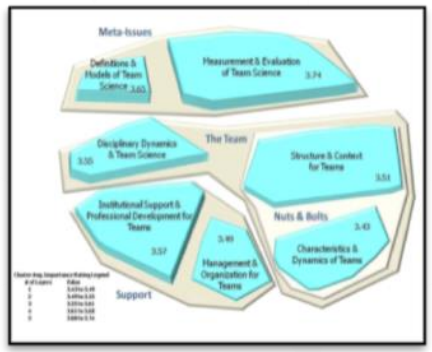
The Science of Team Science: A Review of the Empirical Evidence



2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020

SciTS Journal Supplement

Mapping a Research Agenda for SciTS



Collaboration Science & Translational Medicine

Annual International SciTS Conference

INSciTS
New scientific society launched

ITD ALLIANCE

SciTS | Building the knowledge base for effective team science

Challenges of the Scientific Enterprise and Human Condition: Scarcity, Competition – Survival, Power

Context Examples	Constraining Responses	Tensions	Team factors/ dimensions	Potential Implications	Responsible Research Considerations
Limited Research Funds	Drives competitive-ness	Collaborators vs Competitors	Trust	Hinders collaborative success	How to thrive w/in scarce resource environment and engage with trust?
Grants Process	Conservative approach	"Easier" vs "Complex"	Openness to new ideas, approaches	Maintaining familiar concepts, collaborators	How to efficiently and effectively obtain funding while maximizing innovation?
Job (in)security	Focus on rewards/ recognition	Ownership vs Openness	Knowledge sharing	Slows scientific progress	How to balance security needs while facilitating openness for maximally advancing science?
Promotion/ Tenure	Emphasis on what is measured	Outputs vs Outcomes	Goal hierarchy	Individual vs team goals; Scientific vs societal goals	How to achieve individual goals while supporting team goals and maximizing scientific and societal goals?

Model of Team Effectiveness

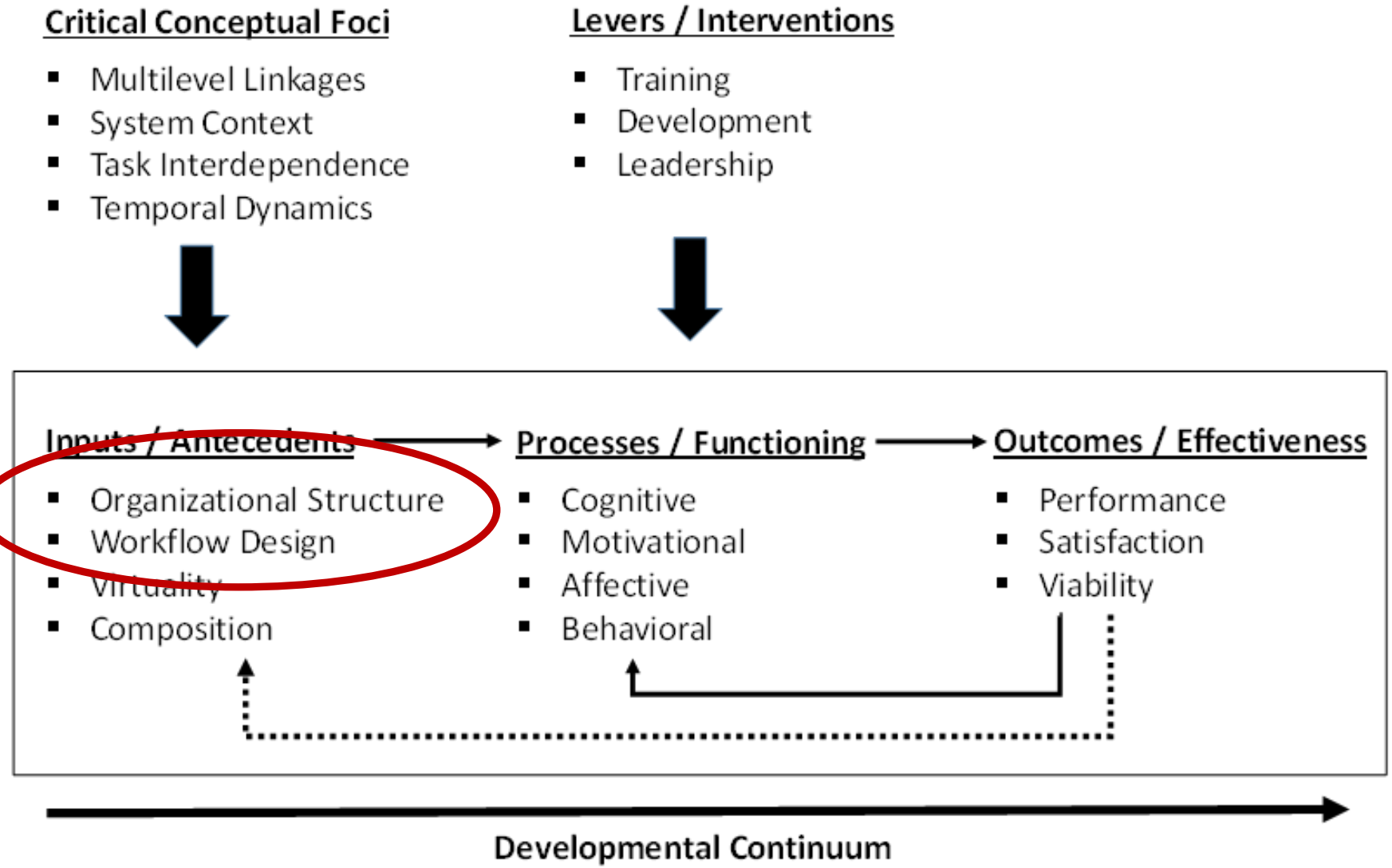


Figure 2. An integrative heuristic of team functioning and effectiveness.

Kozlowski SWJ and Bell BS. (2019). Evidence-based principles and strategies for optimizing team functioning and performance in science teams. In: KL Hall, AL Vogel, and RT Croyle (Eds). Strategies for Team Science Success: Handbook of Evidence-based Principles for Cross-Disciplinary Science and Practical Lessons Learned from Health Researchers. Springer, Inc.

Organizations

Structures

People

Processes

Platforms

Products

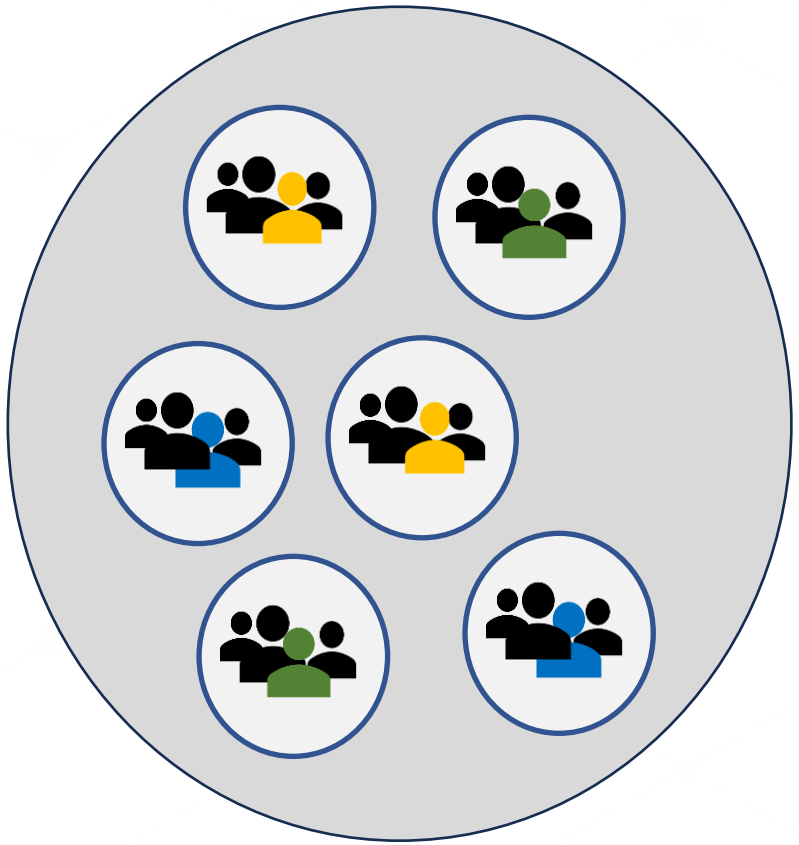
Intentional & Evidence-Informed

Establish ***structures*** that enable ***people*** to work together in a **team and/or system.**

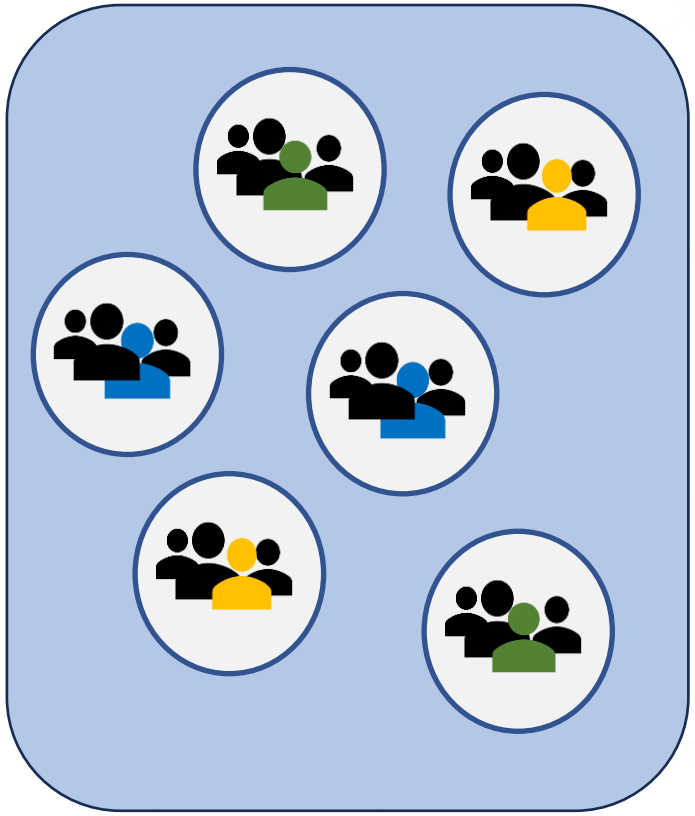
Develop ***processes & platforms*** designed to facilitate teams to produce ***products*** that align with the **team or system's vision and goals.**

Examples of Funding Mechanisms

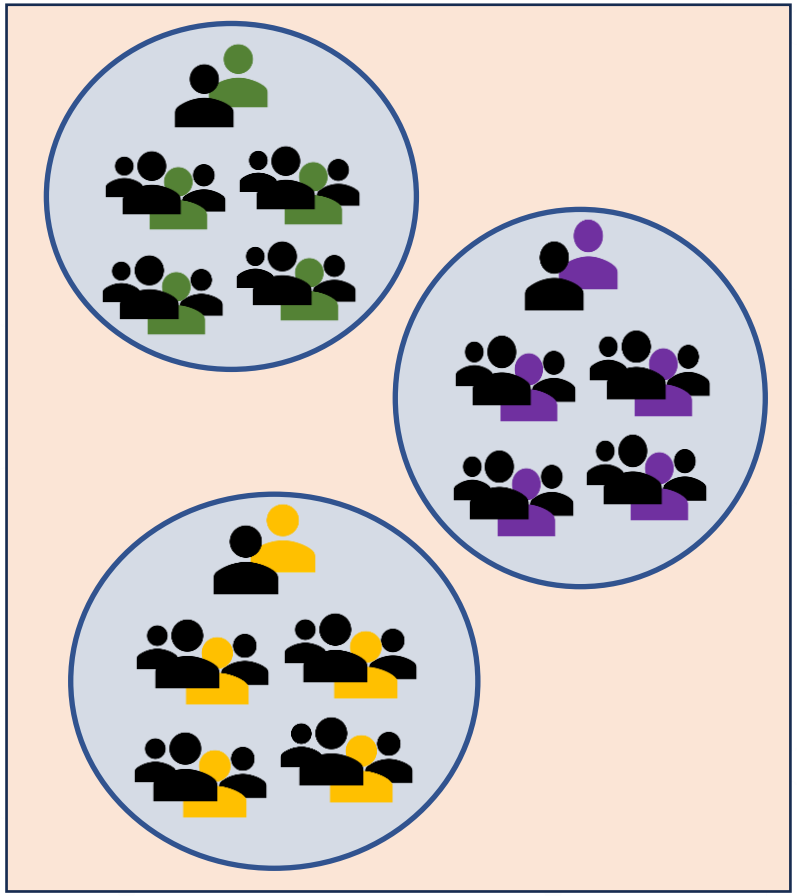
Projects in “Investigator-Initiated” scientific areas



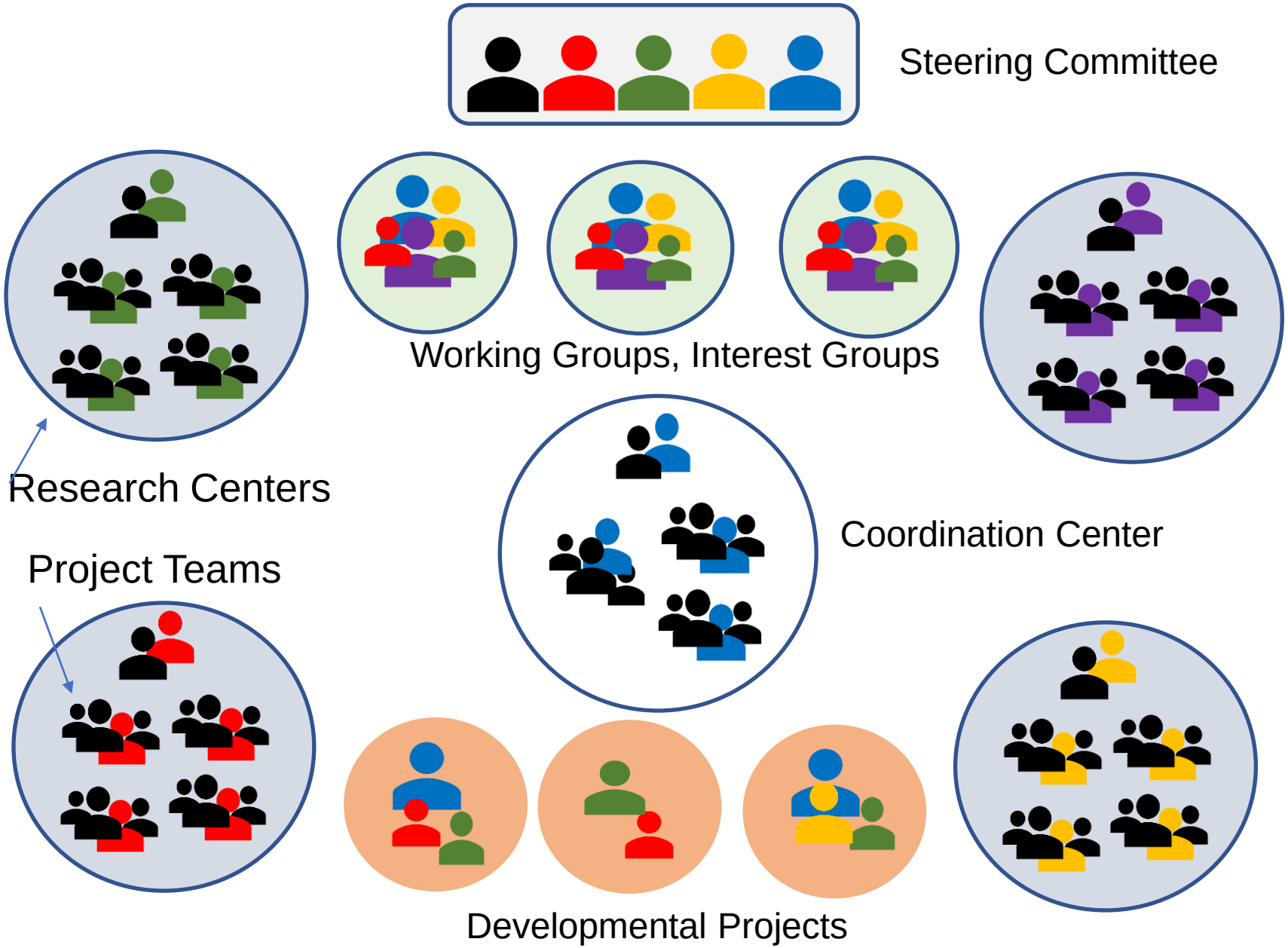
Individual projects in well-defined scientific areas



Center Initiatives in a well-defined scientific areas



Center Initiative - Multi-team System



MULTITEAM SYSTEM CHARACTERISTIC		Key Considerations
MTS Goal Hierarchy	Each MTS component team pursues **subordinate team goals**, while also pursuing **superordinate system goals**	• Understanding **goals of different teams**, and **how the different goals are related** to one another

Interteam Inter-dependence	Each component team is **mutually reliant** on at least one other team **to achieve higher-order goals**.	• Understanding the teams…
		  • …**on whom they are most reliant**?
		  • …**who are most reliant on them**?

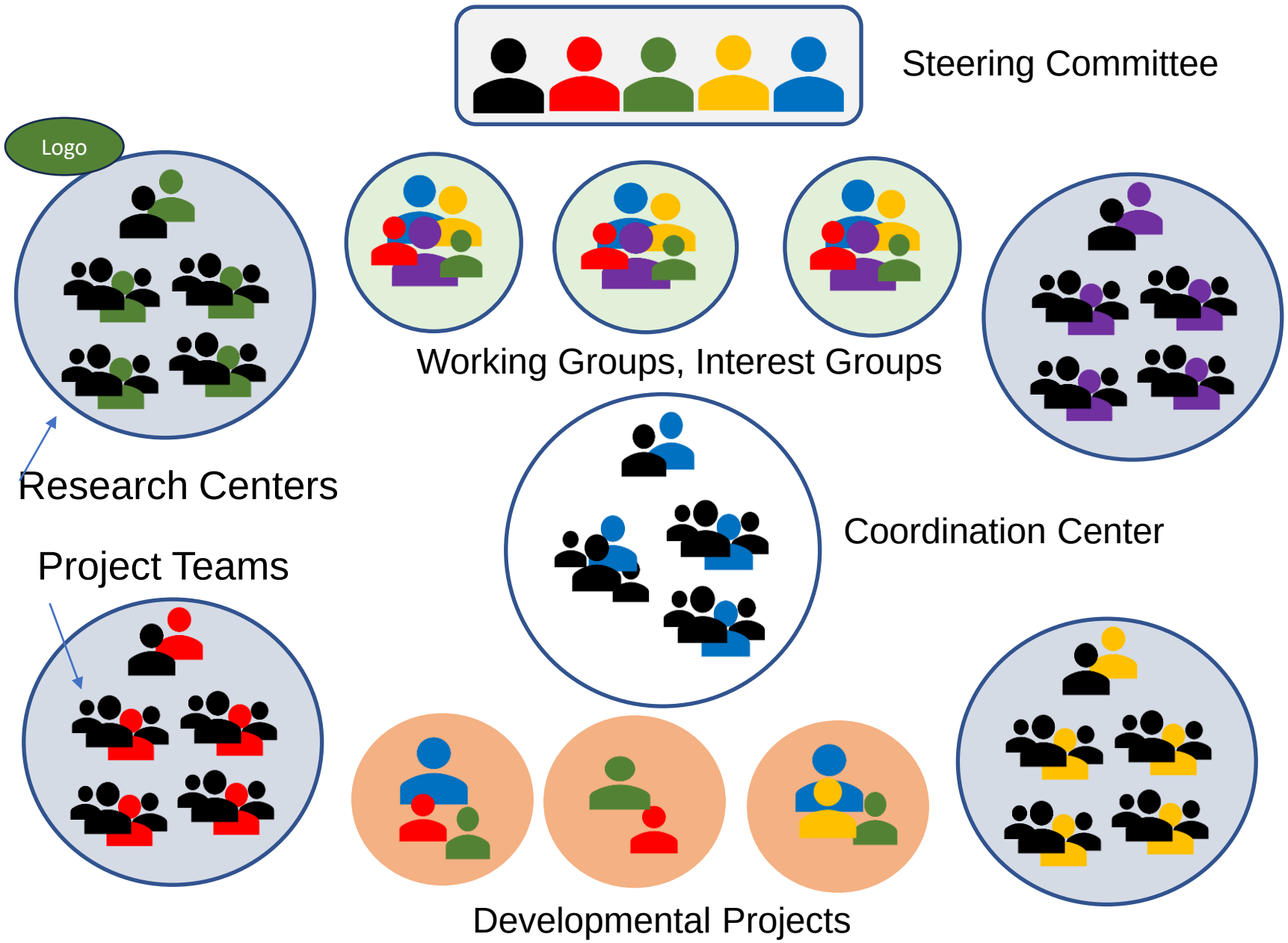
Interteam Differentiation	The **boundaries of each component team** are identifiable	• Uniquely identifying each **component team** • Awareness of distinct team-level identities, goals, AND contributions to the system
Boundary Spanning Com-munication	Communication processes that **bridge a team to other teams** in the MTS, and to the external environment	• Component teams have **at least one** individual who serves as a **boundary spanner**, who continuously **works to maintain and develop relationships** with other teams' boundary spanners
Interteam Leadership	**Influences relationships** between teams that **motivate members to work together** toward the accomplishment of **MTS goals**	• Having a **subset of individuals** who provide **leadership** in support of **multiteam goals** • Leaders **facilitate connections** between teams and **motivating** the members of all component teams to pursue **team goals** as well as **MTS goals**

Adapted from Carter, D. et al (2019) in K.L. Hall et al - Strategies for Team Science Success

LOGO

Research Initiative

Multi-team System



MTS Goal Hierarchy
Interteam Leadership

Interteam Differentiation

Boundary Spanning
Communication

Interteam
Inter-dependence

*Facilitates collaboration among "competitors"

Norms

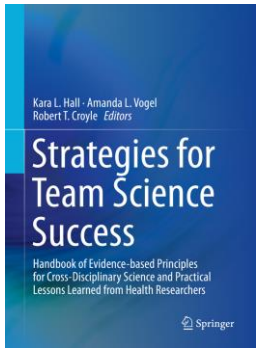
Expectations

EXPECTATIONS	PARTICIPANTS Grads, postdocs, and senior scientists who spend more than 160 hours of effort on CBB work.	AFFILIATES Scientists, educators, and evaluators who spend less than 160 hours of effort on CBB work.
ONBOARDING		
Onboarding Survey	✓	✓
Onboarding Meeting	✓	
Submit Photo for Directory	✓	✓
Implicit Bias Diagnostic	✓	OPTIONAL
Research Code of Conduct Training	✓	OPTIONAL
Submit Demographic Info Opt Out option exists.	✓	OPTIONAL
Create Individual Development Plan Grad students & Postdocs only.	✓	
ANNUAL REQUIREMENTS		
Annual IDP Review Grad students and postdocs with their advisors.	✓	
Annual Report Completion	✓	
Participate in Annual Meeting	✓	
Attend Annual Symposium	✓	
Attend NSF Site Visit	✓	
Submit Ontology Entries Students only.	✓	
Acknowledge NSF award PHY-1549132 and CBB in all CBB-related publications, talks, posters, and slides.	✓	
Attend all theme meetings	✓	
Attend Grad-to-Grad Meetings Grad students & Postdocs only.	✓	
Outreach Grad students only.	✓	

Tips for Interdisciplinary collaboration:

- Use an introductory slide for all presentations so that non-experts or newcomers can follow. Introduce your topic, and explain not only what you're going to talk about, but why it is important. Introduce all acronyms. Not everyone knows what TEM or SRF stands for.
- Always credit results from other researchers, in and out of CBB.
- Upload your slides to Indico in advance of the meeting. This will let people follow your talk on their computer if for some reason their video-connection is lost. This also provides an archive of your talk so that it is available to colleagues (and you!) for reference.
- Avoid side conversations when video-conferencing. For most audio setups, these are difficult for people at other sites to follow and are therefore a time-waster. If you want to talk one-on-one, take it outside.
- Mute your Zoom audio except when talking.
- Treat each other with respect and consideration to create a collegial, inclusive, and professional environment in which people feel free to share their ideas. Better discussion leads to better science.

Acknowledge CBB and NSF award PHY-1549132 in all posters, presentations, and articles.



Ten Collaboration Planning Components

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).

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.

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).

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.

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).

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).

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.

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).

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.

10 Budget & Resource Allocation

- Allocate funds in the budget for activities that facilitate the success of the team, as identified in components 1–9.

TREC
Transdisciplinary Research on Energetics and Cancer Centers

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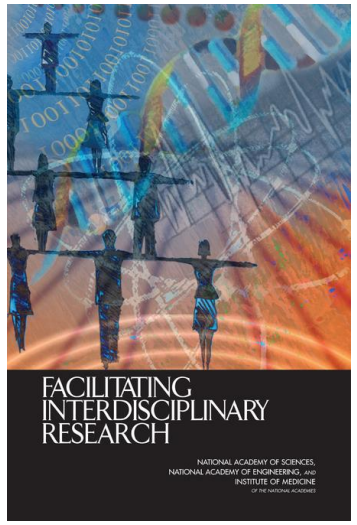
The National Academies of SCIENCES ENGINEERING MEDICINE

2005



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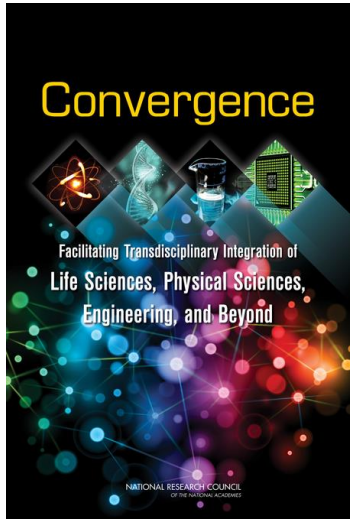
2014



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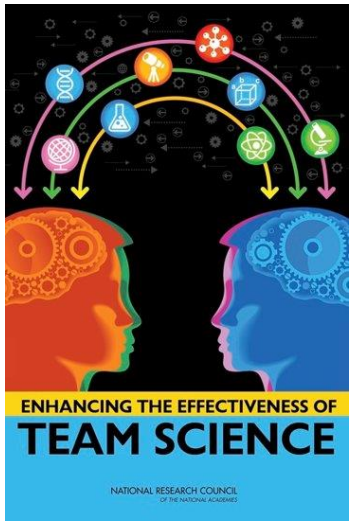
2015



>30,000 downloads across 168 countries

New Consensus Study:

Research & Application in Team Science

(1) Explore the relationship between team science and **diversity, equity, inclusion, and accessibility**, including best practices, barriers, impacts, and the role of virtual and hybrid environments;
(2) Develop a ***contemporary understanding of best practices*** in team science;
(3) Evaluate the growing role of virtual and hybrid teams;
(4) Identify gaps in resources and training for team science; and
(5) Better understand how to measure the effectiveness of teams.


Thank you