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National Research Council Study on the Science of Team Science

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Study Origins

- Conversations with NIH and NSF staff
- Both agencies have invested heavily in team science, but collaborations are not always successful
- Both agencies have extensive criteria for reviewing the scientific/technical merit of research proposals, but lack criteria for reviewing readiness for successful collaboration

Committee on the Science of Team Science

Nancy J. Cooke (*Chair,)* College of Technology and Innovation, Arizona State University
Roger Blandford, Department of Physics, Stanford University
Jonathon Cummings, Fuqua School of Business, Duke University
Stephen M. Fiore, Institute for Simulation and Training, University of Central Florida
Kara Hall, National Cancer Institute, National Institutes of Health
James Jackson, Institute for Social Research, University of Michigan
John Leslie King, School of Information, University of Michigan
Steve W. J. Kozlowski, Department of Psychology, Michigan State University
Judith S. Reitman Olson, Department of Informatics, University of California, Irvine
Jeremy A. Sabloff, President, Santa Fe Institute
Daniel Stokols, School of Social Ecology, University of California, Irvine
Brian Uzzi, Kellogg School of Management, Northwestern University
Hannah Valantine, School of Medicine, Stanford University

Study Charge

Statement of Task: An ad hoc committee will conduct a consensus study on the science of team science to recommend opportunities to enhance the effectiveness of collaborative research in science teams, research centers, and institutes. The Science of Team Science is a new interdisciplinary field that empirically examines the processes by which large and small scientific teams, research centers, and institutes organize, communicate, and conduct research. It is concerned with understanding and managing circumstances that facilitate or hinder the effectiveness of collaborative research, including translational research. This includes understanding how teams connect and collaborate to achieve scientific breakthroughs that would not be attainable by either individual or simply additive efforts.

Study Charge (cont)

The committee will consider factors such as team dynamics, team management, and institutional structures and policies that affect large and small science teams. Among the questions the committee will explore are:

- **How do individual factors (e.g., openness to divergent ideas), influence team dynamics (e.g., cohesion), and how, in turn, do both individual factors and team dynamics influence the effectiveness and productivity of science teams?**
- **What factors at the team**, center, or institute **level (e.g., team size, team membership, geographic dispersion) influence the effectiveness of science teams?**
- **How do different management approaches and leadership styles influence the effectiveness of science teams? For example, different approaches to establishing work roles and routines and to the division of labor may influence team effectiveness**.
- How do current tenure and promotion policies acknowledge and provide incentives to academic researchers who engage in team science?
- What factors influence the productivity and effectiveness of research organizations that conduct and support team and collaborative science, such as research centers and institutes? How do such organizational factors as human resource policies and practices and cyberinfrastructure affect team and collaborative science?
- What types of organizational structures, policies, practices and resources are needed to promote effective team science, in academic institutions, research centers, industry, and other settings?

Study Charge (cont).

- The committee will issue a final report with conclusions and recommendations to advance team science practice and research. The report will inform science teams, funders and managers of team science. The report will be reviewed consistent with the National Academies procedures and released to the sponsor when the review is complete.

Overview of Today's Workshop

Education and Training for Team Science

3 Factors related to Team Processes and Outcomes:

- Team Assembly
- Social Relationships and Scientific Creativity
- Group Faultlines

Keynote address: Convergence, Cancer Research, and the Koch Institute Experience at MIT

Team Leadership

Virtual Science Teams

Multi-team Systems