THE SCIENCE OF TEAM SCIENCE

Board on Behavioral, Cognitive, and Sensory Sciences
Division of Behavioral and Social Sciences and Education
National Research Council

Background

The past half-century has witnessed a dramatic shift in scientific publications and patents, away from solo authorship and toward teams and interdisciplinary research centers and institutes. Science teams are formed to address "the inherent complexity of contemporary public health, environmental, political, and policy challenges…, and the realization that an integration of multiple disciplinary perspectives is required to better understand and ameliorate these problems" (Stokols et al., 2008, p. S96). As such, interdisciplinary teams are increasing across all fields of the physical, life, social and computational sciences and dominating in the production of high-impact, highly cited scientific papers (Wuchty et al., 2007). The Science of Team Science is a new interdisciplinary field that empirically examines the processes by which large and small scientific teams 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. The Science of Team Science recognizes that interdisciplinary research is team research and principles from the study of organizations, teamwork and team training can inform and enhance the processes and outcomes of interdisciplinary research (Fiore, 2008).

Statement of Task the National Research Council Study

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 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?

Committee Membership

The study Committee includes members with in team science, social psychology, science policy and scientific research, organizational/business management, human resource development, organizational studies, social cognition, industrial/organizational psychology and related fields.

- **Nancy J. Cooke, *Chair***, 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

Preliminary Work Plan

The project will begin with a one-day planning meeting of experts who will be convened to provide input on topics to be addressed in the planned workshops and to help assess the literature base for the consensus study. To carry out the consensus study, the study Committee will meet five times over the course of the project. As part of information gathering for the consensus study, the NRC will convene a series of two workshops to explore the research on two critical topics in the science of team science: 1) team dynamics and effective management of large and small research teams; and 2) institutional structures, policies and supports that affect team science. The committee will issue a final consensus report which represents the culmination of the overall project; the report will describe the committee's approach to conducting the study and resulting findings, conclusions, and recommendations.

Study Sponsor
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