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DIVISION OF BEHAVIORAL AND SOCIAL SCIENCES AND EDUCATION
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BOARD ON BEHAVIORAL, COGNITIVE, AND SENSORY SCIENCES

Committee on the Science of Team Science

Workshop on Institutional and Organizational Supports for Team Science

Thursday, October 24, 2013
National Academy of Sciences
2101 Constitution Avenue, NW, Lecture Room
Washington, DC

AGENDA

Goal: This workshop will consider how institutional structures and policies affect team science. It will explore the research related to the following questions:

- 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 science, such as research centers and institutes? How do such organizational factors as human resource policies and practices and cyber infrastructure 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?

Prepared papers, responses, and presentations will be posted on the study webpage as they become available: http://nationalacademies.org/teamscience.

8:00 a.m.	***Introductions, Sign-in, and Badge Pick-up (Working Breakfast)***
8:30 a.m.	***Welcoming Remarks*** *Barbara Wanchisen, NRC Board on Behavioral, Cognitive, and Sensory Sciences* *Nancy Cooke, Arizona State University, Chair, NRC Committee on the Science of Team Science*
8:40-9:45 a.m.	***Lessons From University-Industry and Industry Partnerships*** *Steve W.J. Kozlowski, Michigan State University*
8:40	Introductions and Session Overview
8:45	Presentation: An Evidence-Based Study of Effective Research Collaboration and Team Science: Patterns in Industry and University-Industry Partnerships, by Barry Bozeman, Arizona State University and Craig Boardman, Ohio State University *Susan J. Winter, University of Maryland*

Questions to be addressed include:

- What does the available research on university-industry research partnerships and within-industry team science tell us about effective research management approaches and partnership models that support positive team processes and successful scientific and translational outcomes?
- What is known about effective management approaches and models for both types of team science (university-industry partnerships and within-industry science teams) when the participating scientists are geographically dispersed?
- What is known about the reasons for failure in both types of collaborations?
- How do intellectual property and conflict of interest concerns affect the collaborative processes and scientific and translational outcomes of both types of collaborations?
- What are effective solutions to intellectual property and conflict of interest concerns?
- What are the implications for team science practice and what further research is needed to improve our understanding of these two types of team science?

9:05 Response
Gary Mastin, Lockheed Martin

9:20 Questions, Discussion

9:40 Moderator Reflections
Steve W.J. Kozlowski

9:45-10:00	**Break**

10:00-11:25 a.m. ***Technology and Design for Team Science***
Moderator: *Nancy Cooke, Arizona State University*

10:00 Introductions and Session Overview
Nancy Cooke

10:05 Presentation: Design of Physical Environments for Team Science
Jason Owen-Smith, University of Michigan

Questions to be addressed include:

- What is known about how design influences the processes and outcomes of team science? For example, does building layout (including the locations of offices, research laboratories, and other facilities) affect scientists' participation in interdisciplinary collaborative research projects? What is the role of design in supporting communication and exchange of ideas, data, and information between scientists?
- What principles of design support effective communication and positive team dynamics within existing science teams and/or foster new research collaborations?
- What additional research is needed to improve our understanding of how to design physical environments to support team science?

10:25 Presentation: A Technology Framework to Support Team Science
Judith Olson, University of California, Irvine

Questions to be addressed include:

- What suite of technologies is needed to support collaboration in virtual science teams?
- What groups of technologies are needed (e.g., communication tools, coordination tools, shared databases)?
- What factors should be considered in purchasing and implementing particular technologies?

10:45 Responses
Kevin Crowston, National Science Foundation
Steve Whittaker, University of California, Santa Cruz

11:00 Questions, Discussion

11:20 Moderator Reflections

11:25—11:40 a.m. ***Break to pick up boxed lunch and return to meeting room***

11:40 a.m.-1:35 p.m. ***University Policies and Practices (Working Lunch)***
Moderator: *James Jackson, University of Michigan*

11:40 Introductions and Session Overview
James Jackson

11:45 Presentation: Fostering Interdisciplinary Research at Northwestern University
Henry Bienen, Northwestern University President Emeritus

Questions to be addressed include:

- What types of organizational structures, policies, practices and resources helped to promote effective team science at Northwestern University overall?
- What types of organizational structures, policies, practices and resources were effective to support team science within interdisciplinary research centers and institutes and university-industry partnerships?

12:15 Presentation: Disciplines and Interdisciplinarity in Research Universities
Jerry A. Jacobs, University of Pennsylvania

Questions to be addressed include:

- What is the relationship between teamwork and interdisciplinary communication?
- What assumptions underlie recent efforts by funding agencies, private foundations, scholars, and university leaders to advance interdisciplinary research and team science?
- What evidence is available on the validity of these assumptions?
- What is known about the extent of communication and collaboration across disciplines at present, within the current organization of science and research universities?
- What additional research is needed to improve our understanding of the costs and benefits of interdisciplinary research collaboration?

12:30 Response
Eileen Murphy, Rutgers University

12:40 Questions, Discussion

1:00 Presentation: Influence of the NSF Integrative Graduate Education and Research Traineeship (IGERT) Program
Maura Borrego, Virginia Polytechnic Institute and State University

1:15 Questions, Discussion

1:30 Moderator Reflections

1:35-1:45 p.m. ***Break***

1:45-3:25 p.m. ***Incentives and Disincentives for Team Science***
Moderator: *Hannah Valantine, Stanford University Medical School*

1:45 p.m. Introductions and Session Overview
Hannah Valantine

1:50 p.m. Presentation: Incentives for Team Science
Jeffrey L. Furman, Boston University

The paper will explore what is known about how the following factors may act as incentives or disincentives to team science:

- Advances in scientific instrumentation, data collection and data-sharing
- The "burden of knowledge," created by the rapid pace of scientific discovery, which may encourage scientists to collaborate with others to gain needed expertise and increase research productivity
- The assessment and allocation of credit in scientific publications
- The costs of collaboration (e.g., travel costs, coordination costs), which may discourage collaboration

2:05 *Promotion and Tenure Issues*

Questions to be addressed include:

- How do current tenure and promotion policies acknowledge and provide incentives to academic researchers who engage in team science?

2:05 Presentation: Survey of Promotion and Tenure Policies
Kara Hall, National Cancer Institute

2:15 Presentation: Literature Review on Promotion and Tenure Policies
Julie Thompson Klein, Wayne State University

2:25 Responses from Panel of Academic Leaders
Elizabeth Garrett, Provost, University of Southern California
John L. King, Emeritus Dean and Member of the Committee on Academic Personnel, University of California-Irvine School of Information and Computer Science; Emeritus Dean, University of Michigan School of Information
Barry Ritchie, Vice Provost, Arizona State University

Questions to be addressed by the panelists:

- How do promotion and tenure policies at your institution consider participation in team science projects?
- What steps have university leaders taken to convey these policies to the committees that make decisions on promotion and tenure?
- To what extent do individuals across your university follow the written policies? Have you taken steps to change the culture of the university to support implementation of these policies?
- In what other areas (besides promotion and tenure) does team science challenge the traditional structures, policies, and culture of your university, and how can these challenges be addressed?
- What steps have you taken to enhance the productivity and effectiveness of interdisciplinary research centers and institutes?
- What fundraising and/or financial management strategies can help to obtain and effectively deploy the resources (financial resources, personnel, cyber infrastructure) required for effective team science?
- What human resources policies and practices (not limited to promotion and tenure policies) can best support faculty participation in and leadership of team science?

3:05 Questions, Discussion

3:20 Moderator Reflections
Hannah Valantine, Stanford University Medical School

3:25-3:40 p.m. ***Break***

3:40-4:40 p.m. ***Funding Issues for Team Science***
Moderator: *Daniel Stokols, University of California, Irvine*

3:40 Introductions and Session Overview
Daniel Stokols

3:45 Presentation: Peer Review Mechanisms and Team Science
J. Britt Holbrook, Georgia Institute of Technology

Questions to be addressed include:

- What are the general peer review procedures and mechanisms in federal scientific agencies, and how well-aligned are these procedures and mechanisms with the unique characteristics of team science?
- What challenges does team science pose to current peer review processes (e.g., difficulties recruiting a large enough pool of reviewers to reflect the multiple disciplines while avoiding conflicts of interest)?

- What existing peer review mechanisms (e.g., the NSF broader impacts requirement) and/or new mechanisms (e.g., NCI funding of transdisciplinary centers) may facilitate funding and oversight of team science projects?
- What peer review mechanisms are other nations using to foster team science?
- How should peer review procedures and mechanisms be designed to facilitate the funding and effective government oversight of team science?

4:00 Presentation: Evaluating the Outcomes of Team Science
Gretchen Jordan, 360 Innovation, LLC

Questions to be addressed include:

- What are the important near-term, middle-term, and longer-term outcomes of team science, including intellectual as well as translational and commercial outcomes?
- What metrics and methods can be used to assess levels of innovation and impact of a particular science team or research center within the context of a particular field and its existing theories, methods, and empirical insights?
- What is the current state of the art in evaluation of team science and what further research is needed to more accurately measure the outcomes of team science?

4:15 Questions, Discussion

4:35 Moderator Reflections
Daniel Stokols, University of California-Irvine

4:40-5:05 p.m. ***Reflections on the Day***
Moderator: Nancy Cooke, Arizona State University (Committee Chair)

4:40 Sponsor Reflections
Keith Marzullo, National Science Foundation

4:50 Questions, Discussion

5:05 ***Adjourn Workshop***

NOTE FOR PUBLIC MEETINGS: This meeting is being held to gather information to help the committee conduct its study. This committee will examine the information and material obtained during this, and other public meetings, in an effort to inform its work. Although opinions may be stated and lively discussion may ensue, no conclusions are being drawn at this time; no recommendations will be made. In fact, the committee will deliberate thoroughly before writing its draft report. Moreover, once the draft report is written, it must go through a rigorous review by experts who are anonymous to the committee, and the committee then must respond to this review with appropriate revisions that adequately satisfy the Academy's Report Review Committee and the chair of the National Research Council before it is considered a National Research Council report. Therefore, observers who draw conclusions about the committee's work based on today's discussions will be doing so prematurely.

Furthermore, individual committee members often engage in discussion and questioning for the specific purpose of probing an issue and sharpening an argument. The comments of any given committee member may not necessarily reflect the position he or she may actually hold on the subject under discussion, to say nothing of that person's future position as it may evolve in the course of the project. Any inferences about an individual's position regarding findings or recommendations in the final report are therefore also premature.

This meeting and activity is sponsored by:
The National Science Foundation