



THIRD ANNUAL INTERNATIONAL SCIENCE OF TEAM SCIENCE (SCITS) CONFERENCE CONFERENCE SESSIONS AND PRESENTERS

MONDAY, APRIL 16, 2012

8:30 AM-12:00 PM

Collaborative Communication (Workshop)

The Toolbox Project provides a philosophical yet practical enhancement to cross-disciplinary, collaborative science. Rooted in philosophical analysis, this workshop enables cross-disciplinary collaborators to engage in a structured dialogue about their research assumptions. This approach yields both self-awareness and mutual understanding, supplying collaborators with the robust foundation needed for effective collaborative research. Led by Toolbox Project Facilitators, participants will engage in small group discussion and share respective views in response to a number of probing statements about science motivation, methodology, confirmation, objectivity, values, and reductionism.

- STEPHEN CROWLEY, PHD, Boise State University, Assistant Professor, Philosophy
- MICHAEL O'ROURKE, PHD, University of Idaho, Professor of Philosophy and department of Neuroscience and Environmental Science

1:15-2:45 PM

The Collaborative in Science: Can We Truly Become a Collective Intelligence? (Keynote Address)

Scientific breakthroughs are increasingly the result of collaborative research, team science, or cooperation. In fact, the knowledge creating process is changing so fundamentally that it may be time to define a new age: the collaborative era which some suggest will result in the emergence of a collective intelligence. Openness, trans-disciplinary teams, consumer-driven innovation, collective intelligence, and convergence are some of the terms being used to describe the emerging system. All these terms reflect an underlying fundamental change in how knowledge is created, diffused, used, and protected. Over the past decade, the growth in the amount of knowledge and the speed at which it is available has created a fundamental shift: where data, information, and knowledge were once scarce resources, they are now abundantly available. Groups with abundant resources behave differently from those where goods are scarce, but few guides are available as to how to price, value, and protect knowledge goods in an abundant system. Collaboration, openness, customer- or problem-focused research and development, altruism, and reciprocity are notable features of abundance: they create challenges that many scholars have not yet studied. Vestiges of the "Age of Scarcity" – policies around patents, copyrights, subscription-based publishing, peer review, and national "ranking charts" – are set to change unalterably or pass into history as the collaborative era unfolds. This talk defines the dynamics of the collaborative era, discusses how it came to be, lays out key internal dynamics and most importantly discusses how real-world practitioners are changing to take advantage of it.

- CAROLINE WAGNER, PHD, The Ohio State University, Director, Battelle Center for Science and Technology Policy

2:45-4:15 PM

Reflections on Team Science and Society (Session 1)

Team science (TS) initiatives are promoted today to achieve specific societal goals. In contrast to disciplinary science, which assumes that knowledge production is automatically relevant, team science requires a tighter link between knowledge production and its use. This panel reflects upon the relationship between team science and society and how this relationship shapes the meaning of and possibilities for success. Fern Wickson introduces recent examples of cross-disciplinary team science initiatives within both US and European contexts that focus on promoting “responsible innovation”. These initiatives foster collaboration between social and natural scientists engaged in research on emerging technologies such as nanotechnology and synthetic biology. The aim is to alter innovation trajectories in directions that are more socially robust, ethically sound and environmentally sustainable. The question remains, however, to what extent these initiatives achieve their stated goals and what defines success. Veronica Boix-Mansilla draws upon an empirical study of nine networks supported by three distinct foundations to consider what enables or impedes successful interdisciplinary research. The theoretical construct, “shared socio-emotional-cognitive” [SSEC] platforms is introduced and employed to compare two research network approaches. The first explores open-ended problem spaces with no expectation of immediate societal impact, while the second seeks both to advance knowledge and impact policy. Finally, Robert Frodeman describes the roles that philosophy and the humanities can play in contributing to a societally robust TS. In an age of growing demands for accountability on the part of knowledge producers, researchers need to build relevance into research from the beginning. Philosophy's unique contribution to TS is reflection on the question of relevance. However, this will in turn require that philosophy de-discipline itself.

- VERONICA BOIX-MANSILLA, PHD, Harvard University Graduate School of Education, Professor and Research Associate, Project Zero
- ROBERT FRODEMAN, PHD, University of North Texas, Professor, Department of Philosophy and Religion Studies
- FERN WICKSON, PHD, University of Thomsø, Research Professor, GenØk Centre for Biosafety

TUESDAY, APRIL 17, 2012

8:30-10:00 AM

Bridging Worldviews: International Comparative Perspectives (Session 2)

This session broadens the international scope of the Science of Team Science with comparative reflections on methods of bridging disciplinary, professional, and stakeholder worldview. Every form of expertise builds on particular assumptions (or an epistemology). A crucial challenge for bridging worldviews, then, is to take account of underlying assumptions by making them explicit for critical examination. The session begins by comparing two strategies: the pre-conference workshop on the Tool Box Project, focused on making visible the assumptions that collaborating researchers have about knowledge acquisition in order to bring out their differences; and a model developed by members of the Association for Integrative Studies, focused on identifying assumptions about the nature of human phenomena in order to create common ground for constructing a comprehensive understanding. In the European context of transdisciplinary research, the bridging of worldviews has been developed most fully in the field of sustainability and north/south research, with emphasis on bridging the worldviews of academics and the expertise and frameworks of stakeholders in society. The session concludes with a focus on the purpose of bridging worldviews, whether the aim is to increase knowledge or to achieve a practical outcome (such as a change in government policy, a business innovation, or a practice in civil society). Dialogue methods and other tools add to the variety of approaches to bridging discourses, with examples developed by I2S, td-net, and the Institute for Social-Ecological Research in Frankfurt-Main. Every method has strengths and weaknesses, and there is no perfect approach. However, awareness of options will inform selection of appropriate methods for particular contexts while expanding general understanding of how to bridge worldviews in team science.

- WILLIAM NEWELL, PHD, Executive Director, Association for Integrative Studies
- CHRISTIAN POHL, PHD, Co-Director, Transdisciplinarity-net (td-net)
- GABRIELE BAMMER, PHD, Professor, The Australian National University, NS founder of Integration and Implementation Sciences (I2S)

10:30 AM-12:00 PM

Team Cognition and Affect: Exploring Alternative Trajectories of Scientific Collaboration Across Organizations, People, and Technology (Session 3)

Scientific progress emerges from an interaction between organizations, people, and technology. These interactions produce a complex amalgam of cognitive and affective responses that can either support or hinder knowledge production. In this panel we present a multilevel perspective on scientific collaboration to account for the multi-faceted ways in which cognition and affect influence team members' interactions. First, we examine the joint influence of institutional, organizational, physical environmental, and personal factors on the cultivation and management of shared affect and cognition in cross-disciplinary teams. Second, we discuss how the internalization and externalization of cognition by individual and teams, with each other and through their artifacts, influences knowledge building processes in collaborative contexts. Third, we present an analysis of emotional and affectively toned discourse in relation to problem solving practices to argue that affective processes are not simply tacked onto reasoning, but are integral to it. Our overall goal is to illuminate how the integration of organizations, people, technology and space influence shared affect and cognition. By more clearly identifying sources, levels, and indications of impact as they emerge through collaborative activity, we hope to move the SciTS field towards a multi-level theoretical understanding of the cognitive and affective processes engaged during scientific teamwork.

- STEPHEN M. FIORE, PHD, University of Central Florida, Associate Professor, Cognitive Sciences, Department of Philosophy, Director, Cognitive Sciences Laboratory, IST
- LISA OSBECK, PHD, The University of West Georgia, Associate Professor, Department of Psychology
- DANIEL STOKOLS, PHD, University of California-Irvine, Chancellor's Professor, Planning, Policy and Design; Psychology and Social Behavior

1:15-2:45 PM

Team Science and Collaborative Processes (Session 4)

All collaborations encounter challenges. This is especially true in team science in which team members can represent different disciplines, institutions, and nations. Based upon theoretical and empirical examinations, the presentations in this session will respond to these questions: What factors enable collaboration or create barriers to effective collaboration? What frequently overlooked resources can be leveraged to improve collaborative processes? How can facilitation techniques be used to create or enhance collaboration effectiveness? Can we learn about collaborative process by examining the corpus of journal articles created by science teams of a research center? Presenters will provide practical advice as well as establish a research agenda for the study of collaboration in team science.

- JOANN KEYTON, PHD, North Carolina State University, Professor, Communication
- JESSICA THOMPSON, PHD, Colorado State University, Assistant Professor, Warner College of Natural Resources
- LAURIE LEWIS, PHD, Rutgers University, Director, Master of Communication and Information Studies (MCIS) & Associate Professor, School of Communication and Information Studies

2:45-4:15 PM

Leading Team Science (Session 5)

Leadership is pivotal to team success, particularly in large-scale cross-disciplinary teams that come together to solve highly complex scientific problems. Two particularly salient aspects of leadership in science teams stem from the large and distributed nature of the teams assembled and the substantial expertise of their members. Leadership is the organizational backbone through which loosely connected collections of experts combine their intellectual effort toward a common good. The session will explore the nature of leadership in scientific collectives. First, the presentations will lay theoretical groundwork important to understanding scientific leadership, particularly with respect to developing a team of experts into an expert team. Work will be presented that provides a useful lens for understanding how leaders develop the capacity of teams, enabling them to self regulate and adapt over time. Other findings draw on multiple long-term qualitative and quantitative investigations of leadership in science teams including cancer researchers and high energy physicists. The presenters will focus on how leadership is enacted in large, distributed collaborations through brokerage and boundary spanning activities, bridging of fault lines, constructing parallel organizations to handle ambiguity, and both the constructive generation of and resolution of conflicts among subgroups of scientists. They will also address the question: which leadership arrangements best enable success in distributed, interdisciplinary science teams? To answer the question, they will share research that examines the leadership networks that underpin scientific

innovation, presenting an organizing framework for classifying emergent leadership structures, and present initial findings from two studies of interdisciplinary science teams.

- LESLIE DECHURCH, PHD, Georgia Institute of Technology, Associate Professor, Industrial/Organizational Psychology
- BARBARA GRAY, PHD, Penn State University, Professor, Organizational Behavior, Director, Center for Research in Conflict and Negotiation, Smeal Executive Programs Fellow
- STEVE KOZLOWSKI, PHD, Michigan State University, Professor, Department of Psychology

WEDNESDAY, APRIL 18, 2012

10:30 AM-12:00 PM

Advances in Team Science Evaluation (Session 6)

Team science is a complex construct that requires a variety of evaluation approaches to address the broad range of relevant questions and interests. This panel presents cutting edge work being done in evaluation that spans from micro to macro levels and uses diverse approaches. At the micro level of the individual and team, scientific work fundamentally involves an interpersonal process of exchange among scientists. Local evaluations of team science can benefit by taking this interpersonal process into account when attempting to understand scientific collaboration and its relationship to innovation and discovery. The lens of research on collective intelligence is used to consider the key processes necessary to foster a sufficient diversity of information and perspectives, coupled with tools and practices for information integration, to enable the collective intelligence of diverse groups of investigators to emerge. At a more intermediate “meso” level evaluation work is presented that uses research publications and citations to develop an array of maps to visualize researcher networks. These visual devices are useful for research program evaluations, with an emphasis on gauging interdisciplinarity. At a more macro level, quasi-experimental designs can help us to better understand collaboration, productivity and impact of transdisciplinary research teams. Examples of results of evaluations conducted using multi-method approaches to examine patterns at the individual, project, center and initiative levels will be presented. As the science of team science matures the corresponding approaches to evaluating it needs to evolve. The panel will discuss how the variety of evaluation studies and the methods they have employed suggest new and emerging paths for the evaluation of team science.

- KARA HALL, PHD, National Institutes of Health, Program Officer, National Cancer Institute, Division of Cancer Control and Population Sciences, Behavioral Research Program
- ANITA WOOLLEY, PHD, Carnegie Mellon University, Assistant Professor, Organizational Behavior & Theory
- ALLAN PORTER, PHD, Georgia Tech, Professor, School of Public Policy and Industrial & Systems Engineering (ISyE)

1:15-2:45 PM

Overcoming Barriers to Knowledge Sharing and Communication (Session 7)

Barriers in knowledge sharing and communication are key challenges in cross-disciplinary research teams. The panelists in this session will address approaches for overcoming such barriers. First, the presentations will consider the role of tacit knowledge in interdisciplinary work and how team members can share knowledge by learning to speak—and listen—from experience. Second, they’ll examine the construction of integrated conceptual frameworks that link knowledge and expertise across disciplines and how sharing knowledge across disciplinary perspectives generates new, co-created knowledge. Third, the role of brokers, whether internal or external to the team, and their ability to catalyze the generation of conceptual connections between disciplines will be discussed. Toward the goal of effective praxis of team science, the presenters will share information about key intervention points and guiding principles for knowledge sharing based on experiential and empirical data.

- HOLLY FALK-KRZESINSKI, PHD, Northwestern University, Research Assistant Professor and Director, Research Team Support & Development, Clinical and Translational Sciences (NUCATS) Institute
- DAVID STONE, PHD, Northern Illinois University, Associate Vice President for Research, Office of Sponsored Projects
- DEANA PENNINGTON, PHD, University Texas, El Paso, Research Assistant Professor
- JACOB LEVIN, PHD, University of California, Irvine, Assistant Vice Chancellor, Office of Research Development & Current President of the National Organization of Research Professionals (NORDP)

3:15-4:45 PM

Teams in Action: Lessons Learned on the Front Lines (Session 8)

Many researchers are enticed to team science by the prospect of being able to accomplish what no single scientist could accomplish alone. Working across disciplinary and institutional boundaries holds great potential for conceptual and technological breakthroughs. With those positive incentives, however, come the challenges of melding collaborators with different languages, varied styles, and diverse cultures. The panelists will share lessons learned on the “front lines” of leading interdisciplinary teams in several different contexts: cancer research, community-based participatory research, and science policy analysis. Their presentations will discuss how to help nascent scientific leaders acquire the competencies to grow beyond their scientific and technical competencies in the laboratory and acquire expertise at managing people. Often scientific team members need to collaborate despite vast differences in philosophies of proof, dress, and manners. If anything, differences are even greater among the academics, clinicians, and community members that community engaged research brings together. Even though scientific priorities often compete with community empowerment goals, researchers and community stakeholders are expected to share equally in decision-making. Institutional and science policies can exacerbate or mitigate conflicts that arise when the goals and resources of a center director and participating scientists are non-congruent. By example, the panelists demonstrate and will share tips on how expert leadership makes it feasible for team science facilitators to outweigh team science challenges.

- CRAIG BOARDMAN, PHD, The Ohio State University, Assistant Professor, John Glenn School of Public Affairs
- BONNIE SPRING, PHD, Northwestern University, Professor, Preventive Medicine and Psychiatry and Behavioral Sciences
- DENISE GALLOWAY, PHD, University of Washington, Research Professor, Fred Hutchinson Cancer Research Center
- LINDA MARTINEZ SPRAGUE, PHD, Tufts University, Assistant Professor, Community Health Program

THURSDAY, APRIL 19, 2012

8:30 AM-1:00 PM

Linked Open Data & Team Science (Workshop)

Linked open data (LOD) as a technology that uses the Web to connect related data, is well-poised to transition from proof-of-concept prototyping into significant, high-visibility projects. The analytic/algorithmic aspects of Team Science can readily capitalize upon the graph structure basis of LOD, directly consuming many of the common ontological classes already accessible in LOD form. This workshop will explore the nature of LOD and its applicability and utility to Team Science. Particular emphasis will be placed on the provisioning of Team Science class data as LOD and consuming LOD in Team Science class applications. Research networking (RN; knowledge management for the research enterprise) will be used as a primary motivating application to ground discussion, with examples drawn from representative RN tools (e.g., VIVO, Loki and Profiles). Topics covered in the workshop will include: Basic LOD principles; Why this technology matters to the SciTS community; Getting started serving data (i.e., Resource Description Framework, RDF); Getting started consuming data (i.e., SPARQL); and Integration with other frameworks (e.g., Drupal).

- NOSHIR CONTRACTOR, PHD, Northwestern University, Professor, Industrial Engineering and Management Sciences, Communication Studies, and Management and Organizations
- DAVID EICHMANN, PHD, Associate Director, Biomedical Informatics in the Institute for Clinical and Translational Science
- DEBORAH L. MCGUINNESS, PHD, Professor, Rensselaer Polytechnic Institute (RPI), Computer Science and Cognitive Science
- GRIFFIN WEBER, MD, PHD, Harvard Catalyst Profiles, Chief Technology Officer, Harvard Medical School
- YING DING, PHD, Indiana University Bloomington, Assistant Professor, Information Science
Core Faculty of Cognitive Science