

**(1) Project Title:** Strengthening Teamwork to Confront Socio-Ecological Challenges: Generating New Knowledge for Effective Action in the Americas

**(2) Proposal Team:**

**Lily House-Peters (Project PI)** (School of Geography and Development, University of Arizona, 1103 E. 2<sup>nd</sup> Street (Harvill Building), 4<sup>th</sup> Floor, Tucson, AZ 85721, USA; P| 520.621.1652; Fax| 520.621.2889; lilyhp@email.arizona.edu); **Gabriela Alonso Yañez** (Werklund School of Education, University of Calgary, EdT-738, 2500 University Drive, NW Calgary, Alberta, Canada T2N 1N4; P| 587.2270544; Fax| 403.2108111; galonsoy@ucalgary.ca); **Sebastián Bonelli** (Centro de Cambio Global, Pontificia Universidad Católica de Chile, Vicuña Mackenna 4860, Macul, Santiago, Chile; P| 56.9.9243.7528; sjbonelli@gmail.com); **Martín García Cartagena** (Centro Interdisciplinario de Respuesta al Cambio y a la Variabilidad Climática, Espacio Interdisciplinario, Universidad de la República, José E. Rodó 1843, Montevideo, Uruguay; P| 598.24089010; martingarciacartagena@gmail.com); **Michelle Farfán** (Centro de Investigaciones en Geografía Ambiental, Universidad Nacional Autónoma de México, Antigua Carretera a Pátzcuaro No. 8701, Col. Ex-Hacienda de San José de La Huerta, C.P. 58190 Morelia, Michoacán, Mexico; P|00.52.443.3223835; farfanmichel@gmail.com); **Ignacio Lorenzo** (Proyecto de Fortalecimiento Institucional, Sistema Nacional de Respuesta al Cambio Climático, Ministerio de Vivienda, Ordenamiento Territorial y Medio Ambiente, Calle Zabala 1432, piso 4, 11000 Montevideo, Uruguay; P|598.99180424; ignacio.ucc@gmail.com)

**(3) Funding Requested:** \$19,774 (USD)

**(4) Project Duration:** 12 months (September 1, 2014 – August 31, 2015)

**Executive Summary**

The production and rapid translation of scientific **knowledge** into innovative policy **action** is crucial for confronting today's most urgent socio-ecological challenges, such as climate change, biodiversity loss, water and food insecurity, and energy production and consumption. The existing gap between scientific knowledge production and policy-making presents a significant problem, as it obstructs effective responses to these challenges. Realizing transformative change in the current interface between science and policy obliges improved understanding of the **individual and team dynamics** of **interdisciplinary** (ID) and **transdisciplinary** (TD) research. To elucidate these dynamics, our research asks, 1) *Which team member attributes and team characteristics lead to ID and TD team research outcomes that successfully bridge the knowledge-action gap?* and 2) *How do individual team member attributes and team characteristics interact to influence ID and TD team research outcomes?* We propose an integrated research methodology that combines rigorous empirical data collection and analysis with the design of a conceptual framework based on an agent-based modeling (ABM) approach. Empirical data collected through a review of IAI ID and TD team case studies, an online survey, and semi-structured interviews will inform the iterative process of developing the **conceptual model**.

Our research aims to bridge the knowledge-action gap by advancing understanding of ID and TD team knowledge production dynamics. We seek to reveal pathways toward transforming ID and TD teamwork to achieve policy-relevant outcomes. Specifically, the proposed research will identify and analyze combinations of individual team member attributes and overall team characteristics to determine how they influence research outcomes. The expected products include a website, empirically-based profiles to characterize the attributes of ID and TD team members and teams, and standards for proposal review panels to evaluate ID and TD projects. To complete this research we request \$19,954 (USD) to support 12-months of project activities. Conducting this research will provide our own uniquely qualified team of early-career researchers and practitioners with a significant opportunity to contribute to the transformation of ID and TD research by generating enhanced empirical understanding of what makes these teams successful.

## I. Proposal Introduction/Background Information

Abrupt environmental change is triggering **socio-ecological system** (SES) conflicts across the Americas, posing unprecedented challenges to science and policy communities (Pahl-Wostl et al. 2013). Successfully confronting these challenges requires the effective translation of science into policy design and implementation and the integration of scientific researchers and policy-makers in functional ID and TD teams. ID research incorporates scientific data, techniques, concepts, and theoretical approaches from multiple disciplines to generate integrated scientific knowledge (Clark et al. 2014; Shea and Mozafari 2014). TD research builds on the ID concept to unite **scientists** from multiple disciplines and **stakeholders**, including policy-makers, industry professionals, and members of the public, with the aim to generate integrated knowledge with real-world applicability (Natenzon 2001; Stokols 2006; Fiore et al. 2010; Hidalgo et al. 2011). However, science production and policy-making remain segregated. Today, the lack of integration between scientific knowledge production and policy action persists as a significant problem for tackling complex socio-ecological conflicts across the Americas (Funtowicz and Hidalgo 2008). Effective responses to emerging conflicts require a transformation in the current interface between science and policy, in particular, transforming the interactions between scientists, policy-makers, and practitioners. From this point forward, we use the term ‘team’ to refer to both ID and TD teams.

A growing body of scholarship identifies obstacles that hinder the transformation of knowledge into action. Drawing from a multi-level systems perspective (Börner et al. 2010), we understand these obstacles as affecting perceptions and behavior at three separate scales: the individual actor level (micro-level); the team level (meso-level); and the larger, external environment in which populations of teams work (macro-level). The lack of active and sustained interaction with stakeholders and incentives appropriate to both scientists and policy-makers, the absence of collaboration for framing problems and setting shared agendas and goals, and a shortage of effective communication pathways among researchers and policy-makers serve to negatively impact the transfer, dissemination, and use of the resulting knowledge (Fjelland 2002; Lemos and Morehouse 2005; Stokols 2006; Hidalgo et al. 2011; Castellanos et al. 2013; Cornell et al. 2013; Fischhoff 2013; Pahl-Wostl et al. 2013; Rodríguez et al. 2013). Research also reveals the important roles of individual team member attributes in determining the outcomes of teamwork. Differences in philosophical standpoints, contrasting ethical values, lack of well-developed interpersonal skills, and varying enthusiasm to act under conditions of uncertainty impact team success (Fjelland 2002; Stokols 2006; Eigenbrode et al. 2007; Cornell et al. 2013). Yet, it remains poorly understood exactly how structural **team characteristics** and individual **team member attributes** interact to ultimately **enhance** or **inhibit** team success. A result of this knowledge gap is the inability of teams to bridge the divide between knowledge production and policy action. Thus, teams often fail to advance beyond the production of purely scientific outputs to the integration of scientific knowledge into action.

Our proposed project is guided by two central research questions:

- 1) *Which team member attributes and team characteristics lead to ID and TD team research outcomes that successfully bridge the knowledge-action gap?*
- 2) *How do individual team member attributes and team characteristics interact to influence ID and TD team research outcomes?*

Our research draws on the advances of previous scholarship focused on collaborative team processes (Merton 1973; Stokols et al. 2008; Tabara and Chabay 2012). We aim to contribute to this scholarship by advancing understanding of how the dynamics of individual attributes, peer-to-peer interactions, and overall team structure and composition interact to produce desired or undesired team outcomes. This research represents a significant advance as it focuses explicitly on the dynamics of

research teams and elaborates the poorly understood dynamics of how individual team members interact to effectively produce science for policy.

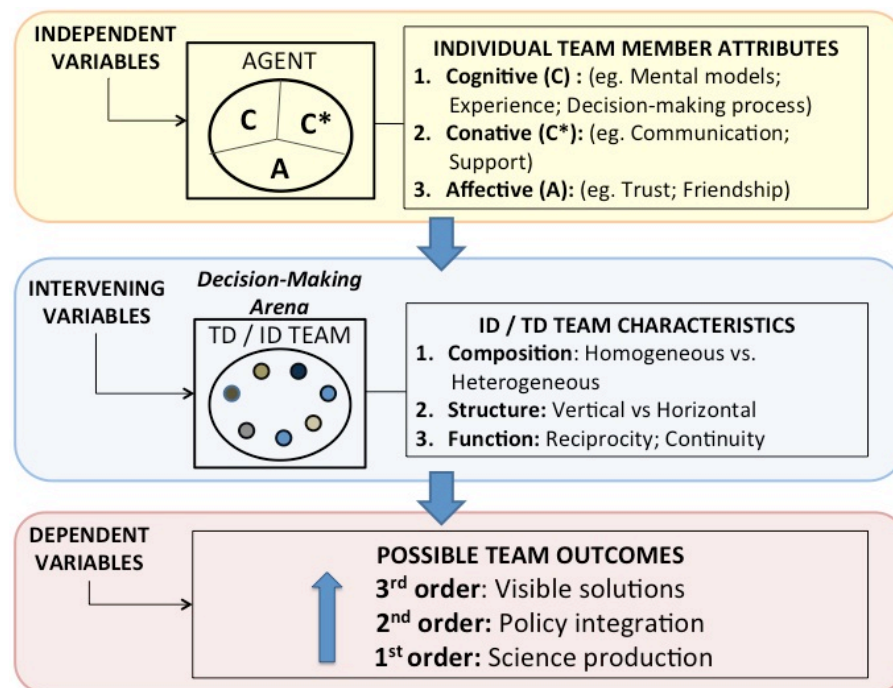
## II. Objectives

We aim to generate new empirical knowledge to advance understanding of team dynamics and improve the current science-policy interface. This research has three specific objectives:

1. To identify individual agent attributes and team structure characteristics that positively or negatively influence team research outcomes.
2. To analyze relations between individual agent variables, group structure variables, and possible team research outcomes.
3. To develop an agent-based conceptual framework grounded in empirical data to represent the complex relations between team dynamics and team research outcomes.

## III. Methodology/Approach

Our research approach integrates empirical data collection and analysis with the design of a conceptual framework based on an ABM approach. Our research methodology will advance in two main phases: 1) empirical data collection and analysis (September-February); 2) data synthesis and conceptual development of the conceptual framework (March-August). We will use the empirical data collected to inform the iterative process of developing the ABM framework. Empirical data collection and analysis will allow us to develop data-rich, comprehensive profiles of team member attributes and team characteristics. Team member profiles will categorize the multifaceted attributes of individuals in three dimensions: **thinking** (cognitive), **acting** (conative), and **feeling** (affective). Team characteristics will also be organized at three levels: **composition**, **structure**, and **function** (Bresman and Zellmer-Bruhn 2013).



**Figure 1:** The conceptual framework guiding our research design and the development of the conceptual model is based on the hypothesis that individual and team attributes influence research outcomes. Adapted from the frameworks presented in Olsen et al. (1997) and Olsen (2003), the three orders of outcomes allow us to measure and distinguish among different levels of team performance, based on the success of the outcome in translating science for SES policy solutions.

We have designed a preliminary conceptual framework (Figure 1), which will act as a guide for determining important variables and hypothesizing relations between the team variables and team outcomes. The conceptual model serves two purposes. During the first phase of the project the preliminary conceptual model will act as a template to guide our data collection and analysis. In the second phase of the project, we will refine the preliminary conceptual model based on the empirical

evidence. Approaching our research problem through an integrated methodology of empirical data collection and analysis and the development of a conceptual framework based on an ABM approach is innovative, but not unprecedented. The science of simulating scientific networks, knowledge production, and community dynamics via ABM is a small but active field (Gilbert et al. 2001; Newman 2001; Barabasi et al. 2002; Pyka et al. 2007; Zellner 2008; Börner 2010; Fiore et al. 2010; Rojas-Villafane 2010; Farhat 2011; Farhat 2013; Watkins et al. 2013). In particular, Farhat's (2011; 2013) research identifies the need to base ABM development on empirical information. Importantly, he refers to the need for explorations of team-work at a more grounded, face-to-face level of interaction. The addition of robust empirical data to the design of ABM frameworks has the potential to better connect simulation outputs and the real-world settings in which individuals collaborate (Farhat 2013). Thus, our approach provides the opportunity to contribute significantly to existing scholarship.

Empirical data collection and analysis will rely on a mixed-method approach (Gable 1994; Creswell 2013) based on three primary data sources: 1) **Case studies** determined from previous Inter-American Institute for Global Change Research (IAI) ID and TD teams; 2) Online **surveys**; and 3) Semi-structured **interviews**. We started initial, exploratory IAI project PI interviews and preliminary IAI study case study review in August 2014. The case study review will focus on previous and ongoing ID and TD projects funded by IAI. We will use the IAI projects as case studies to empirically identify individual team member attributes and collective team characteristics, to derive relevant variables and agent interactions for developing the first phase of the conceptual framework, and to identify survey and semi-structured interview participants. We will design an online survey instrument in both Spanish and English, which will target all team members (n=60), including scientists and non-scientists, from the IAI projects included in the case study review. Survey questions will be designed to elicit information about team member attributes, overall team characteristics, interactions between team members, and team outcomes. We will conduct semi-structured interviews (n=12) with the PIs of the IAI cases. These interviews will elicit highly detailed qualitative data to supplement the quantitative survey data.

#### IV. Activities:

Our project team will accomplish the following activities during the 12-month project:

Project Activity	1	2	3	4	5	6	7	8	9	10	11	12
Selection of IAI projects for case study analysis												
1 <sup>st</sup> Project meeting (Montevideo, Uruguay)												
Design instruments and conduct surveys and interviews												
Data analysis to characterize individuals and teams												
Data synthesis and conceptual framework development												
2 <sup>nd</sup> Project meeting & Conference (Bethesda, Maryland)												
Proposal development to apply for larger grants												

#### V. Contribution of Project Team/ Multinational & Multidisciplinary Collaboration

**(1) Project team:** Our project team is composed of a multi-national and multi-disciplinary group of early-career researchers and practitioners uniquely qualified to carry out this proposed research. *Lily House-Peters*' (PI, USA, University of Arizona) previous experience as a member of ID and multi-country research teams and her experience employing complexity theory and spatial models to analyse socio-ecological processes will contribute to co-leading data synthesis and conceptual framework development. House-Peters will also serve as the PI of the project, including significant roles in grant administration, team leadership, research design and execution, and publication of results. *Gabriela Alonso-Yañez*'s (Co-PI, Canada, University of Calgary) background in Psychology is a significant asset for the behavior component of our research. Alonso-Yañez's expertise in conducting qualitative research and assessment design uniquely qualifies her to lead the design of our qualitative research methods, including data collection and analysis. *Sebastián Bonelli*'s (Co-PI, Chile, Pontificia

Universidad) expertise in modeling and previous research experience as a member of a TD team will contribute significantly. His role will focus on determining system variables and designing the conceptual framework. *Martín García Cartagena's* (Co-PI, Uruguay, Universidad de la República) previous research on epistemic communities as science-policy agent networks and his experience as a member of ID and TD teams will assist in conducting surveys and interviews and his role in leading data synthesis. *Michelle Farfán's* (Co-PI, Mexico, UNAM) experience in modeling SES spatial dynamics and land use and land cover change will be a valuable contribution to the design of the conceptual framework and the integration of empirical data and simulation modeling. *Ignacio Lorenzo's* (Co-PI, Uruguay, National Climate Change Project) experience in climate change policy-making at national and subnational levels of governance provides a practitioner's perspective and a deep understanding of the inner-workings of public policy and the specific types of science that are useful for policy action.

**(2) Multidisciplinary and multinational approach:** Our research integrates qualitative, quantitative, and computational research approaches to design an innovative project methodology. Our research team spans expertise in the social sciences (psychology, human geography, public policy), the natural sciences (hydrology, ecology, climate change science), and computational modeling (statistical models, dynamic models). Through an online survey, semi-structured interviews, and case study review, our team will conduct research in multiple countries across the Americas. Contact with ID and TD research teams across the Americas will allow us to engage deeply in both building new and enhancing existing networks of these researchers.

## **VI. Contribution to Science, Capacity Building, Outreach and Policy Relevance**

**(1) Contributions to science:** There are numerous examples of ABMs designed to simulate team dynamics and scientific networks, but little research exists focusing specifically on team behavior or the translation of science to policy. Our proposed research draws on advances in several fields of science, including the Science of Team Science (SciTS) and computational modeling, to build an empirically informed conceptual framework to analyze team dynamics. Our research approach and the expected results fill an existing knowledge gap regarding team research behavior, the production of science and its integration into policy, and will serve to advance the field of SciTS and simulation modeling.

**(2) Capacity building:** This project will contribute to the dissemination of knowledge to policy-making communities, granting organizations, and other stakeholders. Specifically, we will: 1) develop standards for proposal review panels to use in evaluation; 2) deliver colloquiums, seminars, and/or half day workshops in our own institutions; and 3) assist the IAI by participating in future events.

**(3) Outreach:** We will design a project website to inform the advances and results of our project and present our research findings at the 6<sup>th</sup> *Science of Team Science Conference*.

**(4) Policy relevance:** The populations that will directly benefit from this project include both the producers and end-users of scientific knowledge, including scientists, policy-makers, institutions, and local stakeholders. Our research addresses the pressing needs of these groups, who are currently confronted with the challenge of developing and mobilizing effective, innovative, and creative solutions to confront global change. This seed grant proposal is the 'setting in motion' of a knowledge network in the Americas; one that will directly enhance the ability of policy-makers to communicate effectively with scientists, to inform researchers of the scientific knowledge gaps that are of greatest concern to policy-makers, and to co-produce science for direct integration into policy.

## **VII. Expected results**

**(1) Expected results/specific products:** The expected results and products of this project will be: 1) **Individual and team profiles** with systematized characterizations of the attributes of team members and overall teams based on empirical data collected through IAI case study review, surveys, and interviews; 2) **A conceptual framework** to characterize team members and overall team characteristics, interactions, and possible outcomes; 3) **A future grant proposal** to support long-term research funding for an expanded project based on the research conducted during the seed-grant project; 4) **Standards** for

effective ID and TD research; 5) **A peer-reviewed publication** on our findings in an international journal; and 6) **A project website** to inform scholars, practitioners, and the public of project advances and preliminary results.

**(2) The beneficiaries of the research:** This project aims to strengthen the capacities of **scientists** and **decision-makers** in countries across the Americas to address the critical issues associated with global change in the region. The beneficiaries of this project will be a wide range of academic scientists, researchers, practitioners, policy-makers, and local stakeholders involved in ID and TD research to confront socio-ecological challenges. Results from this project will also suggest more effective ways for funding agencies to design their call for proposals (CFPs), funding allocation mechanisms, and the criteria for assessing research project outcomes.

**(3) The contribution of the research to IAI:** This project analyzes IAI ID and TD projects as case studies to specifically assist IAI efforts to improve the success and effectiveness of ID and TD research development. Results of our research will contribute directly to IAI by providing new criteria to identify gaps in integrating science production and policy-making, and to assess team success by providing a set of standards to evaluate proposed projects and assess the success of ongoing and completed projects.

## VIII. Sustainability and Evaluation

**(1) Follow-up activities:** We will follow up the activities of the initial one-year Seed Grant with a larger multi-year project that will expand on the advances made during the first year of the research. To ensure that our project will be sustainable beyond the one-year IAI seed grant funding we are committed to securing future funds to develop and implement an ABM derived from our conceptual framework that can be used for hypothesis testing and scenario modeling under an expanded range of conditions. For this purpose, we have identified funding agencies whose priority research areas relate directly to our project goals: the USA National Science Foundation (Science of Science and Innovation Policy grant program), International Social Science Council, and the Santa Fe Institute for Science for a Complex World. We anticipate that our research will be of interest not only to traditional funding agencies but also to private institutions aimed at improving their connection to the production of scientific knowledge and the use of scientific results in concrete, action-oriented policy settings. Follow-up activities will include: the publication of policy and technical papers and/or a book chapter; attendance at additional conferences; integration of the initial project components into a PhD dissertation for members of our team who are still enrolled in graduate programs; and incorporation of the project components into other research projects in which we are currently involved.

**(2) Plans for assessing results:** Our team will assemble an **Advisory Board** of four international experts in the field of ID and TD team research. We will solicit mentoring and feedback from this Advisory Board through online meetings once every four months.

## IX. Management plan

The project activities will be led by specific team members as follows:

Project Activity	Project Task Leaders
<b>Data Collection</b> IAI Case Study Materials Survey Interview	Ignacio Lorenzo & Martín García Cartagena Michelle Farfán & Sebastián Bonellí Sebastián Bonellí & Gabriela Alonso Yanez
<b>Data Analysis</b> Qualitative Data Analysis Quantitative Data Analysis	Gabriela Alonso Yanez Michelle Farfán
<b>Conceptual Model Design</b> Data Synthesis	Martín García Cartagena & Lily House-Peters

**Professional Development Seminar on Modeling Strategies and Decision-Support Tools for the Management of Complex Socio-Ecological Systems**

24 - 28 March, 2014 – Antigua, Guatemala/ 18 - 22 August, 2014 – Panama City, Panama

**Project Title:** Strengthening Teamwork to Confront Socio-Ecological Challenges: Generating New Knowledge for Effective Action in the Americas

**Principal Investigator: (name, institution, country):** *Lily House-Peters*, University of Arizona, USA

**Co-Investigators (names, institutions, countries):**

*Gabriela Alonso Yañez*, University of Calgary, Canada;

*Ignacio Lorenzo*, Proyecto Fortalecimiento Institucional del Sistema Nacional de Respuesta al Cambio Climático, Uruguay;

*Martín García Cartagena*, Universidad de la República, Uruguay;

*Michelle Farfán*, Universidad Nacional Autónoma de México, México;

*Sebastian Bonelli*, Pontificia Universidad Católica de Chile, Chile

**Proposed duration (1-12 months):** 12 months **Request starting date (dd/mm/yy):** 09/01/2014

**Proposed budget (US\$):** \$19,974 **Total in-kind contribution (US\$)** \$15,000

**Budget breakdown**

Nature	Value in US\$	Receiving Institution(s)
- Travel	\$ 17,330	University of Arizona
- Communications (Web Conferencing – Adobe Connect)	\$ 150	University of Arizona
- Website Design and Domain Name	\$ 50	University of Arizona
- Other:		University of Arizona
- Online Survey Platform (Question Pro)	\$ 144	
- Audio Recorders	\$ 200	
- Conference Registration	\$ 2,100	

**Total = \$ 19,974**

**In-kind contribution breakdown**

Nature (specify)	Reasonable estimate in US\$	Donating Institution
Lily House-Peters (PI) salary (200 hours (equivalent of 5 weeks) at \$18.75/hour)	\$ 3,750	University of Arizona, USA
Gabriela Alonso-Yañez (Co-PI) salary (120 hours (equivalent of 3 weeks) at \$18.75/hour)	\$ 2,250	University of Calgary, Canada
Martín García Cartagena (Co-PI) salary (120 hours (equivalent of 3 weeks) at \$18.75/hour)	\$ 2,250	Universidad de la República, Uruguay
Sebastián Bonelli (Co-PI) salary (120 hours (equivalent of 3 weeks) at \$18.75/hour)	\$ 2,250	Pontificia Universidad Católica, Chile
Michelle Farfán (Co-PI) salary (120 hours (equivalent of 3 weeks) at \$18.75/hour)	\$ 2,250	Universidad Nacional Autónoma de México
Ignacio Lorenzo (Co-PI) salary (120 hours (equivalent of 3 weeks) at \$18.75/hour)	\$ 2,250	Individual time contribution

**Total = \$ 15,000**

**Timetable & budget (sum of activities, time period and expenditures)**

Period	Proposed Project Activities (specify)	Estimated Expenditure in US\$
Sept. – Nov.	Purchase Communication Software & Voice Recorders (\$350) Purchase Website Domain Name and Design Website (\$50) Purchase Question Pro License (Survey Design) (\$144)	\$ 544
Dec. – Mar.	Register for Conference/Submit Abstract (\$2,100) Team Meeting 1(Montevideo, Uruguay, Feb. 2015) (\$7,720)	\$ 9,820
Mar. – Aug.	Team Meeting 2 & Conference Attendance (Bethesda, Maryland, USA, July 2015) (\$ XX)	\$ 9,610

**Total = \$ 19,974**

**Budget Justification:**

The funds requested from IAI will be used primarily to support two team meetings and to attend and present preliminary results of our ongoing research at the 6<sup>th</sup> *Science of Team Science Conference* in Bethesda, Maryland, USA in July 2015. We anticipate meeting in person twice during the year of the project with the purpose of developing and designing project materials (team meeting one) and to analyze and synthesize results, develop manuscripts for publication, and develop the larger grant proposal (team meeting two). The team will first convene in Montevideo, Uruguay in February 2015, a location that significantly reduces travel costs for 2 of our 6 team members, who are currently located in Montevideo (Ignacio Lorenzo and Martín García Cartagena). During this team meeting we will analyze the data collected from the surveys, interviews, and case study analysis conducted during the first 5 months of the project. Meeting in Uruguay will also allow our team access to the IAI headquarters located in Montevideo. We request funding from IAI to cover the costs of airfare (\$5,200) and per diem (\$2,520) during the weeklong meeting. The salaries of the PI and Co-PIs for the week are reflected in the in-kind contributions.

The second team meeting will occur in Bethesda, Maryland, USA concurrently with the team's attendance of and research presentation at the 6<sup>th</sup> *Science of Team Science Conference* in July 2015. The team will convene in Bethesda, Maryland for the week July 5-12, 2015. We request IAI funds to support the travel of the team to Maryland, including airfare (\$5,200) and per diem (\$4,410) during the weeklong meeting. Additionally, we request funds for conference registration costs (\$2,100). Holding the meeting in the United States is advantageous as three of our team members live in close proximity to the conference location and all team members have valid visas to enter the United States. The salaries of the PI and Co-PIs during the weeklong meeting are reflected in the in-kind contributions. The two face-to-face team meetings will complement and significantly enrich bi-monthly online team meetings (once every two weeks), which will be effectively facilitated through the use of Adobe Connect web communications software (\$150).

The time commitment to design the survey and interview instruments and to gather and analyze the data is reflected in the in-kind contributions. We will also rely on in-kind contributions to reflect the time commitment of writing the expanded grant application to sustain the project in the future, producing the ID/TD teamwork evaluation rubric, and writing manuscripts for publication in peer-reviewed journals.

**Detailed Costs:**

*Meeting 1: Montevideo, Uruguay (February 8 -15, 2015), Total Funds requested from IAI = \$7,720*

Airfare (\$5,200):

Phoenix, AZ, USA – Montevideo, Uruguay (Lily): \$1,400, US Airways

Montevideo- Montevideo, Uruguay (Martin & Ignacio): \$0

New York, NY, USA – Montevideo, Uruguay (Sebastián): \$1,300, American Airlines

Mexico City, Mexico – Montevideo, Uruguay (Michelle): \$1,050, American Airlines

Calgary, Canada – Montevideo, Uruguay (Gabriela): \$1,450, American Airlines

Per Diem (\$2,520):

*Hotel California, Montevideo:* \$60/night (2 people/ room) = 2 rooms for 7 nights = \$840

Food Costs: 6 people for 7 days (\$40/day) = \$1,680

*Meeting 2: Bethesda, Maryland, USA (July 2015), Total Funds requested from IAI = \$11,710*

Airfare (\$5,200):

Tucson, AZ, USA – Bethesda, MD (Lily): \$500, American Airlines

Montevideo, Uruguay – Bethesda, MD (Martin & Ignacio): \$1,700/each, American Airlines

New York, NY, USA – Bethesda, MD (Sebastián): \$200, Delta Airlines

Mexico City, Mexico – Bethesda, MD (Michelle): \$600, American Airlines

Calgary, Canada – Bethesda, MD (Gabriela): \$500, United Airlines

Conference Registration (\$2,100) – 6<sup>th</sup> Annual Science of Team Science Conference  
\$350/attendee (6 attendees = \$ 2,100)

Per Diem (\$4,410):

*Hampton Inn & Suites:* \$90/night (2 people/ room) = 3 rooms for 7 nights = \$1,890

Food Costs: 6 people for 7 days (\$60/day) = \$2,520



## Appendix 2: Curriculum Vitae

### Lily A. House-Peters

School of Geography and Development, University of Arizona  
lilyhp@email.arizona.edu; 520-204-7822

#### Educational Qualifications

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2015 (expected)	<b>PhD</b> (Geography)   University of Arizona, USA
2010	<b>MSc</b> (Geography)   Portland State University, USA
2005	<b>BA</b> (Geography)   The George Washington University, USA

#### Research Experience

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2012 - current	Principal Investigator, Dissertation Research, School of Geography and Development, University of Arizona, “ <i>Desert forests and flows: Managing riparian resilience in drought-prone communities in the Sonoran borderlands.</i> ”
2010 - 2012	Graduate Research Associate, Udall Center for Studies in Public Policy, University of Arizona, “ <i>Strengthening resilience of arid region riparian corridors: Ecohydrology and decision-making in the San Pedro and Rio San Miguel Watersheds.</i> ”
2008 - 2010	Graduate Research Assistant, Geography Department, Portland State University, “ <i>Integrated water and land planning as a climate adaptation strategy: Comparisons of Portland, Oregon and Phoenix, Arizona.</i> ”

#### Selected Publications

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##### Refereed Research Articles

Gober, P. A. Middel, A. Brazel, S. Myint, H. Chang, J.D. Duh, and **L. House-Peters**. 2012. Tradeoffs between water conservation and temperature amelioration in Phoenix and Portland: Implications for urban sustainability. *Urban Geography* 33 (7): 1030-1054.

**House-Peters, L.** and H. Chang. 2011. Urban water demand modeling: Review of concepts, methods, and organizing principles. *Water Resources Research* 47, W05401.

**House-Peters, L.** and H. Chang. 2011. Modeling the impact of land use and climate change on neighborhood-scale evaporation and nighttime cooling: A surface energy balance approach. *Landscape and Urban Planning* 103 (2): 139-155.

##### Policy Papers

Varady, R.G., F. van Weert, S.B. Megdal, A. Gerlak, C.A. Iskandar, and **L. House-Peters**. 2013. Groundwater policy and governance, in *Groundwater Governance: A Global Framework for Country Action*.

##### Conference Proceedings

**House-Peters, L.** and C.A. Scott. 2011. Assessing the impacts of land use change on water availability, management, and availability in arid region riparian corridors. *Proceedings from the XIVth World Water Congress*, Porto de Galinhas, Brazil.

#### Grants & Fellowships

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2013-2014	Fulbright – Garcia Robles Fellowship, Mexico, Doctoral Fellowship, \$15,000.
2013-2014	University of Arizona Water Sustainability Program Graduate Student Fellowship, \$18,000.
2013-2014	P.E.O. Scholar Award, International Chapter, Doctoral Fellowship, \$15,000.
2010	East Asia and Pacific Summer Institute Program Fellow, National Science Foundation, \$8,000.

**Gabriela Alonso-Yanez**  
Postdoctoral researcher/Sessional Instructor  
University of Calgary  
[galonsoy@sfu.ca](mailto:galonsoy@sfu.ca); 587 227-0544

## Educational Qualifications

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2013	<b>PhD</b> (Curriculum Theory and Implementation)   Simon Fraser University
2005	<b>MSc</b> (Environmental Education)   Instituto de Investigaciones Ecologicas, Spain
2000	<b>BSc</b> (Psychology)   Morelos State University, Mexico

## Employment History

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2013 - current	Sessional Instructor   Werklund School of Education   University of Calgary
2012 - current	Postdoctoral Researcher   Geography Department   University of Calgary
2007 - current	Director of Conservation Programs   Institute for Tropical ecology and Conservation

## Ongoing Research Projects

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2014	<i>Weaving Indigenous Perspectives in Education</i> Werklund School of Education, University of Calgary (Research Assistant)
2014	<i>Leading for Knowledge-Building Inclusive Learning Environments</i> Galileo Educational Network (Research Assistant)
2012	<i>Assessing Conservation Status of Natural Protected Areas in Central Mexico</i> Environmental Policy and Governance Research Team, Department of Geography, University of Calgary (Research Collaborator, <a href="http://people.ucalgary.ca/~davidson/group.htm">http://people.ucalgary.ca/~davidson/group.htm</a> )

## Significant Publications

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### Book chapters

**Alonso, G.** & Ceballos, L. (2014). El Análisis de Situaciones: un nuevo enfoque metodológico para el trabajo multidisciplinario y su aplicación en el campo de la conservación ambiental. In Generacion y aplicación del conocimiento psicologico en educacion. (pp. 161-181) Mexico: Plaza y Valdes. ISBN (pending)

Dorado, O., Arias, D.M., Maldonado, B., & **Alonso, G.** (2010). Educación para la biodiversidad a través de la universidad pública en áreas naturales protegidas: el caso de la Reserva de la Biosfera Sierra de Huautla, Morelos. In *Educación ambiental y manejo de ecosistemas en México*. (pp. 129-173). DF, Mexico: Instituto Nacional de Ecologia. ISBN 978 968 817 943 7

### Refereed Research Articles

**Alonso, G.** & Davidsen, C. (2014). Conservation science policies vs scientific practice, evidence from a Mexican biosphere reserve. (forthcoming). *Human Ecology Review*

**Alonso, G.** & Thumlert, K. (2014). Reassembling Natural Conservation. (forthcoming). *Qualitative Sociology Review*.

## Grants and Fellowships

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2011- 2014	Professional Development Grant- The Inter-American Institute for Global Change Research
2006 – 2012	Mexican National Council for Science and Technology. Doctoral Fellowship.
2010	Simon Fraser University International Research Travel Award, Graduate Studies
2005-2007	Critical Ecosystem Partnership Fund (CEPF). Small Grant

### **Brief Personal Description**

I am an Agronomist, MSc. in Natural Resources, with strong expertise in climate change and water resources related impacts, hydrologic modeling and decision making assessment. During the last years, I have worked in connecting climate and hydrology science to decision making processes. This work has been developed in close association to a wide range of local stakeholders (public, private and civil society actors). I have led several training workshops aiming to extend the use of water resources modeling and planning tools to students and stakeholders. I'm interested in research projects that can contribute to climate and water policy development, and water management related issues.

### **Research Experience**

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#### ***Vulnerability and adaptation to climate variability and climate change in the Maipo river basin in Central Chile.***

Roles: coordination and implementation support at most stages of the project. WEAP model expert, Institutional assessment.

#### ***National Adaptation Plan proposal (commissioned by the Ministry of Environment of Chile).***

Roles: literature review in international adaptation to climate change, national institutional analysis regarding adaptation to climate change.

#### ***Capacity building to cope with climate change in Chile.***

Roles: literature search, data collection, report writing, financial management, seminars and training workshops coordination.

### **Work Experience**

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Faculty of Agronomy and Forestry Engineering, Pontificia Universidad Católica de Chile. Integrated Watershed Management (Undergraduate course, Teaching Assistant)

Faculty of Agronomy and Forestry Engineering, Pontificia Universidad Católica de Chile. Climatology (Undergraduate Course, Teaching Assistant)

### **Significant Publications**

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#### **Peer Reviewed Publications**

Meza F., Vicuña S., Jelinek M., Bustos E., **Bonelli S.** (Accepted, *Journal of Water and Climate Change*). Climate change and water conflicts in snow dominated regions: Assessing sensitivity of water demands and coverage in the urban and rural sectors in central Chile.

**Bonelli S.**, Vicuña S., Meza F. (Accepted, *Journal of Water and Climate Change*). Incorporating climate change adaptation strategies in urban water supply planning: The case of central Chile.

#### **Non-Peer Reviewed Publications**

**Bonelli S.**, Meza F. (2012). Abastecimiento de agua en la cuenca del Maipo: Cómo enfrentar el cambio climático. Revista Agronomía y Forestal, Pontificia Universidad Católica de Chile.

**Brief Personal Description:**

I am currently working in the "Centro Interdisciplinario de Respuesta al Cambio y Variabilidad Climática" (CIRCVC) as part of an interdisciplinary research team that provides integrated answers to complex problems related to climate change and climate variability. Through my work in here I participated in several inter and trans-disciplinary projects, covering a range of subjects such as: national institutional and political climate change frameworks, national climate change capacities, agricultural adaptation to climate change, science-policy interphase in draught contexts, Conservation Institutional, Policy and Legal frameworks. My background is in International Relations and I am currently about to finish an Interdisciplinary Master's degree on Integrated Coastal Zone Management also from UdelaR and EI. This program has a hard focus on interdisciplinary approaches and team work. My thesis research project is funded by the Uruguayan Agencia Nacional de Investigación e Innovación (ANII) and integrates my main research interests, International Relations, Climate Change and Integrated Coastal Zone Management through the concept of International Public Policy Transfer and Epistemic Communities.

**Educational Qualifications:**

BA International Relations, M.Sc. Integrated Coastal Zone Management (in progress).

**Employment History:**

2011-2014	Research Assistant – Centro Interdisciplinario de Respuesta al Cambio y Variabilidad Climática, Espacio Interdisciplinario, Universidad de la República
2011-2014	International Relations Area – Unidad de Posgrados y Educación Permanente, Facultad de Agronomía, Universidad de la República.
2009-2011	Admin. Assistant - Unidad de Posgrados y Educación Permanente, Facultad de Agronomía, Universidad de la República.

**Research Experience:**

2013-2014	Tesis de Maestría - La transferencia internacional de políticas públicas y las comunidades epistémicas: el caso del Manejo Costero Integrado y el Cambio Climático en el Uruguay.
2013	Fortalecimiento de la efectividad del Sistema Nacional de Áreas Protegidas incluyendo el enfoque de paisaje en la gestión (Proyecto URU/12/G32). Institutional, legal and policy advisor.
2012-2013	Risk Assessment Methodological Trial: The Case of La Paloma Port, Uruguay.

**Significant Publications:**

Dieguez, F., Toranza, C., Caorsi, M.L., **García, M.**, (2013, in print). “*Construyendo Interdisciplina en torno al Cambio y a la Variabilidad Climática: Reflexiones sobre el trabajo del CIRCVC*” en “Cambio y variabilidad climática: vínculos ciencia-política y ciencia-sociedad”, Cap. 7.

**García, M.**, Taks, J., (2013, in print). “*Transferencia internacional de políticas públicas y Comunidades Epistémicas: el caso del Manejo Costero Integrado y el Cambio Climático en el Uruguay*” en “Cambio y variabilidad climática: vínculos ciencia-política y ciencia-sociedad”, Cap. 5.

**Brief Personal Description:**

I am a PhD candidate at "Centro de Investigaciones en Geografía Ambiental" (CIGA, Universidad Nacional Autónoma de México), where I am currently researching and developing, as part of an interdisciplinary research team, models of land use/cover change as the primary indicator of social-environment interactions and observing their impacts at the forest-cover level. Additionally I have been focused on implementing and developing ecological-niche models, using the DINAMICA EGO platform in order to assess the impact of deforestation in the potential distribution of species. During my academic experience I have contributed in several aspects, such as: monitoring and assessing the deforestation process in México, generating socioeconomic data bases to assess the process of deforestation at local and regional level and finally improving spatial assessment tools for the analysis of deforestation process. My background is in Biology with a Master degree in Geography with emphasis in the integrated landscape management approach.

**Educational Qualifications:**

B.Sc. in Biology, Master in Geography, PhD in Geography with emphasis in socio-environmental systems (in progress).

**Research Experience:**

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| 2013 - 2014 | Centro de Investigación en Gestión de Riesgos y Cambio Climático, Universidad de las Ciencias y Artes de Chiapas. Research adviser. Project: Updating State Climate Change Program for Chiapas, (OT-011-13). |
| 2011 - 2013 | Centro de Investigaciones en Geografía Ambiental, UNAM. GIS -Technical support. Project: Development and implementation of prospective land use/cover change models in Mexico, (IN113511-PAPIIT).            |
| 2009        | Centro de Investigaciones en Geografía Ambiental, UNAM. Master Thesis: From remote sensing to social perception: deforestation and conservation (1971-2000) in the Biosphere Reserve Sierra de Manantlán.    |

**Teaching Experience:**

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|-----------|---|
| 2013      | Faculty of Science, UNAM. Graduate level course: Modeling environmental processes with DINAMICA EGO program.<br>( <a href="http://www.educontinua.fciencias.unam.mx/SiteNuevo/Cursos/ProcesosAmbientalesEGO/MasInfo.php">http://www.educontinua.fciencias.unam.mx/SiteNuevo/Cursos/ProcesosAmbientalesEGO/MasInfo.php</a> ) |
| 2011-2012 | Centro de Investigaciones en Geografía Ambiental, UNAM. Graduate level course: Modeling potential distribution with Maxent and DINAMICA EGO.  |
| 2009      | Centro de Investigaciones en Geografía Ambiental, UNAM. Graduate level course Introduction to local spatial knowledge: concepts principles and applications (Participatory GIS).  |

**Significant Publications:**

**M. Farfán** et al., 2012. Interpolating socioeconomic data for the analysis of deforestation: A comparison of methods, Journal of Geographic Information System.

<http://www.scirp.org/Journal/PaperInformation.aspx?paperID=22155#.U8Vt3kCTETQ>

Mas, J.F., Soares Filho, B., Pontius Jr., R.G., **Farfán, M.**, Rodrigues, H., 2013. A suite of tools for ROC analysis of spatial models. Int. J. Geo-inf. 2 (3), 869-887. <http://www.mdpi.com/2220-9964/2/3/869>.

Escalante T., **Farfán M.**, Rodríguez G y Robayo A. Cambio de Uso de suelo: afectaciones y tendencias en Zacatecas, La Biodiversidad en Zacatecas: Estudio de Estado. (CONABIO <http://www.conabio.gob.mx/>). In process of publication.

### **Brief Personal Description**

I studied Architecture at the University of the Republic (Uruguay), Sustainable Urban Planning at the Federal University of Paraná (Brazil), and Asia-Pacific Metropolis Planning in the Ecole d'Architecture de Paris La Villette (France), have also received several training courses in climate change policy making, primarily in adaptation. I had an early research experience in urban planning for flood risk management and urban sustainable development. I also have 5-years of professional experience in climate change adaptation advising and general climate change policy-making at national and subnational levels.

### **Relevant Climate Change Policy-Making Experience**

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#### ***National Climate Change Response System Institutional Strengthening Project (Uruguay)***

Role: General Coordination.

#### ***Territorial Approach to Climate Change Project (Metropolitan Region)***

Role: Adaptation advisor

### **Other Work Experience**

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Assistant Professor, Urban Economics, University of the Republic, Uruguay.

Researcher, Urban Planning and Land Taxation, School of Architecture, University of the Republic, Uruguay.

### **Contributions to Public Policy Publications**

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- National Climate Change Response Plan (Chapter on Information and Chapter on Built Environment and Health)
- Metropolitan Climate Plan (Chapter on Adaptation and Chapter on Transportation Mitigation)
- 5 Years of NCCRS Actions (General Coordination of the Publication)
- Several Policy Brief Documents and Technical Advisory Documents, Climate Change Public Policy Making

## References

- Barabasi, A. L., H. Jeong, E. Néda Ravasz, A. Schubert, and T. Vicsek. 2002. Evolution of the Social Network of Scientific Collaborations. *Physica A* 311: 590-614.
- Börner, K., N. Contractor, H.J. Falk-Krzesinski, S.M. Fiore, K.L. Hall, J. Keyton, and B. Uzzi. 2010. A multi-level systems perspective for the science of team science. *Science Translational Medicine* 2(49): 24-49.
- Bresman, H. and M. Zellmer-Bruhn. 2013. The structural context of team learning: Effects of organizational and team structure on internal and external learning. *Organization Science* 24(4): 1120-1139.
- Castellanos, E.J., C. Tucker, H. Eakin, H. Morales, J.F. Barrera, and R. Díaz. 2013. Assessing the adaptation strategies of farmers facing multiple stressors: Lessons from the Coffee and Global Changes project in Mesoamerica. *Environmental Science & Policy* 26: 19-28.
- Clark, A. M., K.A. Narine, Z.Y. Hsu, K.S. Wiens, and T.J. Anderson and J.R. Dyck. 2014. Preparing Today's Cardiovascular Trainees to Meet the Challenges of Tomorrow: Team Research and Interdisciplinary Training. *Canadian Journal of Cardiology* 30(6): 683-686.
- Cornell, S. et al. 2013. Opening up knowledge systems for better responses to global environmental change. *Environmental Science and Policy* 28: 60-70.
- Creswell, J.W. 2013. *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage.
- Eigenbrode, S.D. et al. 2007. Employing philosophical dialogue in collaborative science. *BioScience* 57(1): 55-64.
- Farhat, D. 2011. Virtually science: an agent-based model of the rise and fall of scientific research programs. *Journal of Economic Methodology* 18 (4): 363-385.
- Farhat, D. 2013. An agent-based model of interdisciplinary science and the evolution of scientific research networks. *University of Otago Economics Discussion Papers No. 1302*, 12 pp.
- Fiore, S.M., K.A. Smith-Jentsch, E. Salas, N. Warner and M. Letsky. 2010. Towards an understanding of macrocognition in teams: developing and defining complex collaborative processes and products. *Theoretical Issues in Ergonomics Science* 11(4): 250-271.
- Fischhoff, B. 2013. The sciences of science communication. *PNAS* 110(3): 14033-14039.
- Fjelland, R. 2002. Facing the problem of uncertainty. *Journal of Agricultural and Environmental Ethics* 15(2): 155-169.
- Funtowicz, S. and C. Hidalgo. 2008. Ciencia y política con la gente en tiempos de incertidumbre, conflictos de intereses e indeterminación. In: *Apropiación Social de la Ciencia*. Ed: López-Cerezo, J. A., Gómez-González, F. J. Biblioteca Nueva, Madrid.
- Gable, G.G. 1994. Integrating case study and survey research methods: An example in Information Systems. *European Journal of Information Systems* 3(2): 112-126.

- Gilbert, N. and K.G. Troitzsch, K. G., 2005. Simulation and social science. In: *Simulation for the Social Scientist*. Ed: Gilbert, N., Troitzsch, K. G., pp. 1-14.
- Hidalgo, C., Natenzon, C., Podestá, G., 2011. From enthusiasm to pragmatism: Shifting perspectives of success in Interdisciplinary Research. *Interciencia*. 36:21;113-120.
- Lemos, M.C. and B.J. Morehouse. 2005. The co-production of science and policy in integrated climate assessments. *Global Environmental Change* 15: 57-68.
- Natenzon, C. 2001. *Inundaciones y cambio climático como problemática interdisciplinaria*. Primer Encuentro sobre Adaptación de la Ciudad de Buenos Aires y Area Metropolitana al Cambio Climático.
- Newman, M.E.J. 2001. The structure of scientific collaboration networks. *Proceedings of the National Academy of Sciences* 98(2): 404-409.
- Olsen, S.B. 2003. Frameworks and indicators for assessing progress in integrated coastal management initiatives. *Ocean & Coastal Management* 46: 347-361.
- Olsen, S., J. Tobey, and M. Kerr. 1997. A common framework for learning from ICM experience. *Ocean & Coastal Management* 37(2): 155-174.
- Ostrom, E. 2007. A diagnostic approach for going beyond panaceas. *Proceedings of the National Academy of Sciences* 104(39): 15181-15187.
- Pahl-Wostl, C., C. Giupponi, K. Richards, C. Binder, A. de Sherbinin, D. Sprinz, T. Toonen, and C. van Bers. 2013. Transition towards a new global change science: Requirements for methodologies, methods, data and knowledge. *Environmental Science and Policy* 28: 36-47.
- Pyka, A., N. Gilbert, and P. Ahrweiler. 2007. Simulating knowledge: Generation and distribution. *Processes in Innovation Collaborations and Networks, Cybernetics and Systems: An International Journal* 38(7): 667-693.
- Rojas-Villafane, J.A. 2010. An Agent-based Model of team coordination and performance. *FIU Electronic Theses and Dissertations*. Paper 250.
- Shea, M. and C. Mozafari 2014. Communicating complexity in transdisciplinary science teams for policy: applied stasis theory for organizing and assembling collaboration. *Communication Design Quarterly Review* 2(3): 20-24.
- Stokols, D. 2006. Toward a science of transdisciplinary action research. *American Journal of Community Psychology* 38: 63-77.
- Stokols, D., K.L. Hall, B.K. Taylor, and R.P. Moser. 2008. The science of team science: Overview of the field and introduction to the supplement. *American Journal of Preventive Medicine* 35(2): 77-89.
- Watkins, C., D. Massey, J. Brooks, K. Ross, and M.L. Zellner. 2013. Understanding the mechanisms of collective decision making in ecological restoration: An agent-based model of actors and organizations. *Ecology and Society* 18(2): 32.
- Zellner, M.L. 2008. Embracing complexity and uncertainty: The potential of agent-based modeling for environmental planning and policy. *Planning Theory and Practice* 9(4): 437-457.