

# Introduction to the special issue: negotiating boundaries: effective leadership of interdisciplinary environmental and sustainability programs

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**Abstract** This special issue explores challenges and opportunities confronting higher education related to leadership at a variety of levels and the creation of linkages between students, faculty, administration, and community stakeholders necessary to address the many “wicked problems” facing society. One common thread among all the papers is that higher education is being challenged to collectively reexamine and change the paradigms under which they operate. Each of the articles express

explicitly or implicitly that change happens through relationships and negotiating boundaries. The papers in this issue explore the challenges of leadership and program development at different scales from student and faculty learning to institutional initiatives that span across an entire campus. The leadership, relationship development, and boundary crossing experiences presented in the papers in this issue address four primary themes—Interdisciplinary Team Building Strategies, Curriculum and Community Connections, Institution-Level Leadership and Perspectives, and Interdisciplinary Leadership and Scholarship Support. Each of the individual papers address a pressing need in interdisciplinary and transdisciplinary work for development of effective, situation-relevant methods for negotiating disciplinary and professional boundaries.

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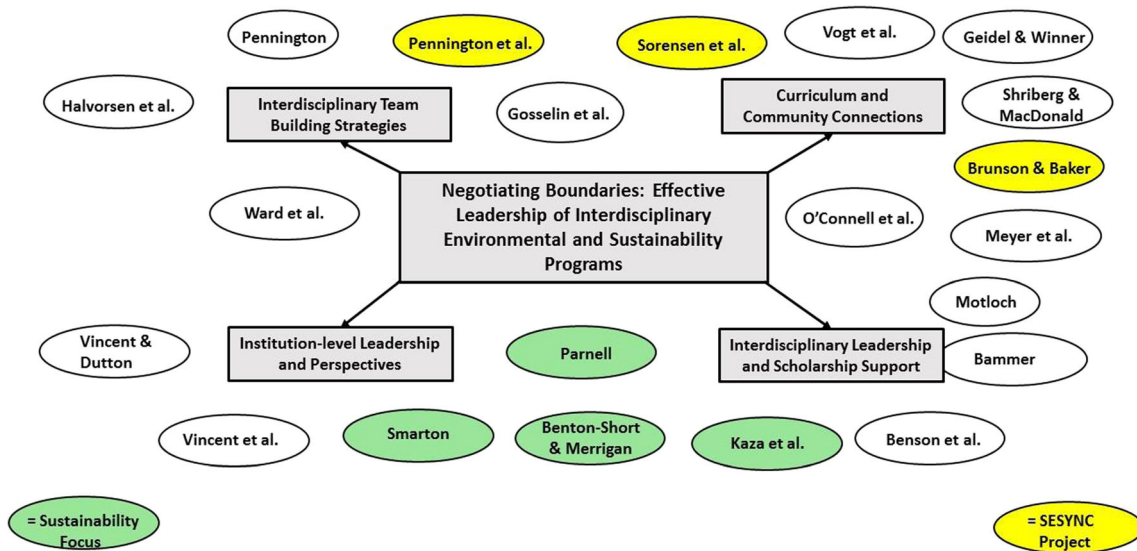
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## Introduction

One of the biggest challenges for higher education is creating effective interdisciplinary and transdisciplinary linkages to address the many “wicked problems” facing society. Wicked problems are real life challenges involving complex systems that are characterized by legitimate, competing values, difficult to predict cause and effect relationships, high degrees of uncertainty, and multilevel social interactions (Rittel and Webber 1973). Interdisciplinary environmental (environmental studies and science and similar) and sustainability education and research programs have proliferated on college and university campuses since the late 1960s some earlier if you include programs in natural resource management to confront the many

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**Fig. 1** A model that illustrates the relationships between and among papers in the context of four themes

wicked problems created as a consequence of human-environment interactions. At the heart of the challenge is developing institutional structures, leadership, relationships, and curricula that provide faculty and students the ability to transcend disciplinary boundaries to address issues related to complex, coupled human-nature systems.

This special issue of the *Journal of Environmental Studies and Science*, entitled “*Negotiating Boundaries: Effective Leadership of Interdisciplinary Environmental and Sustainability Programs*,” explores the challenges of leadership and program development at different scales from student and faculty learning to institutional initiatives that span across an entire campus. The issue will explore the types of boundaries encountered by environmental and sustainability programs and mechanisms that have been used to negotiate them, methods for cooperative program building, practical techniques for promoting effective interdisciplinary leadership, and approaches for developing current and future generations of environmental and sustainability leaders.

One common thread among all the papers in this issue is that higher education is being confronted and challenged to collectively reexamine and change the paradigms under which they operate. Higher education needs to more effectively develop collaborations within colleges and universities and with external partners to address the many environmental challenges posed by human activities and prepare today’s students to meet future intellectual and workforce demands. Each of the articles express explicitly or implicitly that change happens through relationships and negotiating boundaries. These relationships and boundary crossing activities serve to enhance the quality of our work as educators and scholars. They provide the foundation for the expansion of interdisciplinarity and the practice of sustainability within the academy as well as the local and global community.

The leadership, relationship development, and boundary crossing experiences presented in the papers in this issue fall into four primary themes (Fig. 1)—Interdisciplinary Team Building Strategies (Table 1), Curriculum and Community Connections (Table 2), Institution-Level Leadership and Perspectives (Table 3), and Interdisciplinary Leadership and Scholarship Support (Table 4). Figure 1 is a model that illustrates the relationship between and among papers related to the four themes. Papers that have components of two themes are plotted between the two theme boxes. For example, Parnell (2015) has components that relate to Institutional-level Leadership and Perspectives and Interdisciplinary Leadership and Scholarship Support. Papers highlighted in gray specifically address the institutionalization of sustainability at a particular institution.

Another component of this special issue is three articles summarized by Hawthorne and Wei (2016). These contributions focus on three projects supported by the Socio-environmental Synthesis Center (SESYNC) whose focus is the synthesis of information, models, theories and approaches from the biophysical and social sciences to understand environmental challenges in ways that inform solutions. The contributions of Pennington et al. (2015), Sorensen et al. (2015) and Brunson and Baker (2015) use various approaches to the challenge of negotiating boundaries by improving integration across the natural and social sciences, addressing those skills needed for effective integration at both individual and group levels, and developing strategies and approaches for building those skills in undergraduate and graduate students.

**Interdisciplinary team building strategies**

Halvorsen et al. (2015), Gosselin et al. (2015) and Pennington (2015) examine the complexity of team formation (Table 1). A

**Table 1** Papers that focus on interdisciplinary team building strategies

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| -Pennington—A conceptual model for knowledge integration in interdisciplinary teams: Orchestrating individual learning and group processes |
| -Halvorsen et al.—A case study of strategies for fostering international interdisciplinary research  |
| -Gosselin et al.—Lowering the walls and crossing boundaries: applications for experiential learning to teaching collaboration              |

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key factor identified in all of these papers is that the development of successful teams is an emergent process that takes time and intentional action. It is clear that we need to move past the simplistic notion that if we put people in a room who have an interest in a topic/issue/project that a successful team will emerge. Of course, the lack of effectiveness of this type of an approach seems rather obvious, but if we take time to reflect on our own team-related experiences, this approach is used far more often than we care to admit.

The approaches provided in Pennington (2015) and Halvorsen et al. (2015) are well anchored and supported by an extensive literature related to the Science of Team Science (Committee on the Science of Team Science 2015) and the literature on accelerated sustainability transitions and small group team creation, development, and management, respectively. Pennington (2015) synthesized the findings from empirical studies of integrative research teams into a conceptual model (see Fig. 1 in Pennington 2015) that when applied should lead to the more effective emergence of an integrated and shared research vision that results from individual, team, and system-level interactions.

Based on a review of the literature, Halvorsen et al. (2015) identifies six principles for successful team development. An underlying theme of these principles is the importance of investing time in relationship building and the development of shared expectations and goals. They apply and assess the effectiveness of their international, interdisciplinary research team in the context of these principles. See the article for more specific details.

Gosselin et al. (2015) used a backward curriculum design, multiple modalities of experiential learning, and a reflective action research approach to develop collaboration and teamwork skills in undergraduate students to address the challenge of developing interdisciplinary teams. The Environmental Studies (ES) program at the University of Nebraska-Lincoln (UNL) has partnered and used business-based professional assessments from Target Training International Ltd. (TTI), to help students understand the importance of knowing self and understanding and adapting their behavioral and motivational characteristics of their teammates in the creation of interdisciplinary teams. The application of these instruments informs students and the instructors about the visible and invisible barriers that may influence their abilities to collaborate in

interdisciplinary teams. These assessments and the experiential approach used helped the students identify certain mixtures of behavioral styles and motivational drivers that may be problematic to group work and had them learn explicitly learn and practice the factors that go into effective collaboration, especially as it relates the development of a shared vision for the project.

## Curriculum and community connections

The papers by Geidel and Winner (2015), Meyer et al. (2015), O'Connell et al. (2015), Shriberg and MacDonald (2015), and Vogt et al. (2015) provide their perspectives on one of the primary roles of higher education (Table 2). That is, to prepare today's students to meet future intellectual and workforce demands through scholarship, research, practice, and informed citizenship. At the heart of this preparation is the curriculum and connections among the community that need to evolve so students can effectively address important societal issues and challenges.

As documented by Geidel and Winner (2015), the emergence of environmental science (ES) degrees in higher education began in the 1960s as a result of increased public concern and interest about the relationship between human impact on the environment and the desire to protect human health. These programs were some of the first to explore the relationships between humans and nature using an interdisciplinary approach. Since their emergence, those engaged in environmental science have consistently struggled against the perspective of colleagues in engineering and traditional science departments related to academic rigor and depth. Geidel and Winner effectively build the case that ES is a Science, Technology, Engineering and Math (STEM) discipline. ES meets the qualifications as a STEM discipline for four reasons: 1. ES is grounded in the scientific method and the process of discovery; 2. ES is empirical and predictive; 3. ES is rigorous in its provision of specific skills for analytical analysis; and 4. ES provides students with critical thinking skills. As a mature

**Table 2** Papers that focus on curriculum and community connections

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| -Geidel and Winner—Environmental Science: The Interdisciplinary STEM Field   |
| -Meyer et al.—Sustainability science graduate students as boundary spanners  |
| -O'Connell et al.—Supporting interdisciplinary teaching about the Earth with the InTeGrate website   |
| -Shriberg and MacDonald—Sustainability Leadership Programs in Higher Education: Alumni Outcomes and Impacts                                  |
| -Vogt et al.—Urban Forestry and arboriculture as interdisciplinary environmental science: importance and incorporation of other disciplines. |

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science, it appeals to students and prepares them for meaningful careers in a growing area in the workforce.

As programs in Environmental Sciences, Environmental Studies, and other interdisciplinary fields have emerged, the intimately related field of sustainability has expanded and grown over the last 2 decades, and more specifically, since 2008 (Vincent et al., this volume). Although not done as often as it should be, Shriberg and MacDonald (2015) assess the effectiveness of sustainability leadership programs from the perspective of connecting the needs of alumni, developing stronger programs, and improving curriculum. This is one of the first empirical studies of sustainability leadership programs from the perspective of alumni. In general, alumni are highly satisfied with the programs despite a diverse set of interests and demands. This study revealed some potential gaps between academic training, the literature on competencies, and needs in a professional setting. The empirical evidence supports the need for more practice-oriented skills such as negotiation, public speaking, facilitation, and coalition building. These needs may come from faculty competencies and delivery mechanisms, which are more likely to emphasize knowledge and readily available curricula on self-discovery as opposed to the more difficult to teach concepts of communication, systems thinking, and team building. The overall conclusion is that these programs are providing strong education and support for emerging sustainability leaders from the perspective of alumni.

Continuing with the theme of collecting data to strengthen curriculum and training related to sustainability, Meyer et al. (2015) used a mixed methods approach, including a quantitative survey and autoethnographic reflection, as a framework for a case study of the Sustainability Solutions Initiative at the University of Maine to identify key elements for graduate education training in sustainability science (SS). They explicitly explore the broad question: What aspects of graduate education are necessary to prepare new researchers to successfully engage in SS? They offer six recommendations for training future sustainability scientists that ground graduate students in theory and methodologies of SS, provide explicit expectations, and provide training in stakeholder engagement. If these recommendations are implemented, Meyer et al. contend that next generation of sustainability scientists will be better prepared to navigate the many boundaries that exist among individuals, disciplines, and institutions when tackling the wicked problems related to sustainability.

Vogt et al. (2015) stipulate that interdisciplinary education is fundamental to the preparation of students in the field of urban forestry and arboriculture. Interdisciplinary education as defined by these authors means teaching students to use knowledge from other disciplines such as anthropology, biology, economics, political science, urban planning, and more to manage urban forests and trees. These authors present the

results of snowball sampling survey of institutions of higher education across the globe and a targeted survey of individuals that teach courses and who have leadership roles (e.g., deans, program chairs, department heads) at institutions in the USA that have coursework in urban forestry or arboriculture. The specific intent of the survey was to assess “how interdisciplinary urban forestry/arboriculture curricula (whether single courses or entire degrees) are at institutions, and the importance and incorporation of various key concepts from other disciplines within urban forestry and/or arboriculture?” Their survey revealed that while disciplines and concepts from the natural sciences are relatively well incorporated into existing curricula, concepts from the social sciences are not incorporated into most programs. Furthermore, they indicate that future research on interdisciplinary education should synthesize the specific interdisciplinary learning objectives across programs, and then design assessment tools and indicators to evaluate student achievement of these objectives.

O’Connell et al. (2015) highlight the importance of interdisciplinary teaching to creatively, effectively, and ethically address today’s grand, Earth-related, societal challenges. These authors highlight the components of a community-based resource, the InTeGrate website that is designed to provide a more holistic approach to helping faculty in any discipline bridge silos and address Earth-related societal challenges with their students. The website includes effective, tested, community-contributed strategies for incorporating interdisciplinary perspectives using example interdisciplinary teaching activities and course descriptions, and sections addressing teaching specific interdisciplinary topics and themes. The website contains advice and examples of a spectrum of ways to build connections between disciplines, from starting small with a guest speaker in a single course to a fully interdisciplinary curriculum. Teaching activities and course descriptions give concrete ideas of how various interdisciplinary teaching strategies play out in the classroom. Results and recommendations from workshop participants provide a way to jump into the middle of rich, interdisciplinary discussions, including environmental justice, risk and resilience, and system thinking.

### **Institution-level leadership and perspectives**

As the papers highlighted in the previous section illustrate, there has been a growth in the diversity of interdisciplinary environmental and sustainability (IES) programs (Table 3). With this growth has come a diversification of perspectives and leadership approaches to IES programs. Vincent and Dutton (2015) report on the work of the Center for Environmental Education Research (CEER) of the National Council for Science and the Environment (NCSE) whose mission is to better understand the structure and curricula of



**Table 3** Papers that focus institution-level leadership and perspectives

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| -Benton-Short and Merrigan—Beyond interdisciplinarity: how sustainability creates opportunities for pan-university efforts.   |
| -Parnell—Grassroots participation integrated with strong administration commitment is essential to address sustainability leadership: tools for successfully meeting in the middle. |
| -Smardon—Book Review—“The Nine Elements of a Sustainable Campus” by Mitch Thomashow   |
| -Vincent and Dutton—Three leadership perspectives on US interdisciplinary environmental and sustainability programs: a review.....  |
| -Vincent et al.—Interdisciplinary environmental and sustainability education: islands of progress in a sea of dysfunction.  |
| -Ward et al.—Institutionalizing interdisciplinary sustainability curriculum at a large, research-intensive university: challenges and opportunities                                 |

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interdisciplinary environmental and sustainability (IES) education and research programs in the USA.

Although there are statistical differences in perspectives regarding curriculum design and leadership foci, there are characteristics that the programs in the growing IES field have in common. These include the following:

*Goal:* To prepare graduates to be sustainability-oriented problem solvers through scholarship, research, practice, and informed citizenship.

*Focus of study:* The interfaces and interactions between human and natural systems (coupled human-nature systems).

*Educational approach:* A holistic educational approach that focuses on interdisciplinary knowledge and insights gained from systems approaches and diverse epistemological viewpoints to understand environmental problems and devise solutions. It includes key concepts from the natural sciences, the social sciences, the applied sciences, and the humanities. Problem solving is conducted using a systems approach rather than a traditional reductionist approach.

*Key learning outcomes:* Disciplinary synthesis and systems-thinking cognitive skills; knowledge of the sociopolitical and natural aspects of environmental problems, understanding of the limits of technology and science for solving environmental problems, and the importance of acknowledging and reporting uncertainty.”

Despite the urgent need and increasing demand for IES education and research to solve critical environmental and sustainability challenges, Vincent et al. (2015) demonstrate and discuss how the majority of IES programs suffer from limited resources or unequal standing relative to the traditional disciplines. As noted in Geidel and Winner (2015), this unequal standing has existed since the birth of the first IES programs in the 1960s. If one would take a casual business

perspective regarding the urgent need and increasing demand, one might expect that the cost-benefit to colleges and universities to having effective IES programs would have led to generous support. Unfortunately, the majority of IES programs (68 %) suffer from insufficient resources and in many cases do not hold equal standing relative to the traditional disciplines at most colleges and universities. In addition to resources, many IES programs lack administrative autonomy. Administrative independence and the capacity to obtain and direct resources are intimately tied to the fundamentals of effective IES program design.

Benton-Short and Merrigan (2015), Parnell (2015), and Ward et al. (2015) provide excellent examples of approaches that can be used to create new opportunities for transforming institutions of higher education from the perspective of IES programming. Benton-Short and Merrigan (2015) present the experiences from George Washington (GW) University to diversify and expand sustainability education and function using what they refer to as a pan-university approach. In their paper, they document the challenges and obstacles to “creating a genuinely pan-university effort that seeks to escape the traditional ‘silos’ of schools and departments” and to move towards a transdisciplinary approach for their academic program in sustainability. One of the key features of GW’s Academic Program in Sustainability is that it does not reside in any one academic unit, college or school. It resides in the Office of the Provost and as a result sustainability belongs to all schools.

Parnell (2015) describes the efforts at Northern Arizona University (NAU) to integrate university operations and academic programs to help create and enhance a culture of sustainability across the organization. To effectively develop the culture, the needs of students, faculty, planning, budgeting, and decision-making processes of senior administrators need to be integrated. The integration approach used at NAU addressed sustainability leadership at an institutional level, across the range of organization models, from centralized to distributed. A common element used to address many challenges involved both top-down commitment, combined with bottom-up participation in the development and implementation of new efforts in sustainability education and operations. “Silo bridging” was essential to the process.

Ward et al. (2015) document the interdisciplinary sustainability educational initiatives at the University of Utah where they embraced a “silo bridging” approach similar to that used at NAU. The strategies they used involved “top-down, bottom-up, and middle-out” efforts. Furthermore, Ward et al. (2015) document a diverse set of approaches, some that worked well and others not-so-well, that are necessary in the context of a highly decentralized, research university. Two of the most important lessons learned in at Utah was the importance of relationship building in the creation of courses, certificates, workshops, and learning communities, and to avoid the creation of orphan programs that do not have broad

support from existing institutional structures and will be viewed as a budgetary competitor or turf intruder.

Many of the components documented in the papers above manifest themselves in Mitch Thomashow's book "The Nine Elements of a Sustainable Campus" reviewed by Smardon (2015). According to the reviewer, "this book is a must read for those at institutions of higher learning who are interested in sustainability best practices planning and implementation" at the institutional level. The book also benefits from the personalized accounts of experiences with moving sustainability best practices forward as they relate to each of the nine elements involved with institutionalization of sustainability on higher education campuses.

### Interdisciplinary leadership and scholarship support

An increasing number of faculty recognize the need for integrative scholarship that not only transcends disciplinary boundaries, but also transcends the functional boundaries of teaching, research, and community engagement if higher education is going to be a relevant player in solving the grand challenges facing society. University administrations are increasingly promoting interdisciplinary research and teaching but often without the structures in place to support the work by faculty. Faculty provide the structural foundation necessary for successful development, implementation, and leadership for any interdisciplinary environmental and sustainability program. To strengthen this foundation, it is necessary that programs be in place that promote faculty leadership as well as support pre-tenure faculty who want to engage in interdisciplinary scholarship early in their careers. The papers by Benson et al. (2015) and Kaza et al. (2015) provide insight into the components necessary for implementation of such programs (Table 4).

Based on their experiences at three interdisciplinary water resource programs (WRPs) at major research universities—University of New Mexico (UNM), University of Idaho (UI), and University of Nevada-Reno, Benson and her 12 co-authors (Benson et al. 2015) provide five specific recommendations to support interdisciplinary work and encourage faculty to build careers that work across and even beyond

rather than simply within traditional academic disciplines. These recommendations include the following: 1. creating metrics that reward interdisciplinary scholarship and net incentives for interdisciplinary work; 2. allowing faculty to "count" teaching and advising loads in interdisciplinary programs; 3. creating a "safe fail" for interdisciplinary research proposals and projects; 4. creating appropriate academic homes for interdisciplinary programs, and institutional structures for interdisciplinary programs that incentivize an investment in their success; and 5. rethinking "advancement"—developing the standards and processes for evaluation to have the flexibility to recognize research and scholarship that may differ from the norm. Benson et al. (2015) argue that through the implementation of these or similar reforms, faculty will be unchained from disciplinary-bound expectations and pursue the high-risk/high-reward nature of interdisciplinary work so that higher education can more effectively address and respond to the environmental challenges facing our rapidly changing world.

Bammer (2015) calls for the development of a new discipline, Integration and Implementation Sciences (I2S), that may provide an appropriate academic home as called for by Benson et al. (2015). Bammer (2015) provides an overview of I2S. She uses an analogy to the discipline of statistics and argues that I2S would function as a repository and transmission hub conveying dialogue methods, boundary setting techniques, processes for framing, and more. Motloch (2015) in his review of a new book edited by Gabriele Bammer entitled, "*Disciplining interdisciplinarity: integration and implementation sciences for researching complex real-world problems (and the deeper science challenge to co-evolve with complexity)*" indicates that Bammer and colleagues provide further details for this new discipline and how it can be an effective way to document and transmit integrative accomplishments of interdisciplinary research. This discipline is built off of well-established, internationally accepted methodology related to science. I2S would serve as a bridge-science to address complex problems and help people and communities appreciate and live within the complex system upon which they rely.

Kaza et al. (2015) summarize the findings of three assessments designed to evaluate the long-term impact of a grass-root, faculty-driven Sustainability Faculty Fellows (SFF) Program at the University of Vermont (UVM). At its most basic level, the SFF was an emergent faculty development program that promoted and provided opportunities for faculty leadership. As a result of leadership development, the SFF program demonstrated it is possible to pursue, develop, and implement sustainability education goals using a faculty learning community model without formal administrative oversight at the dean or provost level. Through the leadership efforts of SFFs, a general education requirement specifically addressing sustainability was developed and approved through the UVM Faculty Senate in 2015.

**Table 4** Papers that focus on interdisciplinary leadership and scholarship support

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| -Bammer—Negotiating boundaries, leadership, and integration and implementation sciences (I2S)   |
| -Benson et al.—Five ways to support interdisciplinary work before tenure  |
| -Kaza et al.—Developing sustainability leadership through faculty professional development  |
| -Motloch—Book Review—"Disciplining interdisciplinarity: integration and implementation sciences for researching complex real-world problems (and the deeper science challenge of to co-evolve with complexity) edited by Gabrielle Bammer |

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The papers in this special issue address a variety of challenges and opportunities confronting higher education related to leadership at a variety of levels. Each paper provides examples of how higher education is collectively reexamining and changing the paradigms under which they operate. A common feature of all these articles, either explicitly or implicitly, is that change happens through the development of effective relationship and skill sets to negotiate many types of boundaries at different scales. One of the most important contributions of this special issue is it highlights success stories from higher education where the effectiveness of teamwork has improved its ability to engage in societal issues.

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## References

- Bammer G (2015) Negotiating boundaries, leadership, and integration and implementation sciences (I2S). *J Environ Stud Sci*. doi:10.1007/s13412-015-0325-x
- Benson MH, Lippitt CD, Morrison R, Cosens B, Boll J, Chaffin BC, Fremier AK, Heine R, Kauneckis D, Link TE, Scruggs CE, Stone M, Valentin V (2015) Five ways to support interdisciplinary work before tenure. *J Environ Stud Sci*. doi:10.1007/s13412-015-0326-9
- Benton-Short L, Merrigan KA (2015) Beyond interdisciplinary: how sustainability creates opportunities for pan-university efforts. *J Environ Stud Sci*. doi:10.1007/s13412-015-0341-x
- Brunson M, Baker MA (2015) Translational training for tomorrow's environmental scientists. *J Environ Stud Sci*. doi:10.1007/s13412-015-0333-x
- Committee on the Science of Team Science (2015) Enhancing the effectiveness of Team Science. The National Academies Press, Washington, D.C., p 289. doi:10.17226/19007
- Geidel G, Winner WE (2015) Environmental science: the interdisciplinary STEM field. *J Environ Stud Sci*. doi:10.1007/s13412-015-0339-4
- Gosselin D, Cooper S, Lawton S, Bonnstetter RJ, Bonnstetter BJ (2015) Lowering the walls and crossing boundaries: applications of experiential learning to teaching collaboration. *J Environ Stud Sci*. doi:10.1007/s13412-015-0312-2
- Halvorsen KE, Knowlton JL, Mayer AS, Phifer CC, Martins T, Pischke EC, Propato TS, Cavigliasso P, Garcia C, Chiappe M, Eastmond A, Licata J, Kuhlberg M, Medeiros R, Picasso V, Mendez G, Primo P, Frado A, Veron S, Dunn JL (2015) A case study of strategies for fostering international, interdisciplinary research. *J Environ Stud Sci*. doi:10.1007/s13412-015-0336-7
- Hawthorne D, Wei C (2016) Learning to integrate across natural and social sciences. *J Environ Stud Sci*. doi:10.1007/s13412-015-0358-1
- Kaza S, Natkin LW, Rowse T (2015) Developing sustainability leadership through faculty professional development. *J Environ Stud Sci*. doi:10.1007/s13412-015-0330-0
- MacDonald L, Shriberg M (2015) Sustainability leadership programs in higher education: alumni outcomes and impacts. *J Environ Stud Sci*. doi:10.1007/s13412-015-0344-7
- Meyer SR, Levesque VR, Bieluch KH, Michelle L, Johnson ML, McGreavy B, Dreyer S, Smith H (2015) Sustainability science graduate students as boundary spanners. *J Environ Stud Sci*. doi:10.1007/s13412-015-0313-1
- Motloch JL (2015) Gabriele Bammer (ed): disciplining interdisciplinarity: integration and implementation sciences for researching complex real-world problems (and the deeper science challenge to co-evolve with complexity). *J Environ Stud Sci* doi 10.1007/s13412-015-0303-3
- O'Connell K, Bruckner MZ, Manduca CA, Gosselin DC (2015) Supporting interdisciplinary teaching about earth with the InTeGrate website. *J Environ Stud Sci*. doi:10.1007/s13412-015-0317-x
- Parnell R (2015) Grassroots participation integrated with strong administrative commitment is essential to address challenges of sustainability leadership: tools for successfully meeting in the middle. *J Environ Stud Sci*. doi:10.1007/s13412-015-0319-8
- Pennington D (2015) A conceptual model for knowledge integration in interdisciplinary teams: orchestrating individual learning and group processes. *J Environ Stud Sci* (in production)
- Pennington D, Bammer G, Danielson A, Gosselin D, Gouvea J, Habron G, Hawthorne D, Parnell R, Thompson K, Vincent S, Wei C (2015) The EMBeRS project: employing model-based reasoning in socio-environmental synthesis. *J Environ Stud Sci*. doi:10.1007/s13412-015-0335-8
- Rittel H, Webber M (1973) Dilemmas in a general theory of planning pp. 155–169, policy sciences, Vol. 4, Elsevier Scientific Publishing Company, Inc., Amsterdam 1973
- Smardon R (2015) Mitchell Thomashow: the nine elements of a sustainable campus. *J Environ Stud Sci*. doi:10.1007/s13412-015-0282-4
- Sorensen AE, Jordan RC, Shwom R, Ebert-May D, Isenhour C, McCright AM, Robinson JM (2015) Model-based reasoning to foster environmental and socio-scientific literacy in higher education. *J Environ Stud Sci*. doi:10.1007/s13412-015-0352-7
- Vincent S, Dutton K (2015) Three perspectives on US interdisciplinary environmental and sustainability programs: a review of the findings of the 2003–2014 studies of the center for environmental education research, national council for science and the environment. *J Environ Stud Sci*. doi:10.1007/s13412-015-0281-5
- Vincent S, Roberts JT, Mulkey S (2015) Interdisciplinary environmental and sustainability education: islands of progress in a sea of dysfunction. *J Environ Stud Sci*. doi:10.1007/s13412-015-0279-z
- Vogt J, Fischer BC, Haue RJ (2015) Urban forestry and arboriculture as interdisciplinary environmental science: importance and incorporation of other disciplines. *J Environ Stud Sci*. doi:10.1007/s13412-015-0309-x
- Ward M, Bowen B, Burian S, Cachelin A, McCool D (2015) Institutionalizing interdisciplinary sustainability curriculum at a large, research-intensive university: challenges and opportunities. *J Environ Stud Sci*. doi:10.1007/s13412-015-0315-z