Message from the President

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It is with great pleasure that I take the opportunity as AIS’s new president to write directly to you, esteemed members of the Association for Interdisciplinary Studies and readers of Integrative Pathways. This is a special honour, because I realize that it is extraordinary to have the support of the membership, board of directors and past presidents of AIS to become its first president from outside the North American continent in its 35 year history. For me, this demonstrates the open-mindedness and curiosity of the interdisciplinarians assembled in AIS, embracing a president from a different institutional context, who speaks a different language, who might bring along unfamiliar experiences and other idiosyncrasies that could create some extra confusion now and then. However, this in fact appears to suit AIS well, as the AIS president doesn’t receive a hammer but rather is handed over a spoon when the leadership changes, since interdisciplinary are expected to “stir up problems.” Moreover, as most of you will share my experiences (which started with first joining AIS and attending its conference in 2006), the openness and curiosity of AIS members and its board are genuine and widespread. Indeed, this willingness to stir up novel problems was demonstrated when AIS recently changed its name to the Association for Interdisciplinary—instead of Integrative—Studies, in part in order to accommodate the “foreign” perspective on terminology. (The word “integrative” is for Europeans much more associated with alternative medicine

and therapy than with integration of insights, as a search of keywords in libraries and science funds showed.) I’d like to use this message to consider a few issues which are likely to require some further stirring up, by all of us who feel committed to AIS.

In doing so, let us return to the conversation among some “cooks” who previously held the spoon. I refer to the conversation with past presidents Nelson Bingham, Julie Klein, Bill Newell, Joan Fiscella and Don Stowe, led by the immediate past president Rick Szostak at the 35th anniversary celebration of AIS during the 2013 conference at Miami University. Looking back at the history of AIS and interdisciplinarity, they shared the conviction that AIS’s involvement in promoting and facilitating interdisciplinary teaching, research and public policy has yielded many valuable results over the years. They were convinced that AIS has contributed in important ways to the increasing prominence of interdisciplinarity in academia by providing the first and longest existing professional platform for the exchange of ideas and experiences regarding interdisciplinarity. The annual AIS conferences have provided an

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opportunity for this to thousands of interdisciplinarians over the years, especially as the ambience at our conferences is always very collegial and informal. Components that they considered especially important are the publications which stem from AIS, either directly or indirectly. Through the variety—and quality—of the contents of the AIS journal, Issues in Interdisciplinary Studies, and with the appearance of several valuable volumes and textbooks, AIS has also assured a more long-lasting platform for discussion and exchange. Conferences and publications of AIS have, over the years, enhanced the mutual relationships of its members and others interested in interdisciplinarity. Moreover, these have helped to convince others that they need not invent the wheel if they want to develop an interdisciplinary program. The past presidents agreed that AIS’s mission is certainly not completed, and is still relevant today and in the future. For even though interdisciplinarity has become increasingly familiar over the decades—if not popular—within academia and its wider context, it is still, to a large extent, at odds with the disciplinary structures and associated expectations that many inside and outside of academia have about how science in general operates. In the context of this retrospective, the discussants also identified several challenges which they believed AIS is facing. I will mention a few of those that relate to some of the perspectives and plans that the AIS board has developed more recently.

One of the consequences of the peculiar nature of interdisciplinarity is the fact that developing an interdisciplinary approach, which aims at the integration of multiple insights on particular complex problems, cannot rely upon generalizable solutions. Instead, it usually requires a tailor-made toolkit of concepts, methods, practices and so on, that enable integration in the context of a particular problem and participating perspectives. The discussion by the past presidents of AIS confirmed that their engagement with interdisciplinarity in their home institutions or programs met the dual challenge of convincing their colleagues that becoming interdisciplinarian was necessary and then of specifying what interdisciplinarity could mean in their particular contexts. Even though AIS could not help them by providing any specific toolkit, AIS has assisted by identifying and making certain best practices available and in particular by helping colleagues to become capable of developing such a toolkit themselves. Meanwhile, they witnessed how interdisciplinarily flourishes not only in the contexts of general education and the social sciences, but has taken firm root as well in the sciences and humanities. They expressed hope that AIS will continue to facilitate colleagues from those domains as well.

AIS intends to remain the prime platform and venue for interdisciplinarians in all their diversity. Yet, recognizing the fact that interdisciplinarity may be different from context to context, the board of AIS has in 2014 decided to offer its members the opportunity to initiate and convene “sections.” It seemed to us that there are several topics or domains in which many of our members and other interdisciplinarians have a shared interest. Some domains could be characterized in terms of content—sustainability or the arts, for example—while other domains focus more on organizational aspects—like undergraduate education or team research. Befitting a 21st century membership organization, the Board will not itself set up and maintain the sections, however, but will facilitate them as much as possible. Any AIS member can take the initiative of establishing such a section by submitting it to aisorg@oakland.edu. The next step is then collecting enough members (who do not all need to be AIS members) to make the section viable and vital—for which perhaps a minimum of around 20 members is necessary. We will offer opportunities for the sections, depending upon their viability and activities, such as a special page on our website, listserv communication, specially sponsored panels during conferences and a column in our newsletter. We will do all this as we do appreciate such initiative and efforts very much.

Looking back at 35+ years of AIS and interdisciplinarity, other developments were also clear to the past presidents. During the early years, interdisciplinarily was a relatively new phenomenon and the unique position and merit of AIS were easily discernible. Yet with interdisciplinarily having reached the status of a buzzword, many more voices and organizations are contributing to the debates surrounding it, a welcome development. Inevitably, though, interdisciplinarily risks becoming a diluted phenomenon, a label that is easily attached to projects or programs even though these may not all have taken on the challenge of developing or adopting an appropriate toolkit or otherwise specifying what interdisciplinarily implies in their case.

A similar ambivalence pertains to recent discussions within AIS Board of Directors about this development. We are developing a variety of responses, of which I will mention only a few. We will continue to develop and publish resources regarding best practices, guidelines, assessment rubrics, the Scholarship Of Interdisciplinary Teaching and Learning, an "About
AIS intends to remain the prime platform and venue for interdisciplinarians in all their diversity. Yet, recognizing the fact that interdisciplinarity may be different from context to context, the board of AIS has in 2014 decided to offer its members the opportunity to initiate and convene “sections.” It seemed to us that there are several topics or domains in which many of our members and other interdisciplinarians have a shared interest.

Interdisciplinarity” website and so on. We believe that within the current landscape, which has widened and is populated by a much larger group of interdisciplinary practitioners, an organization with a broader mission like AIS has a significant role to play. Nonetheless, we also recognize that given this evolved landscape, it is only natural and valuable that several new and kindred organizations with somewhat different missions have started. As a board, we have established contacts with several such organizations, like Transdisciplinary-Net, Science of Team Science, Centre International de Recherches et Études Transdisciplinaires, Integration and Implementation Sciences, the Association for Core Texts and Courses, and others. We will further explore such connections and develop ways to collaborate and exchange ideas. Yet, in this context too, the Board believes that it would be a shame not to deploy the connections that many AIS members will have with these and other organizations. We hope therefore that our members are willing to share information with us regarding their other memberships and to play an active role in connecting the different networks in which interdisciplinarians participate.

Related to their observations regarding the changing landscape of interdisciplinarity, the previous “spoon-holders” agreed that more empirical data on the outcomes and impact of interdisciplinary programs would be welcome. In addition to the still existing need for guidelines and other resources mentioned above, such data would help to further strengthen the position of interdisciplinarity in an environment where quantitative information has become more relevant over the years. Moreover, they would probably also assist interdisciplinarians in improving their practices and yield new ideas for those, as we would no longer be relying only upon our collective experience.

The collection and analysis of such data is a labor-intensive task for individual researchers and programs. Nonetheless, since the board of AIS, like the past presidents, is convinced of their importance and relevance, we strongly support any initiative in this regard. Several individual board members have been approached for consultation and advice by PhD researchers who are conducting such studies, for example. Every year, our conference program contains a few presentations that focus on empirical studies of interdisciplinarity, and we certainly encourage such presentations and their publication in our own journal. We will discuss how we could foster this endeavour more. Needless to say, we would certainly welcome a section in which members and others would gather around the topic of “data about interdisciplinarity”!

Finally, realizing plans and intentions like the ones mentioned would be easier if we could enlarge the community of AIS members. The Board hopes to work on this in several ways. One way to do this is by making AIS more international than it now is. For many years, there have been a number of Canadian members, and we have had several Canadian board members, including past president Rick Szostak. And now a European has taken over the president’s spoon. We are planning to take our conference abroad by the end of this decade, first to Canada and perhaps in 2019 to Europe. It would also be wonderful if the international character of the Board were reflected more widely in our membership. We will seek to expand our membership internationally. Related to this is our aim to attract more members generally. The reason is not only to increase AIS’s vitality, but also because several plans and projects will be greatly enhanced if AIS can draw more broadly and deeply from the many capabilities and connections of its members. Indeed, the Board believes that many members will appreciate the opportunity to become more actively involved in what many experience as a professional community rather than just as a professional organization. Inasmuch as AIS aims to support and facilitate collaborations across a variety of borders and is convinced that the synergy that such team work provides is the key component of our longtime history and success as a professional organization, we welcome initiatives that you present. We consider you full participants in AIS, in all of our programs, initiatives, and successes and invite you explicitly to contact us if you have any responses to the above or other suggestions. As AIS’s new president, I am enthusiastically looking forward to collaborating with you as members in realizing all of these.
An Interdisciplinary Approach to Literature in Israel Studies

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Students in the Jurisprudence and Political Science programs at Montclair State University have the opportunity to take an elective course in Israel Studies. This is the first class in Israel Studies, interdisciplinary studies and literary studies for most of the students, and so they have no required prior knowledge. During the semester, we study the entry-level interdisciplinary research process, as described in Repko’s *Introduction to Interdisciplinary Studies* (2014). In the context of the issue of Israel’s conflicted identity as a Jewish and democratic state, students are introduced to the interdisciplinary research process, learn to identify relevant disciplines, become familiar with the idea of disciplinary perspective, discover and evaluate disciplinary insights, explore conflicts between insights particularly between different disciplines, are introduced to the notion of common ground and learn to recognize integrations. Throughout the semester, we examine aspects of the political, historical, sociological, religious and legal perspectives on Israel, centering upon the issue of whether Israel can be considered to be both a Jewish and a democratic state. As a culminating project, we apply relevant insights gained to the study of a literary work, the analysis of S. Yizhar’s 1949 novella *Khirbet Khizeh* (trans. 2008).

*Khirbet Khizeh* portrays the complex historical, political and legal dimensions of the plight of the Arab inhabitants of a village in the newly established State of Israel.

The title literally means “site of the ruins of Khizeh.” The work provides key insights into the roots of the ongoing Middle East conflict. An interdisciplinary approach to the novella *Khirbet Khizeh* presents a rich opportunity for students in an Israel Studies class to integrate the insights of different disciplinary perspectives.

Historical, Political and Legal Insights

The perspectives of history, political science and law are most pertinent to the study of *Khirbet Khizeh*. When the State of Israel was created by United Nations resolution in November 1947, the plan was for there to be two states side by side, one predominantly Jewish and one predominantly Arab. However, the Palestinians and the Arab League opted not to accept a partitioned state because it included the establishment of a Jewish state. They promptly began a campaign of violence with the goal of the elimination of the State of Israel.

Israel, a fledgling state, needed to consolidate its hold over its territory. For Israel, the war of 1948-1949 determined its very existence as a country. Israel was also very concerned about the presence of a fifth column in its midst, in the form of Arabs who remained behind yet supported their Arab brethren. The Arabs in neighboring countries wanted to recapture the land called Israel for the Palestinians. The Israelis had nowhere else to go and they fought effectively to retain and gain territory until the armistice agreements of 1949 (Gelber, 2001). According to Morris (1991), “the process by which some 700,000 Arabs departed Jewish/Israeli territory over 1947-1949 was multi-staged, varied, and complex” (p. 43). Morris describes the four stages of the exodus, some voluntary and some involuntary: many of the upper and middle class Arabs left because they did not want to live in a Jewish state; they feared the increasing hostilities and could afford to live elsewhere. Many of the lower classes then left as they saw Arab Palestinian society crumbling. Some Arab fighters were lured from Israel by the Arab High Command, in preparation for the fight to recapture the lands. The fourth part of the exile was the forced evacuation by Israel of certain Arab villages deemed to pose a security risk to the Jewish population. It is the forced evacuation of the Arab residents of the fictional village of Khirbet Khizeh that supplies the basic tension of the novel, within the context of the main issue for the course—Israel’s conflicted identity as a Jewish and democratic state.

Literary Analysis

In preparation for the interdisciplinary analysis of *Khirbet Khizeh*, the class discusses literary analysis, particularly reader-response theory. This theory emphasizes the active role of the reader in creating the meaning of a text. Reader-response theory liberates students from the role of finding a single objective meaning imposed by the author. Paulson (1988), in writing about connections between literature and science, points to reader-response theory and recognizes the role of critics as “co-creators of the meanings of the texts” (p. 96). Reader-response theory helps students to reach a comfort level with ambiguity and indeterminacy; this is important in fostering student flexibility to make connections in interdisciplinary work.

As background for the instructor,
the work of several critics is useful for understanding reader-response theory. Beach (1993) examines the experiential perspective on reader-response theory, which helps students to understand the value of their ideas and contributions. Beach identifies five processes for response to literature: engaging, constructing, imaging, connecting and evaluating/responding (p. 53). According to Fish’s (1980) social form of reader-response theory, we form interpretive communities to allow for communication of shared meaning “despite the absence of an independent and context-free system of meanings” (p. 321). However, Fish explains that the boundaries of the communities are fluid and expand to encompass new interpretations. Students, as participants in interpretive communities, can draw upon and apply the insights that they have gained from the disciplinary perspectives to their interpretations of the novella.

Students prepare an interdisciplinary literary brief of the work, focusing first on the elements of the work: plot, theme, narrator, point of view, characters, literary devices and disciplinary insights—historical, political, and legal—in the work. A literary brief shares some elements with a case brief in law, but here it is applied to a work of literature. In discussing the different elements of the novella, students bring to bear the insights gained through earlier readings. Having studied different disciplinary perspectives on Israel, students are able to participate in the creation of meaning as advocated in reader-response theory.

*Khirbet Khizeh*

*Khirbet Khizeh* is the story of an operation by a small Israeli Army unit at the end of the 1948-1949 war following the creation of the State of Israel. Most of the novel is characterized by lack of movement. It is filled with vividly detailed depictions of scenery and static intervals of boredom where the soldiers wait and wait until they are told to complete their mission. As time progresses, the mission becomes clearer: the soldiers are to evacuate an Arab village and transport the inhabitants to the other side of the cease-fire border, effectively sending them into exile. Only the old, the sick, the women and the children are left; the able-bodied men have gone ahead, implicitly to fight the Israelis from the other side of the border. The beautiful scenery contrasts with the treatment of the Arab villagers, who are likened to animals.

The action takes place only in the last part of the novel. As the villagers are rounded up and transported, parallels to the Holocaust—a reverse Holocaust—are found in the novella’s descriptive language: “this was what exile looked like” (p. 105) as the Jews have become “peddlers of exile, and our hearts have coarsened in the process” (p. 112). Among the new exiles is a woman, described as a “lioness,” holding the hand of a little boy. The narrator says: “we could also see how something was happening in the heart of the boy, something that, when he grew up, would only become a viper inside him, that same thing that was now the weeping of a helpless child” (p. 104). The novella ends with the silence and stillness of the now empty village.

Central to the novella is the mindset of the nameless narrator, a soldier who is conflicted about their mission, though he must ultimately follow orders. The narrator envisions future Israeli villages to be built on the site of Khirbet, to be built upon the ruins of the ruins of the ruins. He evokes an echo of “an echo of the feet of other exiles, dim, distant, almost mythical, but wrathful, like a jeremiad” (p. 106). This Biblical allusion is at once literary, historical and political. It calls to mind a prophecy of doom because of the state of society. The narrator is clearly conflicted at the uprooting of the Palestinians. Yizhar was a soldier in the war that he writes about. Yet, as Keller (2008) states: “In *Khirbet* he [Yizhar] is a man at war with himself, as he tries to reconcile the rights of the Jews with the rights of the Palestinian villagers” (par. 5). Through the voice of the narrator, *Khirbet Khizeh* becomes a story about Israeli conscience.

When the novella is considered in light of the four phases of Palestinian departure outlined by Morris (1991), it clearly falls into the fourth category of those villagers who were involuntarily displaced. This evokes the legal and political...
Understanding the Challenges of Complex Boundary Negotiations

By Jeffry C. Davis
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The eighteen essays in this volume emerged from papers presented at the 2010 conference “Enhancing Communication in Cross-Disciplinary Research,” held in Coeur d’Alene, Idaho. Both the conference and subsequent book were productive responses, sparked by an initial inquiry raised by the editors in relation to interdisciplinary pedagogy at the University of Idaho: What are the most effective means to promote communication and collaboration among interdisciplinary research team members? The collection received support from the National Science Foundation (SES-0823058 and IGERT Grant 0114304) and the University of Idaho. Given this context, the content of the book leans decidedly toward the natural and social sciences, although much conceptual and practical application can be brought to bear on the arts and humanities.

The chapters cohere according to a sensible organizational rubric. The initial two serve to provide a general orientation: the first succinctly introduces the aims and sets the parameters of the book; and the second frames interdisciplinary research (IDR) within a context of the growing interest for it, supplying correlative terms and insights regarding communication and collaboration (C²). The five sections that follow are set up thematically. Part I addresses some important theoretical aspects of C², including linguistic ambiguity, transdisciplinary (TD) cultivation, hermeneutic phenomenology, and diminished disciplinarity. Part II examines practical case studies that have enjoined C², from the work of Quantifying and Understanding the Earth System (QUEST) to negotiating Mendelian versus molecular conceptualizations of the gene. Part III offers tools to be employed by interdisciplinary teams to enrich interpersonal communication and to enhance research effectiveness. Part IV considers the contexts in which IDR occurs, specifically institutional realms, with rules and cultures that impact what and how things get accomplished. And Part V concludes the volume with an essay that ostensibly draws upon the previous chapters in order to make “a bold proposal.”

When researchers, theorists, and practitioners come together to address pressing concerns, they share expertise from diverse disciplinary perspectives; consequently, the discovery of new knowledge and the implementation of innovative procedures can prove to be complex and trying. In the introductory chapter, the editors affirm that despite the challenges, interdisciplinary teamwork is vital, whether dealing with matters of public health or climate change. Adopting the perspective of the National Academy of Sciences, that the “heart of interdisciplinarity” involves information sharing, the editors assert that such an exchange of expertise depends upon effective communication and intentional collaboration: “This book is for anyone interested in the rewarding yet difficult activity that is interdisciplinary work” (p. 8).

Building on the foundation that IDR represents important “boundary work,” Julie Thompson Klein’s essay considers what it takes for research teams to be successful. “Expert praxis does not lie in generic formulas,” she explains. “It emerges from communicative practices in an iterative process that requires collaborative readiness, robust platforms, negotiation of differences, management of conflict, collective communication competence (CCC), mutual learning, interactions in trading zones of language communities, and construction of common ground” (p. 11). This kind of comprehensive involvement requires an informed understanding of C² in multi-, inter- and transdisciplinary contexts, with an operational vocabulary, as well as the incorporation of philosophical, linguistic, communicative, and managerial insights. Klein’s brief survey of select terms and key understandings affords invaluable assistance, especially for those undertaking IDR for the first time.

Part I: Theory

In the first of the four chapters on theory, Rick Szostak’s piece, “Communicating Complex Concepts,” deftly unpacks a central undertaking advanced by the book: “Complex concepts—those that are understood differently across disciplines—can be broken into basic concepts that lend themselves to broadly shared understandings across disciplines” (p. 34). Defining “complex concepts” as “those that lend themselves to different interpretations across groups,” and “basic concepts” as those “for which broadly similar understandings across groups are possible (but not inevitable),” he
provides these “functional” terms and definitions with the intent of clarifying the degree of ambiguity when analyzing the disciplinary concepts that participants bring to IDR collaboration (p. 36). After sketching five concept theories, with corresponding criticisms, he then considers the means by which a research group can analyze their respective assumptions about shared words, placing a premium on the value of clarity: “research involving concepts whose meanings are fairly clear is usually much more useful than research involving vaguely defined terminology” (p. 41). Nevertheless, precision can never be a perfect science, as he cautions, and ambiguity has an important role to play in IDR collaboration. “We want enough ambiguity to stimulate curiosity but not enough to cause confusion” (p. 47).

Daniel Stokols ponders the theoretical characteristics of transdisciplinarity in the next essay, making a case for the augmentation of transdisciplinary training programs at the undergraduate and graduate levels. In a time of increasing cross-disciplinary team research, when the science of team science (SciTS) has never been more vital, a scholar’s disposition to engage in SciTS depends upon educational socialization: “cumulatively influenced by the educational environments, multiple mentors, and collaborative opportunities she or he encounters” (p. 58). Obviously, a single sort of formative education does not meet the demands of multidisciplinary, interdisciplinary, and transdisciplinary research. Therefore, consideration must be given to one’s transdisciplinary intellectual orientation, including one’s “constellation” of values, attitudes, beliefs, conceptual skills and knowledge, and behavior (p. 62). With select transdisciplinary traits in mind, educators can better design programs to tackle specific problems, as exemplified by the School of Social Ecology, at University of California, Irvine.

In what may be the most thought-provoking essay in the book, “Beyond Common Ground:

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Tayler: Khirbet Khizeh

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question of the removal of Arab inhabitants who had a right to their land and their homes as weighed against the question of national security where some of the Arab citizenry, allied with Israel’s enemies, sought the destruction of the state. Khirbet Khizeh is a story about the travails of the Palestinian exiles that presages the current conflict. Palestinian exiles who left Israel in 1948-49 and their descendants have remained detached from the populations of the countries to which they fled. Morris (1991) affirms that “the subsequent decades of humiliation and deprivation in the refugee camps would ultimately turn generations of Palestinians into potential or active guerrillas and terrorists” (p. 55). The image of what was growing in the heart of the little boy in Khirbet Khizeh that “could only become a viper inside him” (p. 104) continues to haunt Israeli-Palestinian relations sixty-six years later.

The novella Khirbet Khizeh provides the setting for students to integrate the insights of history, political science and law that they have gained throughout the Israel Studies course. By employing reader-response theory, students are freed from the strictures of imposed literary interpretations and are able to co-create meaning in the narrative work. They are then able to apply these considerations to the ongoing Middle East conflict between Israel and its Arab neighbors. It is, thus, through a work of fiction that students gain new understandings into the complex multi-faceted central issue of the course, Israel’s conflicted identity as a Jewish and democratic state.

Works Cited:

**Review: Enhancing Communication**

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A Transdisciplinary Approach to Interdisciplinary Communication and Collaboration,” David A. Stone contests the predominant approach to attaining interdisciplinarity—through disciplinarity. Eschewing disciplinary epistemological concerns as a starting point, which actually restricts interdisciplinary understanding, he argues for a transdisciplinary (“beyond disciplinary”) method, one grounded in phenomenological ontology informed by Heidegger (p. 84). The pursuit of “common ground” among divergent disciplinary assumptions, methods, and theories, as proposed by Allen F. Repko in *Interdisciplinary Research* (2011)—including communicative competence, trading zones, and boundary objects—should assume a lesser priority (pp. 86-87). What should be the primary interdisciplinarity preoccupation? “Learning to turn one’s soul around—that is, learning to see how meaning of key entities, terms, and concepts arise for us out of our practices and the fore-structures of understanding” (p. 98). By using “active speaking,” which calls for an honest acknowledgement—“including in one’s own dialogue a sense of where meanings, conceptualizations, and thematizations come from and how they operate in one’s approach”—and “active listening,” which attends to the same concerns in the discourse of others, “each person’s tacit understandings are available for use, modification, and joint development within the course of collaboration” (p. 98).

The last theory chapter proffers a pithy critique of “the age of disciplinarity,” by Robert Frodeman, calling for an understanding of the “new era in knowledge production” (p. 104). Briefly considering some of the sources that are disrupting the current “regime of knowledge,” including escalating costs of higher education, declining funding for state universities, and the loss of academic control of the construction and distribution of knowledge, he prognosticates that a significant reduction of educational institutions will occur, with a continuing increase in technological opportunities for global learning (pp. 104-105). “Disciplinarity may be ending,” observes Frodeman, “but disciplines will continue,” and in the meantime, as we move to a new paradigm, interdisciplinarity will serve as “the marker for the changes under way” (p. 106).

Disputing the notion of unlimited resources for unlimited knowledge production, he also predicts that the university will necessarily lose its stature, and with decentralization, and disciplinary mechanisms of power (e.g. peer review) will be supplanted by a broader number of stakeholders, representing inter-and transdisciplinary interests (p. 110). “The question of the possible limits of knowledge,” he concludes, “is likely to become part of our social and political conversation” (p. 113).

**Part II: Case Studies**

With the rationale that theory informs practice and understanding, the section on case studies begins with an analysis of the IDR synthesis experience of QUEST—a significant environmental research program sponsored by the U.K. Natural Environmental Research Council (NERC), initiated in 2003. Given that QUEST adopted, as an objective, to link Earth system knowledge to human behavior, competence in interdisciplinary communication represented a central task, advancing synthesis of diverse research and outcomes. Sarah E. Cornell and Jenneth Parker report the resulting difficulties, especially from collaborative convergence of biophysical and social sciences. In 2009, QUEST had 250 scientists from 30 institutions working on 18 research projects, and in the move into the final synthesis phase, discussions during a two-day workshop with the authors yielded revealing insights about IDR communication (p. 132). Some of the collective insights from the workshop included the need for team leaders to set clear research goals, the realization that interdisciplinary work changes participants’ inclination from institutional identification to interinstitutional identification, and the awareness that even scientists with a shared experience of phenomena can struggle to find a common language to describe it (pp. 138-141). The upshot: given the diverse backgrounds of QUEST participants, problems investigated, and methods used, effective IDR work should integrate productive behaviors, considerations, and skills—reflexive practices.

Ardyth H. Gillespie and Guan-Jen Sung delve into the realm of food systems, considering two case studies in light of collaborative engaged research (CER) methodology. “Community food systems, made up of farmers, consumer markets, retailers, distributors, processors, and other institutions and businesses, are collaborations with communication patterns that have evolved over centuries in North America” (p. 150). The CER approach assists all of these players in effective communication exchange and decision-related cooperation, encouraging several theoretical communication perspectives: individual differences; social status-based roles; social relations; and metacommunication (p. 152). The two case studies provided illustratively display CER methods in action, both of which deal with...
食品决策：家庭层面——改进规划、购买、准备和消费行为，特别是在儿童肥胖的情况下；以及在社区层面——考虑如何引导鱼和猎物可能会被纳入地方性选择，特别是对低收入人群。

在相关主题——食品和能源系统——Casey Hoy, Ross B. MacDonald, Benson P. Lee, and Steve Bosserman结合了四个相关的案例研究，他们强调合作与沟通在促进对积极系统性变化的认识的重要性。第一案例研究集中在农业系统，其中包含农场、栖息地和社区。多元利益相关者可以从对各种话语和观点的理解中受益。研究人员需要理解两者问题和机遇作为其进化的根本原因，它来自整个系统，而不是特定属性的一个部分”（p. 174）。第二案例研究集中在燃料单元系统，适用于欠发达地区。新科技的成功——如燃料电池——取决于其燃料的充足供应，特别是在欠发达世界的社区。而这些社区的独特需要，如食品、健康和家庭，需要在个体层面得到改善。

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Part III: Tools

在这一节中，通过工具来改善合作沟通，第一篇论文，“通过合作的窗口：工具箱工作坊来促进跨学科沟通”，由Chris Looney等提出，展示了生产可能性，从其中“一朵概念之花可能绽放”（p. 212）。

Wayde C. Morse观察到，在“整合框架和理论跨学科为有效的跨学科沟通”中，“结果是许多不相关的研究和不同的研究/实验实践。正如所有这些案例证明的那样，没有进展不是通过要求严格和精确的概念性定义，而是通过寻求共享的边界对象，从其中‘一把概念之花可能绽放’（p. 212）。

在第三章的论文，“整合框架和理论跨学科为有效的跨学科沟通”，由Chris Looney等提出，展示了生产可能性，从其中“一朵概念之花可能绽放”（p. 212）。
several IDR authors have provided various methods, including Szostak (2002), Newell (2007), and Repko (2012). Morse innovates, with these scholars in mind, presenting what he describes as “collaborative concept mapping of complex systems as a guide for a dialogue method for interdisciplinary project theme definition and metatheoretical framework development” (p. 251). Going through the steps outlined by Morse can aid in the integration of disciplinary frameworks and theories, which he defines. He concludes with three examples of framework-theory integration.

In their essay “Modeling as a Tool for Cross Disciplinary Communication in Solving Environmental Problems,” Laura Schmitt Olabisi, Stuart Blythe, Arika Ligmann-Zielinska, and Sandra Marquart-Pyatt consider how quantitative computing models can serve as a means for enriching interdisciplinary communication and collaboration. Computer modeling has become ubiquitous in interdisciplinary scientific investigation, especially about environmental concerns. However, “quantitative models are viewed by research teams primarily as scientific tools rather than communicative tools, and they have been designed by scientists, not group process experts” (p. 272). IDR collaborative model building involves three iterative activities: exploring individual perceptions, achieving shared assumptions, and determining management decisions (p. 273). Without question, the nature of a research project should affect model design, including consideration of the assumptions behind it. Therefore, modelers must enact best practices for collaborative involvement, considering the team and other project stakeholders.

Part IV: Contexts
Because interdisciplinary collaboration and communication occurs in multiple spaces and places, contextual knowledge becomes crucial, especially as it pertains to the institutional cultures of colleges and universities—the area of concern for the essays in this section.

Michael M. Crow and William B. Dabars analyze the nature of institutional design insofar as it relates to interdisciplinary initiatives and operations. Despite general consensus in support of inter- and transdisciplinary scholarship, the old structures of disciplinarity still dominate, directing epistemological and administrative biases.

“Our academic culture not only perpetuates traditional disciplinary thinking but also assigns inordinate significance to distinctions in an implicit hierarchy” (p. 299). Therefore, knowledge networks tend to reinforce conceptualizations of “stocks” rather than “flows,” a dynamic related to the disciplines-as-silos perspective (p. 301). Given that academic professional life and social organization have been profoundly molded by disciplinarity, new institutional strategies and practices must be instigated. And a new interdisciplinary vision depends upon communication and collaboration. “Artificial science—or design science—determines the form of that which we build...institutional and organizational structures” (p. 304). After canvassing a number of models for the organizational or social models of interdisciplinarity, including “invisible colleges,” “communities of practice,” and “epistemic communities,” the authors foreground the virtues of the interdisciplinary model represented by Arizona State University, the newest major research university in the U. S., and also the largest land-grant research university as it relates to cross-disciplinary research, making a case for the ongoing vitality of this type of institution in the current epoch. After the Morrill Act was signed by President Lincoln, in 1862, federal lands were granted to each state for the creation of educational institutions that to serve the masses, and thus they served as democratizing social structures (p. 324). The 76 land-grant institutions that exist today are poised for significant opportunities, despite threats of reduced appropriations and proliferating regulations. In the 21st century, there is a resurgence of democratic inputs by private foundations and federal agencies for broader and more cooperative involvement in the university, superseding disciplinary structures of the past. To meet the challenges of increased interdisciplinarity, the land-grant institution must do three things: reward transdisciplinary research; form outside partnerships; and enhance effective communication (p. 328). Nellis closes with an illustration of interdisciplinary outreach and engagement at the University of Idaho.

Maura Borrego et al. highlight the positive influence that Integrative Graduate Education and Research Traineeship (IGERT) has had upon two state universities (both kept anonymous). The IGERT program was resourced by the National Science Foundation to educate scientists and engineers in order to design innovative models of graduate learning that include interdisciplinary features. Based upon interviews of participants in the grant projects, the authors determined...
that “Multiple IGERT grants to a single institution particularly helped create a community of advocates for interdisciplinary education and research that effected institutional-level policy changes” (p. 352). In other words, IGERT grants clearly communicated IDR priorities, resulting in lasting lateral transformations of the host institutions’ internal cultures. And with the explicit goal of bringing interdisciplinary institutional change to recipient institutions, IGERT grants function as an effective driver for innovative interdisciplinary STEM training in the future.

In “Supporting Interdisciplinary Collaboration: The Role of the Institution,” L. Michelle Bennett and Howard Gadlin study the connection between interdisciplinary research teams and their respective organizational contexts. One problem lies in the fact that some institutions with IDR initiatives possess policies and practices that have not caught up with the initiatives (p. 357). For example, the authors cite a study they conducted at the National Institutes of Health (NIH), in which the institution made formal statements in favor of collaborative research, yet, the members of scientific teams there perceived their work as counter to the dominant culture (p. 359). The authors elucidate potential problem factors in which an institution can undermine IDR collaboration, including communication, trust, vision, difference, power, and leadership. Drawing on case study samples, they aptly recommend ways to strengthen communication and collaboration between research teams and institutional hegemonies.

Part V: Conclusion
The final chapter in the volume, by Gabriele Bammer, serves as the conclusion: a teaser essay entitled “From Toolbox to Big Science Project: A Bold Proposal.” To solve the problems of fragmentation and unorganized diversity characteristic of interdisciplinarity, the author calls for the making of a new discipline that would address these quandaries: Integration and Implementation Sciences (I2S). She laments the fact that “it has not been possible to institute a substantial, internationally accepted methodology for interdisciplinary communication or other aspects of interdisciplinary research and teaching,” and therefore this lack of codification leaves scholars “reinventing the wheel” within each research team, unaware of superior developments in research methods (p. 388). Likewise, there is a large volume of interdisciplinary research and pedagogy that lacks classification for access, leaving a ramshackle result. Bammer acknowledges that “for some the idea of building a discipline to underpin interdisciplinarity will seem counterintuitive, even bizarre” (p. 393). Nevertheless, she believes that such a venture will be productive, especially if I2S addresses three domains: “1) Synthesizing disciplinary and stakeholder knowledge; 2) Understanding and managing diverse unknowns; and 3) Providing integrated research support for policy and practice change” (p. 395). To further the process of clarification and systemicity, she tenders a five-question framework to be used in conjunction with each of the domains, explained for implementation. This “Big Science project” (p. 404) is indeed a bold proposal, one that has merit as a “thought experiment” (p. 393). Nevertheless, beyond that goal, the proposal seems to presume a ready means to resolve the inherent complexity of the vast realm of interdisciplinary research, communication, and collaboration——

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one not readily consistent with several of the essays in this volume.

The scope of this volume of essays is, in and of itself, impressive. The diverse topics, perspectives, and methods promote a broad understanding of interdisciplinary research, and the requisite skills of communication and collaboration. Equally notable is the currency of the issues addressed, providing fresh and innovative approaches to real-world situations in which IDR is producing extraordinary results. Relevant to teachers and researchers, this book conveys a practical and beneficial understanding of the communicative and collective proficiencies essential to interdisciplinary practitioners in the classroom and the lab.

About AIS

The Association for Interdisciplinary Studies is the U.S.-based international professional association devoted to interdisciplinary teaching (including service learning), research, program administration, and public policy. Interdisciplinarity integrates the insights of knowledge domains to produce a more comprehensive understanding of complex problems, issues, or questions. AIS serves as an organized professional voice and source of information on interdisciplinary approaches and the integration of insights from diverse communities to address complex problems in education and research. Founded in 1979, it is incorporated as a non-profit 501(c)3 educational association in the state of Ohio.