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The Role of Professional Societies

Many professional, or disciplinary, societies were founded to support the single disciplines for which they are named.¹ And yet in recent decades, these societies, like many other organizations, have been increasingly called on to expand their relationships to new fields of research. In addition, a new breed of professional society has arisen, mostly after World War II, that is primarily interdisciplinary (see Appendix D). Among the many interdisciplinary societies are the IEEE Computer Society (1946), the Society of Industrial and Applied Mathematics (1952), the Biophysics Society (1956), the Biomedical Engineering Society (1968), and the Materials Research Society (1973) (see Figure 7-1).

The mission of the professional societies is primarily educational and informational. Their influence flows from their continuing and highly visible functions: to publish professional journals, to develop professional excellence, to raise public awareness, and to make awards. Through their work, they help to define and set standards for their professional fields and to promote high standards of quality through awards and other forms of recognition.

¹Among the oldest professional societies are the American Society of Civil Engineers (1852), American Chemical Society (1876), American Mathematical Society (1888), and American Physical Society (1899).

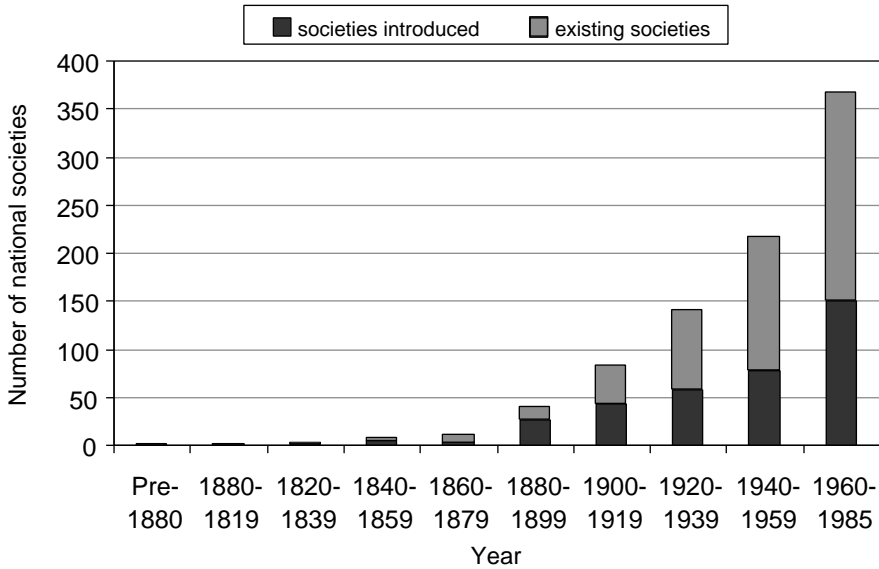


FIGURE 7-1 Growth in numbers of professional societies, 1880-1985.
NOTES: Many national professional associations were founded over the period 1880-1985; founding dates are grouped into 20-year periods.
SOURCE: The data are from the *Encyclopedia of Associations, 1985* as compiled by Burton R. Clark in *The Academic Life: small worlds, different worlds* (1987).

A VISION FOR PROFESSIONAL SOCIETIES THAT WISH TO FACILITATE IDR

In some ways, professional societies have a clearer overview of trends in their fields than do federal agencies, universities, and funding organizations. The central position of professional societies brings excellent leverage with which to design and promote change, including through publications, policy statements, meetings, committees, lectureships, and awards.

One particularly important function of professional societies relative to IDR—publishing professional journals—is shared with commercial publishers, some of which are large and influential forces in their own right. Because commercial publishers are for-profit ventures, however, their mission differs in an important way from that of the societies, which address the full gamut of concerns and achievements of their scientist and engineer members.

PUBLICATION BARRIERS ENCOUNTERED BY RESEARCHERS

With the exception of a few leading general journals—such as *Science*, *Nature*, and the *Proceedings of the National Academy of Sciences*—the prestigious outlets for research scholars tend to be the high-impact, single-discipline journals published by professional societies. Although the number of interdisciplinary journals is increasing, few have prestige and impact equivalent to those of single-discipline journals, so students and faculty who publish in them might not receive the recognition they need for professional advancement.

Interdisciplinary researchers may find some recognition by publishing in single-discipline journals (journals to which part of their work is relevant), but the truly integrated portion of their research may not be clear to too much of the audience or be noticed by peers who do not read those journals.

A general concern of researchers is the need to produce evidence of appropriate productivity at the time of tenure review. Members of a review panel usually want to know which journals a researcher publishes in and what impact those publications have had on other researchers. A person working on an interdisciplinary project may be publishing in an interdisciplinary journal that is unfamiliar to some reviewers.

SUPPORT FOR PEOPLE AND PROGRAMS

The policies of professional publications have a strong influence on researchers who must gain public recognition to advance in their careers. Those published by professional societies have an opportunity to lower barriers to researchers by revising policies. In the committee's survey, the top two recommendations for journal editors were to incorporate interdisciplinary expertise in review panels (38.8 percent) and to feature novel innovations and initiatives (36.2 percent); 17.3 percent of respondents reported that they were satisfied with the current situation.

Research Publications

Disciplinary societies have a great deal of influence through their journals in terms of their willingness to publish, their review procedures for papers submitted to a journal, and their ability to create new journals for subdisciplines. In addition, disciplinary society newsletters can be used to facilitate communication among disciplines (see Box 7-1).

Disciplinary societies could help their members by founding or promoting new journals, new sections, and other kinds of homes for emerging interdisciplinary subjects. They can also help researchers by giving awards

TOOLKIT

BOX 7-1 The Role of Journals in Fostering IDR

Publishing journals that support interdisciplinary research

The creation of journals that are dedicated to publishing research at the intersection of two or more fields is critical to the development of IDR and is another way that societies can foster this type of investigative approach.

Here is a selected list of recently established journals that represent research fields arising from the combination of disciplines:

- Archaeoastronomy (University of Texas Press for The Center for Archaeoastronomy in cooperation with ISAAC, the International Society for Archaeoastronomy and Astronomy in Culture)
- Astrobiology (Mary An Liebert)
- Biogeochemistry (Kluweronline)
- Computation Geosciences (Kluweronline)
- Ethnomusicology (Society of Ethnomusicology)
- Internet Mathematics (AK Peters)
- Journal of Neuroscience (Society for Neuroscience)
- Neuropsychopharmacology (American College of Neuropsychopharmacology)
- Geochemistry, Geophysics, Geosystems (American Geophysical Union)
- Transactions in Mechatronics (IEEE/ASME)

The emerging field of bioeconomics has the *Journal of Bioeconomics*, which was created in 1999 “to encourage alternative approaches and creative dialogues between economists and biologists and a transfer of concepts, theories, and tools, and data bases in both directions by extending and integrating economics and biology.” The journal “is interdisciplinary in spirit and open to various schools of thought and methodologies.”^a

Highlighting important research in other fields

In some journals, there is a regular and committed effort to expose readers to research and news in other fields. For example, the journal *Cell* includes a section that highlights recent findings on signaling mechanisms with article summaries from such journals as *Neuron*, *Immunity*, *Molecular Cell*, and *Current Biology* and another section that highlights cancer biology findings with article summaries from such journals as *Cancer Cell*, *Current Biology*, *Immunity*, and *Chemistry & Biology*. The interdisciplinary journal *Science* has a regular feature called “Editor’s Choice” that highlights recent publications in many fields and journals.

^aLanda, J. and Ghiselin, M. 1999. “The Emerging Discipline of Bioeconomics: Aims and Scope of the *Journal of Bioeconomics*.” *Journal of Bioeconomics* 1(1):5-12.

and recognition for interdisciplinary work; this would help faculty who are working on interdisciplinary projects and who must demonstrate the value of their work to review committees that might not be familiar with either the interdisciplinary field or the interdisciplinary journals of significance to it.

Mathematics journals, for example, traditionally discourage researchers from submitting papers on interdisciplinary research; this tends to be true as well in chemistry. But some journal editors have broken with tradition to publish papers that turn out to have high importance to emerging fields. An example is an early paper on string theory by Edward Witten, a theoretical physicist, in 1983. The paper was published in *Communications in Mathematical Physics* (Arthur Jaffe, editor)—primarily a mathematics journal—over considerable objection. A decade later, Witten was awarded the Fields Medal in mathematics, and the interdisciplinary pursuit of string theory is today of major importance for both mathematics and physics.

In addition, some societies create a subscription model based on article access rather than journal title. For example, IEEE allows access to all its professional journals, regardless of which subdiscipline's journal or conference published an individual article.

Program Initiation

Societies have taken and will continue to take a direct and active role in initiating IDR programs (see Box 7-2). In particular, the sponsorship of interdisciplinary groups (such as biochemistry in a chemistry society or biogeochemistry in a geophysical society) may constitute a proving ground for new disciplines as they emerge.

In addition, societies are able to

- Award prizes to students and faculty for excellent IDR proposals or projects. Such awards and other professional recognition can be important in helping an interdisciplinary researcher to gain tenure. For example, the American College of Neuropsychopharmacology gives many such awards that can enhance the careers of researchers in a field of considerable complexity. In the American Geophysical Union, all disciplinary awards include a sentence indicating that IDR investigators can qualify for the award.
- Target stipends, awards, or scholarships that permit students to spend time in other laboratories or with collaborators at various institutions.
- Invite interdisciplinary experts to serve on standing committees when that is appropriate.
- Reward outstanding mentors of interdisciplinary activities.

TOOLKIT

BOX 7-2 Professional Societies Have Fostered IDR through a Number of Initiatives

Hosting Workshops on Emerging Subjects

Professional societies often host seminars, meetings and colloquiums that bring together scientists in different disciplines to learn about diverse fields and research topics, to learn the languages of different fields, and to discover where these research topics overlap. In December 2000, for example, the American Academy of Microbiology held a colloquium titled "Geobiology: Exploring the Interface Between the Biosphere and the Geosphere."^a The colloquium participants outlined a number of challenges facing this emerging field and called for interdisciplinary training of researchers and funding of research projects in the new field. Similarly, both the American Geophysical Union and the Geological Society of America have held special sessions on geobiology at their annual meetings since 2000.

Organizing Interdisciplinary Society Panels or Divisions

Organizations that support researchers often foster IDR through the creation of groups or divisions in the society. For example,

- In 2000, the American Geophysical Union formed a section on Biogeosciences.^b The Geological Society of America created the Geobiology and Geomicrobiology Division in May 2001.
- The Institute of Electrical and Electronics Engineers has an Engineering in Medicine and Biology Society, which has a Sensors Council.
- The American Institute of Chemical Engineers has a Food, Pharmaceutical, and Bioengineering Division.

There is also an increasing trend toward intersociety collaborations, such as the joint meetings on interdisciplinary topics sponsored by SIAM (Society for Industrial and Applied Mathematics) and the American Statistical Association.

IDR Awards

A disciplinary society can support IDR by granting research awards. The Fund

All such steps can focus more attention on IDR and strengthen the reputation of IDR among academic institutions and funding organizations.

SUPPORT FOR IDEAS AND INITIATIVES

After publications, the second important forum of professional societies is their regional and national meetings. By bringing the right people

for the Advancement of the Discipline^c awarded by the American Sociological Association “provide scholars with venture capital that has the potential for challenging the discipline, stimulating new lines of research, and creating new networks of scientific collaboration.” It provides up to \$7,000 in unrestricted funds “to provide opportunities for substantive and methodological breakthroughs, broaden the dissemination of scientific knowledge, and provide leverage for acquisition of additional research funds.” Recent winners include Charles Kurzman of the University of North Carolina-Chapel Hill for a series of workshops to bring together scholars in three overlapping fields (Islamic movements, social movement studies, and social network analysis) in two sets of workshops designed to stimulate intellectual cross-fertilization among them; and Marjorie L. DeVault of Syracuse University for a conference that will bring together distinguished senior scholars, mid-level scholars, and graduate students to develop Institutional Ethnographic (IE) approaches for studying the workings of economic restructuring.

Interdisciplinary Recognition Awards and Lectureships

Professional societies can recognize and encourage IDR by granting awards to researchers whose interdisciplinary work has advanced the field. For example, at its annual meeting, the Materials Research Society presents one member with the von Hippel Award for “brilliance and originality of intellect, combined with vision that transcends the boundaries of conventional scientific disciplines.”^d Esteemed lectureships, such as the George A. Miller lectureship of the Cognitive Neuroscience Society, can also highlight researchers’ IDR and provide a venue for recipients to describe their work to others outside the field.^e

^aGeobiology: Exploring the Interface between the Biosphere and the Geosphere, Colloquium Report 2001. American Society for Microbiology, available at <http://www.asm.org/Academy/index.asp?bid=2132>.

^bAGU Adds Biogeosciences Section. AGU Press Release No. 00-16, June 8, 2000. http://www.agu.org/sci_soc/prrl/prrl0016.html.

^cFund for the Advancement of the Discipline, available at <http://asanet.org/members/fad.html>.

^dThe von Hippel Award of the Materials Research Society, available at <http://www.mrs.org/awards/VonHip.html>.

^eInformation available at the Cognitive Neuroscience Society Web site at <http://www.cognitivesociety.org/content/February%202003>.

together, these meetings and the activities that grow out of them can nourish new ideas and initiatives.

Professional-Society Meetings

Meeting organizers have opportunities to devise many kinds of strategies that promote interdisciplinary research and education. Society meet-

ings are effective venues for interdisciplinary researchers to get together with potential collaborators, interested employers, and sympathetic institutions (see Box 7-3). Searches for interdisciplinary positions can be facilitated through formal presentations, informal drop-in rooms, and coffee sessions. Funding agency representatives can discuss grant mechanisms and topics of high funding priority, allowing graduate students, postdoctoral scholars, and faculty to plan programs and partnerships. Organizers can hold topical interdisciplinary symposiums or colloquiums that are sponsored jointly by other societies.

Promoting the Integration of Disciplines

Societies can plan special activities to facilitate communication between disciplines. They can form alliances with other professional societies to help researchers in different disciplines to become more familiar with one another and one another's research (see Box 7-4). To help to encourage familiarity, they can develop a lexicon that explains the vocabulary of the field in general scientific terms. Communication becomes more important as some older disciplines become more interdisciplinary; for example, biogeosciences recently became the subject of a new section of the American Geophysical Union. In addition, they might offer joint awards with other associations.



"So NOW I understand what that means."

INNOVATIVE PRACTICE

BOX 7-3 The Association of American Geographers

The Association of American Geographers (AAG)^a celebrated its 100th anniversary in 2004. The centennial meeting was attended by over 5,000 people and showcased many of the ways that the society has supported integrative research and partnerships with other disciplines and organizations. More than 3,000 papers and posters were presented on a wide variety of geographic topics, many of them interdisciplinary and many by scholars from outside the discipline.

Plenary sessions featured internationally renowned scholars in a variety of disciplines who spoke of their own research and of their perception of geography and its role in interdisciplinary education and research. Speakers included National Academies President Bruce Alberts, a biochemist; past National Science Foundation Director Rita Colwell, a microbiologist; Clark University Professor Cynthia Enloe, a political scientist; and Columbia University Professor Jeffrey Sachs, an economist. In addition, many of AAG's 54 specialty groups invited speakers in related disciplines with financial support from the AAG Enrichment Fund, especially established for the purpose.

AAG presents an annual honorary geography award to recognize contributions to geographic knowledge by scholars outside the discipline. In 2004, the award went to Georgetown University Professor of Decision Sciences Keith Ord, a pioneer in spatial statistics. The centennial meeting included workshops that highlighted core interdisciplinary research tools, such as geographic information systems, global positioning systems, and other new technologies for integrating and analyzing spatial data from multiple disciplines. Other sessions focused on collaborative public, private, and academic partnerships for research, education, and outreach, including the My Community, Our Earth (MyCOE) project to help middle- and high-school students around the world learn to study and propose solutions to sustainable-development issues in their own communities.

^aAssociation of American Geographers Web page <http://www.aag.org/>.

Other opportunities in communication and education include initiatives to

- Provide journal subscriptions at reduced cost to members of other societies.
- Cosponsor sessions at the main meetings of other societies.
- Jointly sponsor workshops, other small topical meetings, and field trips.
- Offer short courses at other meetings.
- Cooperate with other societies on K-12 and undergraduate educational programs.

INNOVATIVE PRACTICE

BOX 7-4 Models for Collaboration between Professional Societies

Often, societies that support individual disciplines recognize the importance of interdisciplinary collaboration. Because of the representation of diverse populations of researchers in their membership, societies hold a unique position: they can be the collective mouthpiece of researchers and identify research subjects or fields that are weaker both in numbers of people involved and in the current body of knowledge. When societies team up to try to strengthen these neglected subjects or fields, they build on the experience of their society members and hold a dialogue that includes people in different fields (see Box 6-9).

Recently, the Coalition for Bridging the Sciences^a identified the interface of biology with physics, mathematics, engineering, and computer science as having great potential. The coalition is made up of nine research societies that represent 126,000 scientists in academe and industry. Members of each society emphasized the importance of their disciplines in the progress of biomedical research. In this specific example, the member societies called for a review of federal funding of these “supporting” disciplines and asked that a new funding entity be created to focus on long-term research in subjects not covered by existing funding mechanisms.^b In particular, it would support basic research to develop technology and innovations necessary for the advance of biomedicine.

The synergy of research societies in fostering IDR is powerful. Disciplinary societies are a convenient medium for researchers to voice their opinions, and such initiatives as regular focus groups on emerging research concerns can promote the recognition of topics ripe for interdisciplinary collaboration. The collaboration of disciplinary societies can allow their members to interact and develop a common language and to learn more about research in other fields. Finally, collaboration between societies can have more influence on the support of IDR topics because they present a unified front that comprises the memberships of the participating societies.

^a<http://www.biophysics.org/pubaffair/bsc.htm>.

^bCouzin, J. Congress wants the Twain to Meet. *Science* 301:444, 2003.

- Publish special issues of periodicals independently or jointly with other societies.

SUPPORT FOR INSTITUTIONS AND FACILITIES

Although the missions of professional societies do not ordinarily include direct support for institutions in which research is performed, the societies strongly influence practices and attitudes related to IDR.

Developing Norms for Interdisciplinary Activities

One of the overarching needs for research is better mechanisms to evaluate the quality and success of interdisciplinary activities. Professional societies can be leaders in proposing and developing norms for interdisciplinary practice. For example, they might suggest appropriate skills and standards that should be mastered by students and faculty who participate in interdisciplinary research and education. They could publicize practices found to promote success, such as inclusion of funding in research grants to support substantial startup time during which participants can absorb the language and culture of multiple disciplines. They can invite the members of successful IDR teams to write or talk about their experiences in the society journals and at meetings.

CONCLUSIONS

Most researchers are members of professional societies. When these societies choose to support a particular policy, they convey the “voice” of the research enterprise with a unique degree of legitimacy. They now have the opportunity to raise that voice on behalf of interdisciplinary research and education: to broaden the interdisciplinary outlook of scientists, to recognize young interdisciplinary scientists of talent, and to facilitate the interdisciplinary strengths of their society.

FINDING

Professional societies have the opportunity to facilitate IDR by producing state-of-the-art reports on recent research developments and on curriculum, assessment, and accreditation methods; enhancing personal interactions; building partnerships among societies; publishing interdisciplinary journals and special editions of disciplinary journals; and promoting mutual understanding of disciplinary methods, languages, and cultures.

RECOMMENDATIONS

Professional Societies

PS-1: Professional societies should seek opportunities to facilitate IDR at regular society meetings and through their publications and special initiatives.

For example, societies can

- Include IDR presentations and sessions at regular society meetings by
 - Choosing IDR topics for some of the seminars, workshops, and symposia.
 - Promoting networking and other opportunities to identify potential partners for interdisciplinary collaboration.
 - Cohosting symposia with other societies.
 - Holding workshops on communication skills, leadership, consensus-building, and other skills useful in leading and being part of IDR teams.
- Establish special awards that recognize interdisciplinary researchers.
- Sponsor lectureships that bring recognition of the value of interdisciplinary experience.
- Prepare glossaries, primers, tutorials, and other materials to assist scientists in other fields who wish to learn new disciplines.
 - Create sections, divisions, or boards that represent interdisciplinary aspects of their fields.

Journal Editors

J-1: Journal editors should actively encourage the publication of IDR research results through various mechanisms, such as editorial-board membership and establishment of special IDR issues or sections.

In particular, journal editors can

- Increase the exposure of IDR by devoting special issues or sections to specific IDR directions in a field and accepting more research papers that introduce new IDR areas.
 - Add researchers with interdisciplinary experience to editorial boards and review panels and develop specific techniques for evaluating interdisciplinary submissions.
 - Consider whether their publications' guidelines for authorship and submission of manuscripts are appropriate for IDR.
 - Take steps to improve the sharing of knowledge between disciplines by publishing
 - Comprehensive review articles on related disciplines.
 - Overview articles on fields relevant to published interdisciplinary works.
 - A list of the fields covered in interdisciplinary papers.
 - Hyperlinked text in papers directing on-line readers to discipline-specific educational resources.
 - Create subscription models based on article title and subject rather than journal title to enhance cross-discipline access.