

UNIVERSITY OF WYOMING

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TO: Life Science Deans, Directors, Department Heads and Faculty

FROM: Thomas Buchanan, Vice President for Academic Affairs
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RE: Life Sciences

The 1999 Academic Plan recognized the life sciences as an area of strength at UW. Citing unrealized potential for even greater distinction, the Plan urged faculty members in Arts and Sciences, Health Sciences, and Agriculture to identify measures that might help realize this potential. After nearly three years of discussion and collaboration, there is much to report, and there is much left to be done. The purposes of this document are five-fold:

- to review the progress made to date,
- to draw some conclusions from these activities,
- to propose life-science foci for the near future,
- to articulate a model for long-term scientific growth in this and other areas, and
- to propose an administrative reconfiguration to help implement the model.

Appendices to this report are available in the deans' offices of the Colleges of Agriculture, Arts and Sciences, and Health Sciences. We invite feedback and comments from the entire campus community.

Progress to date

The 1999 Plan included three action items specific to the life sciences (#58, #59, #60). Action Item #58 called for consultation with distinguished life scientists from other universities to help develop a vision for the life sciences at UW. In response to this action item, the Office of Academic Affairs sponsored a Life Sciences Symposium on March 31-April 1, 2000. Speakers included a member of the NSF Advisory Panel for the Biological Sciences Directorate, the Director of the USDA-NRI Competitive Grants Program, the Director of the National Center for Research Resources at NIH, the Dean of Biological Sciences at UC Davis, the Director of Molecular Biosciences at Washington State University, and the President of Oregon State University. This symposium helped formulate some of the organizing themes and possible future directions for life-science research at UW.

Action Item #60 called for a cross-college working group to make recommendations regarding undergraduate life-science instruction. This ad hoc committee, appointed by the Deans of Agriculture and

Arts and Sciences, included Lee Belden (Veterinary Science), Greg Brown (committee co-chair, Botany), Patricia Colberg (Zoology and Physiology), Ron Delaney (committee co-chair, Plant Science), Karen Hansen (Animal Science), Ann Hild (Renewable Resources), and Jim Rose (Zoology and Physiology).

This committee's work deserves comment. Historically, Arts and Sciences faculty and Agriculture faculty have been the principal participants in formulating and delivering undergraduate coursework in basic life sciences. The departments of Botany and Zoology-Physiology continue to bear the bulk of the instructional effort. Although they have participated for many years as stakeholders, faculty in the College of Agriculture have only sporadically taught basic service courses in biology. The involvement of Health Sciences faculty has been even more distant. Yet, history notwithstanding, there is a clear willingness among administrators and faculty in all three colleges to work together in delivering basic undergraduate life-science instruction. The committee's report (Appendix A) makes several thoughtful recommendations regarding curriculum and pedagogy.

Action Item #59 is by far the most complex of the three. It called for the appointment of a study group to explore structural arrangements that might promote greater interdisciplinarity in the life sciences. It also called for an examination of institutional incentives to complement the structural changes. The Life Sciences Committee, appointed by Academic Affairs, included Robert O Kelley (Health Sciences), Rollin Abernethy (Academic Affairs), Jerry Johnson (Molecular Biology), Nancy Stanton (Zoology and Physiology), Tod Hansen (Animal Science), Greg Brown (Botany), Bill Gern (Office of Research), Patricia Colberg (Zoology and Physiology), Ann Hild (Renewable Resources), Frank Galey (Veterinary Sciences), Harold Bergman (ENR), Jerry Bricker (LCCC), Judy Ellsworth (Science Math Teaching Center), and Jim Rose (Psychology). The committee report recommended three alternative organizational structures but stopped short of reporting a consensus regarding the most desirable of these structures. The three alternatives included: 1) an interdisciplinary core model, 2) a division/section model, and 3) a new college model (Appendix B).

These recommendations led to a response by President Dubois (Appendix C), followed by a counterproposal from the College of Agriculture (Appendix D). The committee's alternatives, the President's response, and the Ag counterproposal differed in spirit, tenor, and the degree to which they invested hopes for positive change in administrative and organizational measures.

Noting these variations of opinion, the Vice President for Academic Affairs tabled the discussion late in spring semester 2001. Campus-wide discussion began anew during fall 2001, via a series of forums organized through the Ellbogen Center for Teaching and Learning. Sixty-seven faculty members and administrators, representing 14 departments from the three colleges mentioned above, participated in discussions that focused on substantive opportunities for life-science enhancement. Minutes kept by CTL staff from these discussions appear in Appendix E. The discussions revealed a wide range of views on the future of the life sciences at UW, confirmed the faculty's commitment to excellence in these fields, and yielded many thoughtful ideas about how to nurture this excellence.

Summary of discussions and committee recommendations

The deliberations to date have highlighted two clear points of widespread agreement. The first is that the life sciences form a core of intellectual strength as well as a central foundation for other facets of the university's mission. The second is that there is little support, either among rank-and-file faculty members or among deans and central administrators, for establishing a new administrative umbrella for the life-science departments. In particular, our discussions have revealed scant support anywhere on campus for the creation of a separate College or Division of Life Sciences, virtual or real. Instead, there is broad consensus that existing administrative structures per se do not act as barriers to excellence and that new administrative structures are unlikely to improve matters.

Underlying this consensus--to keep the existing organizational structure but to promote interdisciplinary instruction and research--is a compelling motif: any institutional investment of resources should aim at building scholarly infrastructure, not administration. And the proper roles of existing administrative structures are (1) to orchestrate these investments and (2) to facilitate interdisciplinary cooperation.

Foci in the life sciences

The discussions to date have also had the practical effect of clarifying questions about where UW's life-science strengths will lie in the future. There are nearly as many ways to parse these strengths as there are life-science faculty members, and the areas most frequently mentioned are often disparate in scope and maturity: neuroscience, reproductive biology, ecology, stable isotopes, wildlife management and disease, biogeochemistry, alpine environments, water, evolutionary biology, geobiology, biosecurity, fetal programming, aging, environmental toxicology, cell science, nutrition, and extreme environments. Several of these areas exist as formally recognized research groups enjoying distinct degree programs, steady extramural funding, and a record of interdisciplinary teaching. Some other areas are less formally developed, and in a few instances lack either the critical mass of UW faculty needed to form vibrant, stable research foci or deeper strategic links to any organizing principle for long-range planning.

However, at least two research areas stand out as exemplars. For the immediate future, reproductive biology and neuroscience are two interdisciplinary areas in which UW should focus for distinction.

Reproductive biology spans three colleges and numerous academic departments, is well funded, and enjoys a stable core of aggressive, highly research-active faculty. Moreover, reproductive biology has the potential to interact with a variety of other research groups. An example of such is the interdisciplinary team studying fetal programming. This area of inquiry, centered on *in utero* animal physiology, has health implications for humans and animals, ample opportunity for external support from USDA and NIH, and clear scientific ties to the recently established Centers for Biomedical Research Excellence (COBRE).

Neuroscience also enjoys a strong interdisciplinary core of faculty now spanning three colleges. Although smaller in faculty numbers than reproductive biology, this is a well-funded area that holds substantial promise for sustaining and expanding its research base.

Neuroscience and reproductive biology are not the only promising focus areas for the life sciences, nor is it appropriate to envision the array of focus areas as static. UW currently has other centers and areas of outstanding research, including but not limited to the following:

- Environmental toxicology
- Ecosystem analysis
- Stable isotope analysis
- Wildlife biology.

In addition, there are several emerging foci in the form of large, federally funded initiatives. These new areas include the COBREs studying cardiovascular health and the biological role of nitrogen oxide, the BRIN grant recently obtained through the College of Health Sciences, and a potential new COBRE in protein structure and function. As science evolves, new focus areas will continue to emerge, and existing areas of strength may change their emphases. The critical question is, how might we enhance the institution's ability to adapt to these changes?

Perhaps the best way to think about neuroscience and reproductive biology is as examples of a more broadly applicable structural model that can accommodate this need to adapt. There are four essential features to the model. First, the research area is scientifically important and topical. Second, the research crosses traditional departmental boundaries, and as a consequence the customary structures for faculty tenure and promotion and for graduate education may not be completely appropriate. Third, decisions about resource allocation may require interdepartmental and cross-college commitments that are sustainable over time scales lasting a decade or more. Fourth, the long-range health of the research area hinges in part on the existence of opportunities for synergies and intellectual ties with other existing and emergent areas.

In the long term, we envision replicating this model through institution-wide investments in existing and newly forming groups, within the life sciences and in other areas of science. At the center of any successful group we envision a seminal group of scientists, working across traditional academic boundaries on questions of recognized scientific importance. The institutional investments that support such groups must be sustainable over reasonable time scales. These investments must also be dynamic, evolving as research strengths come into greater relief and as interdisciplinary groups coalesce around emerging frontiers. And the investments must be concerted, reinforcing activities that have a high probability of promoting synergy with other groups over time, and based on scientific opportunity, faculty interest, and sustainable commitment at various levels of administration.

This structural model gradually and logically expands our conception of interdisciplinary focus groups. It is similar to the “graduate-group” concept in place at other institutions, but it does not necessarily involve additional layers of administration. It also fits with our institutional scale and culture. UW has a long tradition of interdisciplinary, cross-department, and cross-college research, and we are compact enough to sustain this tradition.

Implementing the model: an administrative reconfiguration

At the core of the life-science question--and of crucial concern to other areas of interdisciplinary instruction and research--is what administrative structures can most effectively promote the model just advanced. We do not find the structures proposed to date particularly compelling. Maintaining the status quo simply ignores the needs for sustained, well articulated organizing principles and a mechanism for aligning resource-allocation decisions with those principles. At the other end of the spectrum, the establishment of a new college raises a host of politically charged and fiscally burdensome administrative issues. The fate of traditional expectations on the College of Agriculture and the prospect of diverting salary dollars from rank-and-file faculty positions to administrative oversight are just two of these issues. Few researchers or administrators at UW find this approach palatable.

An idea that we find more promising is reconfiguring the role of the Graduate School. In its new configuration, the Dean of the Graduate School would have significantly less involvement in the routine management of admissions, records, and oversight for established, departmentally based graduate programs. Some already consider these tasks to be the natural purview of departments and college deans. Instead, the Dean of the Graduate School would have a greater focus on the cultivation and oversight of innovative, cross-departmental graduate programs that lack natural administrative “homes.” In this configuration, the Dean of the Graduate School would retain responsibility for the institution-wide allocation of graduate assistantships.

Such a reconfiguration has several appealing features. It addresses a long-standing concern at UW about duplication of effort among the Graduate School, college deans’ offices, and academic departments. It places responsibility for administering these established, traditional graduate programs squarely in the departments and colleges that “own” them. It requires no net growth in university administration. It

facilitates access to graduate assistantships for innovative and interdisciplinary programs – a problem that is difficult to manage when departments and colleges “own” these resources. It provides innovative and interdisciplinary programs with advocacy and representation at the Academic Deans’ Council and in central position management.

There is some precedent for this reconfigured role. The Graduate School currently holds responsibility for administering the interdisciplinary graduate programs in reproductive biology, neurosciences, and water resources. The role that we propose amounts to a generalization of this responsibility. The arena need not be limited to the life sciences. UW has tremendous potential for interdisciplinary research and graduate education in other areas, including environment and natural resources, geographic and earth systems science, and computational science and engineering, among others.

In summary, we propose promoting greater strength in the life sciences through an interdisciplinary structural model. The success of UW’s programs in reproductive biology and neuroscience illustrates that the model is workable and demonstrates that scientific excellence need not hinge on additions to administrative infrastructure. And the model suggests an even more demanding and substantive mission for the Graduate School. For this reason, rethinking the role and stature of the Graduate School in providing leadership for interdisciplinary graduate education and research warrants serious attention. Over the next few months, as prelude to the discussions that will help guide the 2004 Academic Plan, we intend to pursue this idea.

Your comments are welcome.