

Life Science Proposals

From the

State of the University Address

September 10, 2009

In March 2009, a panel of faculty members from among the leading land-grant universities visited the University of Nebraska-Lincoln and reviewed the molecular biology programs, primarily at the Institute of Agriculture and Natural Resources, but with interactions from other units within the university. In April the team issued its report, which made several recommendations for enhancing the coordination and development of the life sciences at UNL. Subsequently, consultants advising the university regarding the development of Innovation Campus found that some of the most promising university initiatives to make Innovation Campus successful involve research in the life sciences.

The central theme of the review team's report is that the University of Nebraska-Lincoln cannot achieve its full potential in the life sciences without significantly greater collaboration among all appropriate units of the university that relate to the life sciences. While the focus of the review team was largely on the life sciences that directly impact agriculture, it is also clear that scientific developments, particularly in the molecular sciences, have unified the life sciences so that it is no longer possible to identify in advance the potential applications of life science research. The techniques, instrumentation, and scientific support to pursue new branches of life science such as genomics, metagenomics, proteomics, etc., have application both for agriculture and other life science-based industries. Training a workforce for the bio-based economy requires a curriculum and set of experiences that would be relevant to many different life science-based careers. As Nebraska's only comprehensive research and land grant university, our commitment to teaching and research that supports agriculture is paramount. We cannot claim success in the life sciences if agriculture is not a major beneficiary of our work. At the same time, we cannot fully succeed in positioning the university to support agriculture in the future if we do not have a vibrant and collaborative life science community across the university, which includes both faculty whose primary focus is perceived to be in agriculture and faculty who explore the implications of life sciences for human health, for energy, and for the variety of opportunities that a bio-based economy may envision. Thus, the recommendations contained here speak to the larger life science community.

These recommendations assume that the current discipline-based administrative structure of the university should and will be retained. Discipline-based peer review of qualifications for faculty is the best assurance for achieving faculty strength, and deans and department chairs and heads provide assurance that the broader missions of the university are in balance. The unique strength of having the Institute of Agriculture and Natural Resources as a separate administrative unit is to assure that the university attaches a high priority to support of agriculture. Enhancing the life sciences across the university is the best method of assuring that the Institute becomes the premier source of the talent and research, both basic and applied, needed to provide for food security within this country and around the world.

The close relationship the Institute, through cooperative extension, maintains with agricultural producers enhances the opportunity for the university to address the current and future challenges of agriculture. This means UNL should be engaged in significant research across the range of basic and applied sciences important to agriculture, it should extend its research through extension for the benefit of Nebraska producers, it should make its expertise available to the world-wide effort to enhance food security, particularly in developing countries, and it should have courses of study at both the graduate and undergraduate levels that provide the human capital upon which agriculture will depend in the future. At the same time, none of these missions is fully achievable without a coordinated effort to enhance the life sciences across the university.

What follows are proposals to respond to each of the recommendations of the external review team. These proposals are designed to retain the current structure of the university and to preserve the significant role that discipline-based administrators and faculty play in the advancement of the university. The proposals for the most part fix responsibility for implementation on the three academic vice-chancellors — the Senior Vice Chancellor for Academic Affairs, the Vice Chancellor of the Institute of Agriculture and Natural Resources, and the Vice Chancellor for Research and Economic Development. However, the proposals are also designed to assure a broader discussion among life science faculty and between faculty and administration to fashion and implement a more coordinated and efficient life science program at UNL.

No definition of who is in or out of the “life sciences” is provided. The intention is to advance research and instructional programs that relate to the opportunities and challenges facing the life sciences, and the appropriate disciplines may change from issue to issue. Disciplines important for advances in water research and policy may be different from those engaged in plant transformation. Chemistry, physics, engineering, and computer science may all have faculty whose primary focus is on the “life sciences” even though the major focus of the department may be elsewhere. It is expected that the vice chancellors for each proposal can determine the appropriate participation.

General Recommendation: Creation of a Faculty of the Life Sciences

Recognition that today's problems require a multi-perspective approach has produced challenges for modern universities where faculty and departments are organized by disciplines. Universities, including UNL, have adopted a variety of mechanisms to facilitate interdisciplinary activities. Some have resulted in administrative structures, such as "centers," where faculty from various departments can work together toward common objectives. Examples of this already exist within the life sciences, e.g., the Nebraska Center for Virology, the Redox Biology Center, and the Center for Plant Science Innovation. Particularly with the increased importance of the "omics," i.e., genomics, proteomics, etc., advances in molecular science have driven the life sciences into an even more cohesive whole. UNL's structure, with life science faculty located both within the Institute of Agriculture and Natural Resources and within the colleges on the city campus, increases the importance of finding creative ways to assure life science faculty interact with each other. UNL's tradition as a land grant university, makes it imperative that translating the research of the university into innovations be a priority for all of life science research, so it is critical that cooperative extension and the Office of Technology Development fully participate. UNL needs a mechanism to bring life science faculty together without disrupting the normal administrative structure and decision-making of the university.

It is critical to the future of the university and its commitment to agriculture that we find a way to enhance the respect, understanding, and collaboration among all faculty who engage in life science research. We have learned throughout our recent experience, in a variety of fields, that such collaboration and respect cannot be dictated from the administration nor can it be assumed to follow from structural change. In the end, it comes best from the personal interaction of faculty with a commitment to their research and to their roles in meeting the overall mission of the university.

It is thus proposed that UNL create the Faculty of the Life Sciences (FLS). The FLS would include the faculty in core life science disciplines and any other faculty member who might self-select to become a member because his or her teaching and research relates to life science issues. The FLS would consist of two elements: the General Assembly which would include all members, and an Executive Committee which would be broadly representative of the various life science interests. At a minimum, the Executive Committee should contain faculty from both city and east campuses, those whose work is primarily basic research and those whose work is primarily applied research, and those whose primary responsibility relates to extension activities in the life sciences. The Executive Committee will be responsible for organizing the activities of the FLS and shall be the direct conduit through which proposals from the General Assembly will be communicated to the administration. Initially, the Executive Committee will also play an advisory role with regard to the implementation of the recommendations contained further in this report. The Executive Committee will be appointed by the Chancellor, after consultation with the appropriate Vice Chancellors.

The FLS will have no governance responsibilities. Its primary mission will be to encourage all life science faculty to engage with each other in meaningful ways – to learn what each is doing in order to facilitate building collaborations, to discuss areas of common opportunity, and to inform university decision-making to assure that life science efforts are pursuing the right areas and have the appropriate support to do so. The General Assembly should meet at least twice a year. A meeting in early fall should provide an opportunity to introduce all new faculty hired into life science departments and their research interests as well as recognizing all life science faculty recently promoted or tenured and their research accomplishments. A meeting in the spring should

focus on what steps the administration of the university at all levels should take to achieve the proper vision for the life sciences. Other potential activities could include hosting program officers from funding agencies, conducting seminars or colloquia on matters with broad interest to the life science community, coordinating existing colloquia managed by a variety of life science units, consideration of proposals that would enhance the life sciences at the university, and programming designed to build appreciation for and collaboration with each other. A Web site might, for example, keep all life science faculty informed about faculty hiring across the university to assist in finding candidates, coordinating hiring, and broader participation in recruited faculty colloquia and on search committees.

Faculty might properly ask “Why should I participate?” particularly when the FLS will have no governing authority. As with most important issues within university governance, the inherent force of good ideas means more than the force of governance authority. At its best, the FLS will have a significant voice in how this university moves forward. It is expected its ideas will be addressed publicly to the campus as a whole and to administrators at every level of the academic enterprise. It is understood by all that faculty will participate only if it becomes clear that their voices are heard.

The campus administration should provide sufficient administrative support to the FLS to assure that faculty members are not unduly burdened by the activity. Resources should be provided to assure that the purpose of the FLS can be achieved.

Recommendation 1: Develop a core curriculum for the life sciences

Embedded in this recommendation are at least two outcomes. The first is to have a core life science undergraduate curriculum that could be taken by any student regardless of the particular field of study. The second is to better utilize the teaching resources at the university to provide instruction in these courses. There will be questions regarding the content of the curriculum, the extent to which alternative curricular choices are appropriate, and the mechanisms for teaching the curriculum across departments and units.

A curriculum is more than a convenient organization of courses. It is, rather, a way in which faculty and the university identify for students the important learning outcomes that will be needed by the student for future success. Not all students have the same aspirations and not all undergraduates fully grasp the opportunities they may wish to pursue. Any life science curriculum should, at least, fully inform students of the opportunities that are opened and foreclosed by their curricular choices.

Proposal: The SVCAA and the VCIANR jointly form a faculty task force to develop a life science core curriculum and to provide advice to both vice chancellors on the questions posed above. The model employed to develop the ACE general education program should be explored. It may be important at the outset to establish the learning outcomes that a core life science curriculum should achieve before addressing the details of a curriculum necessary to produce those outcomes. The goal is to have a core curriculum in place for students entering in fall 2011.

Recommendation 2: Develop a uniform system of faculty evaluation

The External Review team suggested that there remains misunderstanding among the various life science units about the quality of the faculty in the other units. Because life science faculty are in units that report to two separate vice chancellors, it is perceived that the standards for hiring, promotion and tenure, or post-tenure review may be different. Two steps might help, over time, to build the respect and information necessary to foster collaboration. One step is to align the promotion and tenure practices across the university. It is standard practice at research universities across the country that in order to guarantee the rigor of the evaluation mechanisms used to hire, promote, and tenure faculty, there must be external, peer review. A few years ago the Senior Vice Chancellor for Academic Affairs mandated external reviews for city campus units. The VCIANR has indicated his intention to mandate external review letters for all promotion and tenure cases in the Institute. Thus, beginning in 2010, all promotion and tenure files will include external letters of review. There may be other issues relating to the promotion and tenure that also could be made more uniform.

Proposal: The two academic vice chancellors should explore and where appropriate adopt a uniform procedure for all promotion and tenure cases across the campus. This requirement should be effective for all applications considered during fiscal year 2010.

Recommendation 3: Core Facilities

The external review team proposed that, where appropriate, the university should inventory and designate as core facilities appropriate equipment and instrumentation used in life science research. This would facilitate efficiency as well as provide opportunities for greater collaboration. Moreover, one of the amenities the university could offer to attract private sector companies to Innovation Campus is access to university core facilities. Thus it is imperative for a variety of reasons to develop a more systematic and more effective approach to the acquisition of expensive instrumentation and resources essential for life science teaching and research.

Proposal: The Vice Chancellor for Research and Economic Development appoint, with the concurrence of the two academic vice chancellors, a Life Science Advisory Committee on Instrumentation. The purpose of the committee shall be to develop protocols to identify the type of instrumentation that should be designated as a core facility, inventory the university to determine to what extent such instrumentation already exists at the university, develop an instrumentation plan to enhance core facility instrumentation in the life sciences, and advise the vice chancellors and deans with regard to the purchase of any instrumentation that would appropriately be designated a core facility and its appropriate location. This Advisory Committee should be in place by October 2009 and its protocols developed for implementation no later than January 2010.

Recommendation 4: Areas of Excellence

The university has been committed to developing areas of excellence. The UNL Strategic Compass outlines the criteria for such designations. The external review team identified eight areas that had potential for being an area of excellence. Some of the listed areas are more mature than others. Some have recently been the subject of external review, either in the process of renewing federal center grants or at the initiative of the university. Others have not been reviewed. Some of the areas have been developed after retreats that have elicited faculty interest in particular subjects; others have not. Some have had the benefit of collaborative participation by other units. It may be that some of the areas listed by the external review team should be broadened or refocused or be

deferred. The strategic planning process of the university is designed to develop areas of excellence.

Proposal: The SVCAA, VCIANR, and VCRED should develop a plan for evaluating each of the areas of excellence identified by the external review team as well as such other areas that seem appropriate. Such a plan should directly involve those faculty currently working in the area, but should also provide an opportunity for broader involvement across the faculty of the university. The Faculty for the Life Sciences, once formed, should be asked to provide its recommendations. For each area, a determination should be made as to whether the promise of excellence is real, the resources or other steps necessary to move it forward, and the metrics of success one might expect. While evaluation of these areas will take place over time, the university should have a plan and a process for evaluation in place by January 2010. Such a process should assure broad participation. Areas of excellence that already exist through the program of excellence funding by the Board of Regents will remain and be periodically reviewed as provided in their funding agreements.

Recommendation 5: Structures for Enhancing Collaboration

The external review team pointed to three examples of structures that might facilitate more collaboration within the life sciences: Bio5 at Arizona, the Bond Center at Missouri, and the Ohio Centers for Excellence. The University of Nebraska-Lincoln could benefit from a structure that facilitated collaboration between faculty and units from both city and east campus but that would not undermine the importance and significance of the Institute of Agriculture and Natural Resources, the College of Arts and Sciences, the College of Engineering, or individual faculty members' allegiance to their particular discipline. The Faculty of the Life Sciences, proposed here, is one step toward creating a mechanism for increasing collaboration. Additional structures may also be appropriate. Indeed, consistent with the concept of innovation Campus, a structure for UNL must also contemplate partnerships with private sector companies or other entities.

Proposal: The SCVAA, VCIANR, and VCRED, along with the Dean of the College of Agriculture, the Dean of Arts and Sciences, the Dean of Engineering, and the Dean of Agricultural Research Division, and such other individuals as they shall identify, should examine a number of structures at other universities that influence collaboration. These administrative officials should also consult with faculty to determine what restraints exist in current structures that hinder collaboration at the university. The ultimate objective would be to develop a proposal for a structure or series of structures that are suited for the university that could serve to enhance collaboration within the Life Sciences. Centers have been utilized in the past to manage this collaboration and recently an Interdisciplinary Task Force examined this issue. Until significant funding is available, it is unlikely that a major structural initiative can be successful. However, the University should be positioned to have considered the alternatives. The development of Innovation Campus may drive some structural initiatives.

Recommendation 6: Integrated Hiring Plan

During the open forum discussing the external review team's report, it was suggested that more coordination in hiring in the molecular sciences would advance the university's agenda and provide more incentive for collaboration. While better coordination of hiring across the life sciences might be feasible, coordination most likely will have greater impact as one focuses on positions in the molecular and basic sciences. The prioritization of open positions is a balance of

many competing interests and must ultimately rest with the administration. However, faculty representing the breadth of the life sciences can be extraordinarily useful in focusing attention on issues that bring benefits to the university as a whole, beyond individual departments.

Proposal: The VCAA, VCIANR, and VCRED should develop a process through which an integrated hiring plan in the life sciences can be facilitated. It should involve the Deans, Chairs and Heads from the various life science units to enhance coordination of recruitment and selection of candidates to contribute to the life sciences. Coordination most likely will have greater impact as one focuses on positions in the molecular and basic sciences. In preparation for each hiring season, the Faculty of Life Sciences should be consulted about the areas of expertise that could best serve the university life science program as a whole. Similarly, the coordinators of any area of excellence in the life sciences or directors of any center in the life sciences should be consulted about the types of candidates needed to advance that area. The Deans, Chairs, Heads, and the three Vice Chancellors should review the outcome of these deliberations and develop an integrated hiring plan that could guide hiring in life science units. Even if a detailed and fully integrated hiring plan may not be ready by FY 2011, the process should be developed immediately and should be positioned to impact the hiring for FY 2010.

Recommendation 7: Public Policy Impacting Agriculture

Although not mentioned as a potential area of excellence or collaboration, it appears the university might be well positioned to develop an interdisciplinary program directed at a variety of issues relating to agriculture involving sustainability, economic stability, trade, and the implementation of scientific advances. While many of the issues here may be applicable to the life sciences in general, the focus on agricultural policy seems the most sensible initial effort.

Proposal: The VCRED, in collaboration with the SVCAA and VCIANR, should hold a faculty retreat to identify the resources in Law, Political Science, Economics, Agricultural Economics, the social sciences, journalism, and the Public Policy Center that might be brought together to create a significant initiative in agricultural policy.