

Natural Sciences Program Review
One-Year Progress Report
23 September 2009

- **Develop a 5-year strategic hiring plan in view of the anticipated retirement of faculty in the near future with emphasis on “cluster hires” especially within a trans-disciplinary life sciences unit.**
 - Open positions and expected retirements will eventually provide opportunities to hire groups of faculty who will bring new specialties and new cross-departmental opportunities to the College. Presently, given the hiring freeze and the state of the campus and CNS budgets, most positions will remain vacant to provide salary savings.
 - The formation of a Biology Department combining several of the life sciences departments will lead to a unit with as many as 10 open faculty positions. We expect to fill these positions with faculty having a cross-discipline viewpoint who will provide expertise in genetics, developmental biology and other fields that interact with all the life sciences.
 - The Chemistry department is currently severely short of faculty, with 6 open positions. It is expected that 3-4 of these positions will be filled by a cluster hire of biochemists to produce a strong Biochemistry Group within Chemistry. Such a group should also have close ties with the new Biology Department.
 - The Mathematics Department is understaffed and expects several retirements in the near future. The resulting 4 open positions in Mathematics will provide an opportunity to plan a cluster hiring program that will enhance the Department in new areas such as K-12 teacher education and STEM programs.
 - The Department of Physics and Astronomy has had several retirements and moves of faculty to administration. One of the retirements is currently being replaced. A modest cluster of faculty hires in the future would present the opportunity to add a new field of research or to strengthen an existing field. As the Free Electron Laser becomes operational it may be advantageous to consider new opportunities for diverse research fields.
- **Establish clear goals for increasing external investments from all sources in the research programs of the College.**
 - Funding for research in the Biological Sciences should increase as the open positions are filled with faculty actively engaged in research. Note however, that the main focus of the biological sciences at Mānoa is evolution and ecology, not medical science. Since the largest source of funding in biology is the NIH, which does not support those fields, our funding profile in the Biological Sciences cannot be expected to grow quantally.

- Funding for Chemistry research will also be positively impacted by filling the open positions. The establishment of a focused Biochemistry Group will contribute significantly to external funding, since NIH is a primary source of research funds for this group.
- Funding for research in Information and Computer Science and in Mathematics could increase substantially in the future. New funding opportunities should be identified and pursued, particularly within the NSF STEM initiatives.
- Research in Physics is well-funded at the present and is expected to expand when the Free Electron Laser is fully operational.
- The identification of research funding opportunities and their pursuit is at present almost entirely carried out by individual faculty members in the College. The funding levels could be expanded substantially with the help of a specialist in research funding. The College is currently in initial discussions regarding a merger of PBRC into the college; this would include a substantial support staff. If such a merger were to take place, then the possibility of creating a research office to expand the volume of contracts and grants would become more of a reality.
- If Natural Sciences is able to fill its vacant positions and PBRC is merged into the college, a 25% increase in research funding within a five year period and a 50% increase within 10 years could be an attainable goal.
- **Develop a feasible implementation plan for addressing the most pressing research/instructional facilities needs for the College.**
 - The biological science departments are currently located in Edmonson, St John and Snyder. These buildings are outdated and run down and have been damaged by flood and/or fire. Remodeling is planned in Edmonson and the fourth floor of Snyder, which will provide short-term relief. In the long term, however, a new facility for the life sciences will be essential if the program is to continue growing in both student numbers and research support. We propose that planning begin now for a modern life sciences facility on the Mānoa campus. Such a facility should have adequate laboratory space for both teaching and research laboratories for about 60 research active faculty, 300 graduate students and ca 1500 undergraduate majors.
 - The Mathematics Department is located in Keller Hall, an older building without air conditioning. The campus master plan indicates that a parking structure is to be built next to Keller. It is essential that Keller be sealed and air conditioned before construction begins on the parking structure.
 - The Department of Information and Computer Sciences is located in the POST building, a modern facility. However, the Library and Information Science program is a part of ICS and is now located in the same limited space, due to the destruction of their facilities in the basement of Hamilton library by the October

30, 2004 flood. LIS will soon be relocated to their restored facilities in Hamilton, relieving the crowding in POST.

- The Chemistry and Physics programs are presently housed in a mix of older and more modern facilities. The older buildings (Bilger and Physical Sciences) are barely adequate. In particular, air conditioning is old and inadequate and electrical power is limited and unreliable. These buildings need to be modernized to support the teaching and research activities located there. (The air handling system in Bilger Annex will be addressed in Summer 2009.) Before cluster hiring can begin for a Biochemistry Group, part of the third floor of Bilger would need to be completely renovated and the roof above re-surfaced.
- **Provide opportunities to help faculty develop and implement a program of assessment and appropriate learning outcomes across the College using data to make proactive programmatic and curricular improvements addressing impact on planning and budgeting.**
 - We organized a workshop for department chairs and assessment coordinators with the staff of the Mānoa Assessment Office
 - We have sent to the department chairs examples of SLOs from other universities
 - We have regularly reminded chairs to ensure that their faculty include SLOs in materials for each course
 - The next step in this ongoing program is to ensure that each department has a set of program/degree SLOs and a matrix of courses and degree SLOs showing how each course contributes to the education of the student and how each outcome is supported by one or more courses.
- **Address undergraduate student concerns about complexity of the curriculum, inconsistencies in advising, and time to completion.**
 - We have worked closely with the Arts and Sciences advising staff (CASSAS) to develop sample 4-year schedules for each degree offered within the College. These sample schedules show students how they can fit into a 4-year program both the Mānoa and Arts and Sciences general education requirements and the sequences of courses required for their selected major. We continue working with the advisors to ensure that students have maximum opportunity to receive a sample schedule and to talk with an experienced advisor early in their college career.
 - We are working with the Arts and Sciences advising office to identify means (organizational or technical) to coordinate advising more closely between departmental (major) advisors and the CASSAS advising staff. Any advisor meeting with a student should be able to review the complete history of that student's encounters with the advising system.
 - The Biology Department is submitting a Howard Hughes Medical Institute proposal to completely transform the undergraduate Biology curriculum and its

associated laboratories into an integrated, inquiry-based curriculum with the objective of providing a comprehensive introduction to the life sciences while training students to be scientists themselves.

- **Address graduate student concerns about inadequate student stipends and need for additional training for TAs.**
 - Largely through the efforts of the College of Natural Sciences students and administration, TA stipends across campus were increased one step; one additional step increase within the College was implemented utilizing College operating funds. This increase was supported by all Department Chairs in the College, despite the loss of funds from their operating budgets.
 - Several of the departments in the College have formal TA training programs, making use of experienced TAs to demonstrate and explain best practices. In some departments video recording of each TA making a practice presentation are reviewed and critiqued in these training sessions. Some departments have a representative from the EEOC office present a brief lecture on issues that TAs may encounter involving harassment or conflicts between individuals.
 - In the past, the Biology program has offered additional TA training in the summer, particularly for graduate students who seek academic positions in the future. Although this program was cut as budgets were reduced, the college is considering offering such summer training once more.
- **Create opportunities to increase student involvement in governance of the college.**
 - Graduate and undergraduate advisory councils have been established but it has proved quite difficult to arrange meetings of the councils due to students' schedules. Presently, we meet once per semester, but are considering having representatives attend monthly Department Chair meetings to increase their involvement and receive more timely input. The major changes taking place in the University will impact students and it is important that we listen to their concerns and let them know what is happening and will happen in the near future.