

# Natural Sciences Program Review

## Three-Year Progress Report

The College is pleased to deliver this progress report on the College of Natural Sciences and elaborate upon our successes in addressing the concerns and recommendations of the 2008 program review of the College. Let me address these in order of the original report.

### I. Environmental Scan

The College was successful in recruiting a permanent dean who has been empowered by the administration to identify, address and solve the problems identified by the review committee as well as lead the College to vibrancy and success. The College is now well on the road towards stability and success.

### II. Critical Issues

#### A. Organizational Structure

The academic program review indicated that CNS appears to have too many small programs/units and needs to address structural and organizational issues that are an impediment to transdisciplinary and interdisciplinary education and research. We are making considerable progress in breaking down these silos. We have addressed this in several ways. First we have developed and launched new MS and PhD graduate degrees in Marine Biology (jointly administered by the College's Department of Biology and SOEST) as well as a joint BS/BA in Biochemistry under the Chemistry Department. (We are also in the process of developing a BS in Astrophysics and a BA in Astronomy jointly between IFA and the College's Department of Physics and Astronomy). We are in the initial stages of the creation of a School of Astronomy and Astrophysics where we hope to jointly deploy and administer our AstroX (Astronomy, AstroBiology, etc.) research and educational initiatives. IFA and CNS are actively engaged with our respective faculties in the creation of the new school. Now that the Departments of Biology (originally a program) and Zoology have successfully merged into the Department of Biology, we are currently engaging the faculty in the Department of Microbiology to gauge their level of interest in moving towards a School of Life Sciences and those discussions are ongoing.

It was also noted in the report that the College needed to determine an appropriate "fit" for the Information and Computer Sciences throughout the College. Towards this end we are undergoing a critical assessment of hiring and curriculum needs within ICS and looking at how it integrates with the College and the University. Increasing the level of sophistication of how ICS weaves into the fabric of not just our College but general initiatives such as Informatics, BioInformatics and mobile computing will be a top priority for the college in the coming year.

## B. Faculty and Administrative Partnership

As indicated in the review, faculty and some of the chairs of CNS expressed concerns about a “disconnect” between the faculty of CNS and the upper administration (an ‘us’ versus ‘them’ attitude). To address this concern we have made some organizational changes that have increased communications between the administration and faculty and that focus upon teamwork and transparency to bring more of a sense of shared community to the College. Specific organization and structural changes include:

Bimonthly chairs meetings with the Dean, associate dean and appropriate administrative officers to keep the chairs (and their faculties) informed and to address specific departmental, college and university concerns and opportunities.

Revision of the expectations of the chairs’ role to focus more upon leadership and vision and less on operational and managerial roles. The College has implemented changes so that the day-to-day operational and managerial roles are now being handled by newly appointed associate chair(s). To facilitate this new role the budgetary structure and allocations of the CNS departments are being revised so that each chair has a core budget plus a discretionary budget to enable them to invest in new initiatives as well as to improve existing operations. A benefit of having one or more associate chairs is that more faculty at all levels can become involved in a broader range of departmental management and leadership. This level of involvement in departmental affairs and management dramatically increases our ability to mentor, cultivate and recruit talent from within for administrative/leadership roles.

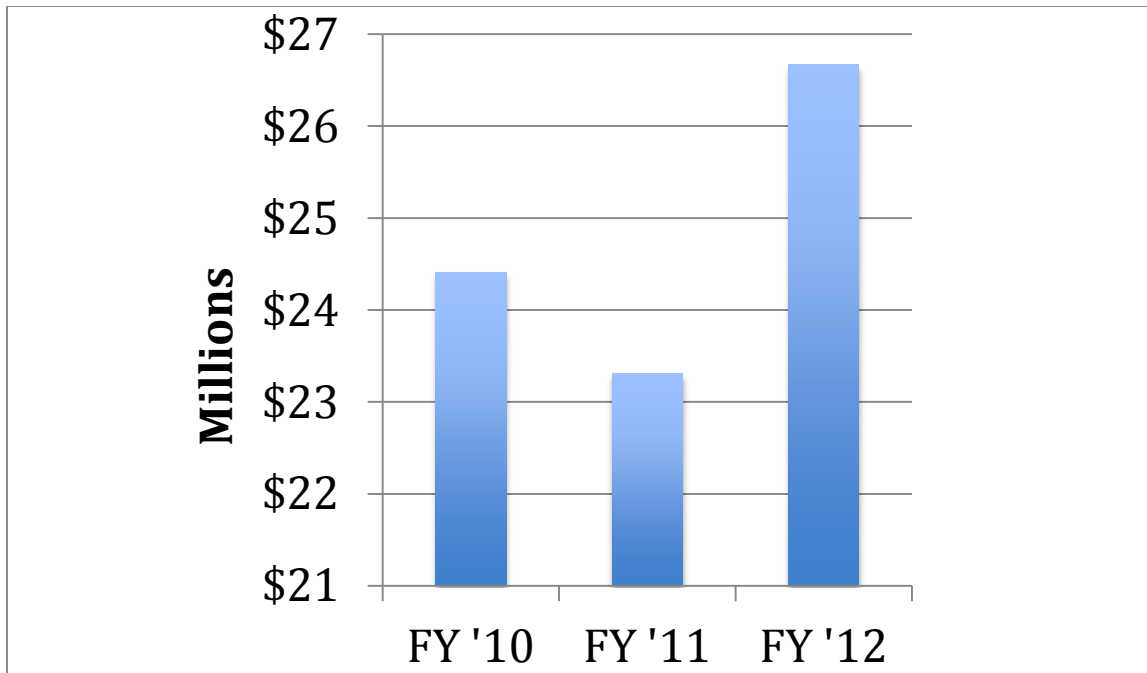
Increased college support staff to provide a broader and more comprehensive range of services ranging from additional capacity in pre- and post-award staffing to IT/web/multimedia support services.

Creation of a dramatically improved web presence for the College to disseminate information about our student and faculty successes and provide improved resources and communication throughout the college. We are providing resources to the departments to do the same.

## C. Faculty – Research/Scholarship

Over the last year research expenditures have increased 10%. However, the overall research funding levels are still too low for a College of Natural Sciences of this size and quality. As noted in the report there is a generational change brought on by retirements. Over the past two years the College has recruited new faculty in Botany (3), Biology (5), Chemistry (2), Mathematics (7) and Physics (2) for a total of 20 new tenure/tenure track faculty. We have active searches in Botany, Biology, Chemistry, Information and Computer Sciences, Mathematics, Microbiology and Physics. All new faculty are of the highest quality and show enormous promise and productivity in research. Indeed some of the new faculty already have NSF Career awards and current NIH, NSF, DOD funding. It has been a banner couple of years for recruiting of faculty. With ongoing searches for the new chairs of Biology and Botany as well as the Hsiao chair in Marine Biology we expect to continue a vigorous replenishment of our College’s talent at more senior levels as well.

With so many new faculty coming onboard we are undergoing a critical need to expand our chronically understaffed contracts and grants staff. We have grown our research infrastructure administrative staffing from two to three with some temporary hires to support the anticipated increase in grants submissions and support. This is a work in progress but we are off to a great start in providing the resources the faculty need to successfully attract and retain funding. The College is already seeing some early successes in terms of an increase in research expenditures in the last year (from \$23.3M to \$26.6M). We expect research expenditures to continue to increase with a goal of doubling our research expenditures from \$25M/yr to \$50M/yr, which would be closer to our peer institutions. One of the rate limiting steps for CNS to achieve this goal is our lack of enough senior talent to go after larger, multidisciplinary and collaborative grants. There is not enough of a culture or talent base yet to be credible in any but a few areas. However, this is starting to change with the addition of some new associate professors (three) as well as the recruitment of more senior-level, accomplished full professors (in progress). Our only real longer-term obstacle, and it is a significant one, is the lack of high quality laboratory space. Our dilapidated facilities in Biology are being renovated (Edmonson and Snyder Halls) which should provide high quality research infrastructure for most of our Biology and Microbiology faculty. We are working with JABSOM and the VCRGE to identify and renovate laboratory space for our new initiatives in Biochemistry, Imaging and Synthetic Biology.



Last Three Years of Research Expenditures for CNS.

To achieve an increase in external investment in CNS from all sources we have also been assigned, from the UH foundation, a new full time development officer work with the Dean, chairs, students and faculty to enable us to meet our development targets in support of research, student scholarships, endowed chairs, named building, equipment purchases and the like. Our targeted goal is to raise \$30M over the course of the next capital campaign.

#### D. Facilities and Infrastructure

As indicated previously, the Snyder and Edmonson Hall renovations are proceeding. We now need to shift our focus to the Physical Sciences research and teaching spaces. These are in very poor shape. We are currently undergoing a space ranking survey to identify the most critical needs in the College and a plan for acquisition of the resources needed to bring our Physical Sciences infrastructure up to modern standards. We are currently planning for renovating and reclaiming space in Keller Hall for instructional and mathematical department use. This will go a long way towards addressing the space needs for Mathematics while increasing the overall classroom space for the University.

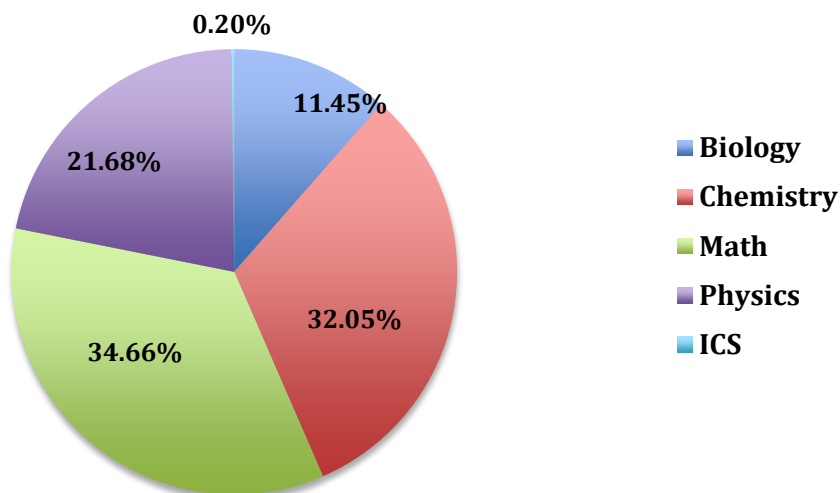
#### E. Undergraduate Education

As noted in the report the current College and University requirements for undergraduates in CNS are quite complex and difficult to navigate. To address these concerns CNS has taken on the challenge to review and revise its curriculum in all departments. Towards this end the departmental college curriculum committees are currently taking a fresh look at the curriculum with a goal of revising it over the next two years. Such a revision will combine fresh approaches to teaching (problem based learning, flipping the classroom and interactive classroom experiences, more hands on experiences, ...) with modern assessment tools based upon performance and learning outcomes. A skill-set and knowledge-based view of the curriculum will be our guide for the revision. Additionally all departments now have established and posted student learning outcomes and curricular maps for classes and degree programs and have implemented program assessment activities. We also now have programs to improve curriculum based on assessment outcomes.

We are pleased with the success of the new CNS Learning Emporium in facilitating student success. The Emporium is a one-stop resource center for introductory study in the fields of mathematics, chemistry, physics, biology, and information & computer sciences. It serves as a multidisciplinary learning space where students can join a community of learners with similar interests and engage in conversations to strengthen their knowledge and understanding of material covered in first and second year science and math courses. Students registered in one or more of the introductory courses are encouraged to study and/or complete their homework or laboratory assignments in the Emporium, where assistance is readily available when they encounter difficulty in understanding a concept or problem. Assistance is provided on a walk-in basis, with one-on-one or group assistance provided by undergraduate and graduate tutors and volunteer faculty. The entire facility is equipped for wired and wireless Internet access and ample white boards to allow for group work and discussion.

Students seeking assistance come from across the UH Manoa campus as assistance is open to all students enrolled in CNS courses. The distribution of assists by academic discipline in AY 2011-2012 appears below:

## Student Assists by Discipline (AY 2011- 2012)



The numbers of student assists per week has grown at least 130% year-over-year and the Emporium is now a core resource for undergraduate student success. At the end of the Fall 2011 semester students registered in the courses covered by the Emporium were asked to complete an online survey. Over 79% of the students indicated on the survey that their grade(s) would have been lower if they had not visited the Emporium and over 76% of the students rated their overall experience as 'above average' or 'excellent'.

Another chronic academic problem has been the numbers of failed registrations for gateway courses that result in students not being able to get the classes they need to stay on track to graduate in four years. Over the last year we have dramatically increased the numbers of sections of gateway courses, thus increasing the number of available seats in these courses. This has significantly reduced the number of failed registrations that our students encounter.

An ongoing issue for CNS students has been the advising process. Advising has typically been done both at the departmental level and through the Colleges of Arts and Sciences Student Academic Services office (CASSAS). The Deans of the Colleges of Arts and Sciences (CAS) are currently undergoing a review of CAS to address the deficiencies and complexities of the overall student experience with particular attention to advising and requirements. The College of Natural Sciences, in conjunction with individual departments, will be taking on the role of CASSAS as part of establishing an integrative student experience including recruitment, retention and advising, as well as creating interactive and hands-on experiences that incorporate undergraduate research as an integral component. Advising, in particular, will move from the isolated CASSAS environment to be an integral piece of this revised approach to the overall student experience that will also integrate graduate and undergraduate education. Finally, we are in the process of creating an undergraduate advisory group to advise the College on undergraduate issues as well as working as ambassadors of the College for activities that include recruitment, the student experience, outreach and development.

## F. Graduate Education

The most pressing and chronic problem facing our graduate educational efforts are very low TA stipends. There has been very little progress in addressing this issue due to the budget constraints of the last few years yet it is at the top of the list of problems that impede our graduate students. The College is currently working with both the departments and the upper administration to find a structural solution to raising TA stipends that will enable the College to offer competitive TA salaries. We are also in the process of creating graduate advisory group to advise the College on graduate issues as well as working as ambassadors of the College for activities that include recruitment, the student experience, outreach and development.

## G. Climate

As part of the revision and reorganization of how we improve the overall student experience we are working with the advisors and the College STEM coordinator to develop satisfaction and exit surveys of our undergraduate and graduate students. These surveys, along with input from our undergrad and graduate advisory councils, will be used to assess overall student satisfaction and success. We do not do a good job of tracking our undergraduates once they complete a degree and will be working with the Alumni Affairs office to improve upon this vital task.

## Conclusions

Overall we are well on our way to addressing the concerns raised in the program review and establishing CNS as a vibrant, creative and effective College for our students, faculty and staff.