The priority of CNS at this time is to leverage existing resources to create opportunities to help UH and the citizens of Hawai‘i recover from the economic and social crisis of the COVID-19 pandemic. The main focus for CNS is on improving courses and programmatic offerings, and creating new degree programs that will attract additional students and result in a well-prepared workforce to spur new economic initiatives. We will also continue to reach out to other units on campus to create stronger interdisciplinary opportunities and reduce redundancies. While this is a vision to build and create, it must be done with an eye to streamlining and creating efficiencies. At the same time, we aim to build programs that will bring additional students and resources to the College and the University.

Summary of updates

Several of our departments have received recommendations focused on improvement of degree programs and gateway course success rates, adjusting faculty workload, and establishing interdisciplinary connections (Chemistry and Mathematics), and these units are working towards these recommendations, as outlined below.

Information and Computer Sciences (ICS), Physics & Astronomy, and the School of Life Sciences have been discussing and exploring more consequential recommendations that would entail unit re-organizations, in addition to improving academic programs. There were 2 major suggestions for potentially moving programs and faculty in ICS to other Colleges. There is strong support for moving the LIS program currently in ICS, to the College of Social Sciences, and becoming part of a new school in that College. The second suggestion was to explore moving part or all of the computer sciences programs of ICS to the College of Engineering. The faculty explored various scenarios at length with many meetings with Engineering and others. The vast majority of the faculty continue to strongly favor remaining in the College of Natural Sciences, a preference shared by most students. The College is continuing to work with the ICS department to overhaul their CS degree programs as recommended by the external review. In addition, the College is working with all CNS departments to create a new interdisciplinary degree program in computational sciences. This effort is spearheaded by ICS and will also focus on data science and informatics. We expect that this degree program will attract many additional students to UH.

The School of Life Sciences (SoLS) has been exploring collaborations with other units in instruction. An analysis of the Biology/Marine Biology/Botany curriculum revealed that most opportunities for instructional collaboration lie in the upper division courses, at present. SoLS is also working toward establishing new degree programs that would increase student enrollment at UH, including a BA in Marine Biology, BAM and Clinical Microbiology tracks in Microbiology (with JABSOM as a key partner), and 4+1/BAM programs with the College of Education for all five life sciences undergraduate degrees (Microbiology, Biology, Botany, Molecular Cell Biology,
and Marine Biology). Discussions with Microbiology faculty and colleagues in SOEST, CTAHR and JABSOM (both informally and formally) are occurring about re-envisioning the graduate programs. Remodeling graduate degrees and programs is also being discussed more broadly, in consultation with other units, but with the administrative home of SoLS programs remaining within the School.

Physics and Astronomy is continuing to work closely with IFA to improve their joint programs and course offerings, as recommended by the UHM Budget Team.

Below are the individual responses of the CNS departments.

Information & Computer Sciences

Since the budget team made its initial recommendation to move the ICS department into the College of Engineering, the ICS Chair and other ICS department leaders have met repeatedly with the College of Engineering concerning details of the plan. The ICS Chair and leaders of the LIS program have also met repeatedly with a planning group for a new School of Communication and Information (tentative name) to be located within the College of Social Sciences. We have engaged ICS faculty in discussion of multiple alternatives. At the same time, we have continued our own plans to implement changes consistent with the recommendations of the external evaluation.

LIS
The LIS program move to the College of Social Sciences has support of all sides. The ICS Chair and representatives from LIS have met repeatedly with a planning group to create a proposal for a new School within the College of Social Sciences which will include LIS as a unit. Social Sciences expects to integrate all current LIS faculty and staff.

ICS and Engineering
The College of Engineering has modified initial plans for moving only selected ICS faculty and has now agreed to absorb all faculty and staff from ICS so long as the resources are also transferred. The Dean of Engineering has also agreed to accept all ICS degree programs, including the Bachelor of Arts. He has also agreed to keep the ICS department as an independent department and not combine it with the department of Electrical Engineering. Despite these concessions, two polls of ICS faculty (one before the agreement to non-breakup and one after) have shown only one member of the ICS faculty has an interest in moving to the College of Engineering. More than half of the ICS faculty wish to remain in the College of Natural Sciences. The remaining faculty are noncommittal.

ICS and Social Science
The College of Social Sciences has been open to receiving some ICS faculty members into a unit related to “Information Science,” and this has been part of the discussion with the Social Sciences planning group. However, ICS department faculty have opposed a breakup into the “information science” side versus the “computer science” side. Although some ICS faculty may
be interested in the possibility of moving to Social Sciences in the event that the ICS department is relocated to Engineering, they have been unwilling to commit publicly because of fear of being involuntarily separated from the ICS department. The desire not to split ICS has hampered planning for “information science” within the College of Social Sciences, but, ironically, it has resulted in a commitment from the Dean of Engineering to accept all ICS faculty.

ICS in Natural Sciences
The majority of ICS faculty members wish for the department to remain in the College of Natural Sciences, and only one faculty member supports reorganization. The primary concern is that a move to the College of Engineering will deemphasize the science aspect of computer science in favor of an engineering approach. Many faculty members feel that it will be more difficult to work with colleagues across college boundaries since most current research collaborations are within Natural Sciences.

The ICS department has continued on the change path that was outlined after the Fall, 2019 external review. This change path was envisioned for the scenario in which ICS remains in the College of Natural Sciences. Four primary goals for quick change are:

1. Advisory Board
2. Curriculum change
3. Program and course assessment
4. Capstone and project-based learning

Advisory board: An external evaluation advisory board has been formed and the first meeting is set for December 11, 2020. The Board consists of 12 members representing local business, government, and defense leaders. In addition, one member works for a venture capital firm and another represents a mainland company with remote workers in Hawaii.

Curriculum change: The department curriculum committee has worked through all courses currently offered by ICS. The committee is ready to recommend some courses for deletion and others for upgrading. The committee has identified courses that are redundant with Computer Engineering and will be working in Spring 2021 to regularize these duplications either by cross listing or better distinguishing the materials and approaches. The committee has also developed a three-year plan for course offering.

Assessment: A separate group of faculty members is now developing updated assessment criteria for the overall ICS degree programs. Part of the assessment will include assessment of experience with software project development in the upper-level courses. An assessment tool is being developed (for more than just ICS) in which data will be collected for use across a variety of the reporting requirements at UHM.

Capstone: In Spring, 2020, the ICS faculty voted on implementation of a capstone course requirement. Students entering the BS General degree program in Fall 2020 are subject to this requirement in their senior year. Meanwhile, the first pilot capstone course was offered
in Spring 2020. A second capstone pilot course will be offered in Spring, 2021. A web page explaining capstone and presenting potential capstone projects has been developed and deployed. Discussion has begun with the College of Engineering on implementing the multi-year Vertically Integrated Project (VIP) program in ICS.

In addition to these changes, the ICS department is exploring radically changing the BA in ICS degree to be a BA in Informatics and Computational Science. The new focus would be very interdisciplinary and aimed at students interested primarily in applying information science, data science, and computational thinking and methods to other areas (e.g. chemistry, physics, economics, business). The refocused program could dovetail with the CIS graduate program. Currently, enrollment in the BS is growing while enrollment in the BA is shrinking. We believe this is due to the lack of distinguishing features between the two degree paths. We believe that this new focus will attract a completely different group of students to the program and that enrollment will again begin increasing in the BA track.

The University administration has indicated that there is little or no financial benefit to reorganization of the ICS department. The ICS department would remain unchanged in terms of personnel and programs if it were moved. The ICS department has already embarked upon a slate of changes to improve its curriculum, administration, and productivity. Refocusing the BA could attract a new and growing cohort. In its current home, the ICS department has implemented cross-disciplinary degree efforts with multiple units across campus. In its current home, ICS has collaborated with the Data Science Institute, including housing three of its primary personnel as ICS faculty members. The ICS department has instituted a data-science track within the BS degree and has established a Data Science Certificate. The College of Natural Sciences offers many collaborative opportunities and can guarantee continued support for graduate teaching assistants (which ENG may not be able to do) and has indicated willingness to change language requirements. The majority of ICS faculty members oppose reorganization. This leaves little argument for why ICS should be reorganized into the College of Engineering.

School of Life Sciences

Two Revised Recommendations were submitted to the School of Life Sciences (SoLS) for consideration. Three recommendations remained unchanged as are our goals for pursuing the changes previously proposed. The two newly revised recommendations that are presently being addressed are described below.

*Continue review and implement planned modifications to the MS and PhD programs in Microbiology.*

As described previously, we are working toward developing a BAM program that will provide a direct route for students wishing to accelerate training for jobs in clinical and research laboratories, a desirable career path for many local students. The State of Hawai’i has a
recognized need for more highly trained clinical lab and biomedical research scientists, an ongoing need that is intensified as a result of the COVID-19 pandemic.

We are also working toward developing Clinical Microbiology track within the undergraduate Microbiology degree that will prepare undergraduate students for licensure to work in clinical microbiology labs within the State of Hawai‘i. We are currently creating a certificate in Clinical Microbiology. JABSOM is seen as a key partner in these endeavors.

A third program that we are now also pursuing is with the College of Education toward development of 4+1/BAM programs for our undergraduates. The purpose of this would be to have our students graduate with their BS degree and, with some additional training through the College of Education, receive either their teaching certification or a Master’s degree (depending on the student needs). This program will be of benefit to undergraduates in all five of the SoLS majors (Microbiology, Biology, Botany, Molecular Cell Biology, Marine Biology).

The Microbiology faculty have been meeting regularly in self-review and modernization. They have also been meeting (either privately or in groups) with faculty from other programs including SOEST, JABSOM, and CTAHR to discuss how this graduate program may expand in the future.

Consider developing combined degree pathways within the Life Sciences and with graduate programs in JABSOM, CTAHR, and SOEST.

Preliminary discussions with our faculty revealed that there was no way to amalgamate Botany and Zoology into a single graduate program. Given the breadth of expertise among our faculty, there is no single graduate program name that fits everyone. We are exploring the possibility of remodeling the graduate programs and developing graduate specializations that will best serve the students. In this process, we are also in consultation with Graduate Division to determine what actions will be feasible from an administrative perspective.

As we consider these directions, the programs are specific to the research interests of the SoLS faculty. Although there are other faculty among various departments that have research interests that overlap, these do not represent the foci of these other departments. As such, the administration of these graduate programs will be maintained within SoLS.

A further consideration is the necessity for many students seeking employment in a variety of State and Federal agencies to have within their degree title the traditional “Botany” and “Zoology” monikers. We are proposing to maintain these as Specializations for this purpose. As Specializations, they would also be available to students from other graduate programs to participate, and we foresee this as an opportunity to develop degree pathways in common with graduate programs in JABSOM, CTAHR, and SOEST.

Department of Physics & Astronomy
Physics and Astronomy is continuing to work closely with IFA to improve their joint programs and course offerings, as recommended by the UHM Budget Team.

**Department of Chemistry**

The revised recommendations made to the Chemistry Department are as follows:

- Continue addressing low success rates in gateway courses and Organic Chemistry.
- Review the BA/BS in Chemistry to address declining majors and retention issues.
- Ensure graduate students have access to the courses needed in identified sub-disciplines.
- Collaborate with faculty outside of Chemistry on research and a faculty-hiring plan.

Update: We have continued to discuss these suggestions, and we will likely request a meeting with the planning committee in the new year. Specific actions being planned or underway are as follows:

*Continue addressing low success rates in gateway courses and Organic Chemistry.*

- In spring 2021, students in Chem 273 (Organic Chemistry II) will take the American Chemical Society’s standardized Final Exam for Organic Chemistry I on the second Monday of the semester to assess their current level of knowledge. This exam will count towards their final grade in 273 to encourage students to review OCHEM I content. We will then assign specific on-line homework or review sessions tailored to each student in an attempt to help them rapidly address any deficiencies much earlier in the semester.
- Analysis of previous CHEM 273 exam results has established student success correlates directly with their mastery of the fundamentals taught in OCHEM I. While we strongly encourage students to review OCHEM I content right away, many do not until it is too late. Therefore, the goal is to force students to review 272 content during the first week of the semester and provide personalized feedback to each student about content deficiencies early in the course. We are attempting this instead of the originally proposed bootcamps due to the lower associated costs and the ability to personalize the feedback. If successful, this approach could be extended to our other service courses.
- We have revised the question pool used for our Chem GenChem I and PrepChem placement exam. We have increased the number of variants for each question and rebalanced the topics and skills being tested in response to assessment data. We anticipate using the new set of questions beginning during the summer of 2021.

*Review the BA/BS in Chemistry to address declining majors and retention issues.*
We continue to explore adding degree tracks (concentrations) to our BS or BA CHEM degrees, which would be consistent with general recommendations from the American Chemical Society. We are creating surveys for students in PrepChem and GenChem I to assess if the proposed concentrations would entice students who are not currently CHEM or BIOC majors to change their degree objectives or would just be of interest to our current majors.

We are also debating formally changing the name of the Chemistry department to communicate the breadth of our programs and research interests.

Department of Mathematics

Continue innovations in undergraduate courses: The multiple department initiatives that were detailed in our prior response are continuing.

Review faculty workload, adjusting for research productivity: This is done regularly, most recently when the Chair and DPC prepared the Workload Assessment report submitted last week.

Think strategically about hiring, collaborating with units outside of the Math Department: The department has and, when hiring is again authorized, will continue to think strategically about hiring in the broad range of pure, applied and computational mathematical sciences.

Once there is clarity on the budget, the department would like to accept the budget team's offer to meet. But for now, until there is budget clarity, the department sees little reason for a meeting.