Building on SOEST excellence for the future of Hawaii’s students, workforce and economic as well as environmental sustainability — a response to the MB draft program review, DL post-pandemic UH white paper & an update on our April 2020 program/budget review: Sept 1, 2020

SOEST Excellence
In any holistic external evaluation of UH faculty productivity and quality, when compared to their peers SOEST units and disciplines are the highest ranked at UH Manoa — whether it be by Academic Analytics or by international rankings (e.g., Shanghai Jiao Tong ARWU: Oceanography 14th, Atmospheric Science 16th, Earth Sciences 51-75; National Taiwan University: Geosciences 37th; Nature Index: Earth & Environmental Science 66th; in the world: https://manoa.hawaii.edu/mb/rankings/#efs-togglepane-1-0). While our global rankings are the highest at UH, they scale with size and hence have fallen recently due to significant cuts in faculty – NTU from 13 to 37 and Nature Index from 35 to 66 in just the last four years. And now we face another year of across-the-board budget cuts, indiscriminate position sweeps, and a hiring freeze.

By any metric based on quality, SOEST is the premier research and graduate education program at UH. As such, it should be preserved and nurtured, but the above actions restrict its growth and place it in further jeopardy. We continue to increase our undergraduate programs and SSH (up >25% from ~8,000 in AY16-17 to >10,000 in AY19-20, including that (~1,500) taught by ORU R-faculty), without any increase in S-fund allocations. Likewise, extramural funding is up (to $102M last FY) despite having fewer faculty.

The whole of SOEST is greater than the sum of its parts or, put another way, its Academic, Research and Extension units benefit from, leverage and compound each other’s strengths. For reasons unknown to us, the MB draft program review did not address the whole of SOEST, only the academic programs, and not all of them. Apparently nor did it have the benefit of this fall’s enrollment numbers (SOEST Fall 2020 u/grad majors are up 14% on last year and 30% on Fall 2017), nor of the SOEST 1-year response to last year’s External Academic Review (EAR) (submitted Aug 14th). Essentially all of the MB draft program review recommendations have already been addressed in that 1-year response, as noted below.

Atmospheric Sciences
ATMO BS majors, having graduated 12 in the last 3 years and declined from 16 to 9, are now back up to 14. We consider it premature, therefore, to contemplate stopping out or otherwise combining the BS in Atmospheric Science. This was not a recommendation from last year’s EAR.

As noted in the MB draft program review, Atmospheric Sciences changed its name from Meteorology in 2015, to better reflect the full field. Unfortunately, through no fault of the Department, that resulted in the omission/misplacing of its course listings in the 2016 course catalog and the loss of a full year of enrollments. The Department is starting to see the recovery from that debacle as a result of several initiatives already underway. As outlined in the 1-year response:
1) The renewal and diversification of the faculty, starting with Jennifer Griswold (the first female faculty, and now Assoc. Chair), the tenure and promotion of Christina Karamperidou, the Regents Medal for Teaching to Asst. Prof. Alison Nugent, and the progress of Asst. Prof. Giuseppe Tori. These young faculty, augmenting the outstanding productivity and reputation of the senior faculty, are remaking the image and approachability of the Department. For example,

2) Senior undergraduate students, with faculty support, are now serving as peer mentors for lower division majors. This has been very popular and also effective in helping the department to attract and retain freshmen and sophomores. The Department now has a “perfect pyramid” of near-peer interactions and mentoring, from undergraduates, to graduates, to postdocs, to junior and senior faculty.

3) A 4+1 program has just been approved for UH majors, making it possible for them to receive an ATMO BS + MS in 5 years.

4) A 5-year teaching plan is now posted on-line and updated every semester.

5) Griswold and Businger were successful in their proposal to Unidata, 50% cost-matched by the Dean, for a ~$40K upgrade in hardware and software for the teaching computer lab – which will give it the same look and feel as the NWS forecast office by this October.

6) Public appreciation of the program grows each hurricane season with, for example, multiple episodes of “Cruz and Nuge” on KHON2 and invited Businger commentaries on KHNL8. Of note also is that the Director and forecasters of the Honolulu NWS Office are UH Meteorology graduates, as are many of the weather forecasters across the insular territories and nations of the Pacific.

Earth Sciences – a few highlights from the 1-year response:

1) “Our undergraduate program is growing, especially our Environmental Earth Science BA. Our long-term efforts to expand our online presence continue to bear fruit, and we were thus well positioned when all courses had to move online mid-Spring. We continue our work to integrate program assessment of student learning into our degrees, and the 2020-21 academic year will see a top-to-bottom review and revision of our entire undergraduate program (both our BA and BS) in order to offer relevant degrees of interest to students. One of several aspects to be examined is the deep integration of research in undergraduate education and if that goal is best served by a senior thesis or other means. Recently, we secured funds to develop virtual field trips; another stalled activity due to Covid-19.”

2) “The faculty/graduate student climate in Earth has been partly addressed by the year-long work of developing the code of conduct. However, we expect this work to continue. The department has been a leader in these areas and will continue to push the school to arrange for more workshops and training (e.g., bystander training) for all faculty, staff, and students, as a culture change is not accomplished after a single retreat. Orientation for new incoming graduate students has a presentation by native/local students on cultural sensitivity and procedures when working in the field. Our planned hiring was also meant to help address the diversity of the department. Furthermore, before Fall 2019 semester started all graduate faculty took a workshop in
LGBTQ+ Safety and Inclusion, thus providing faculty with updated skill sets to navigate a changing student population.”

3) “While the campus has not increased tuition revenue to the department following our large increase in student semester hours (SSH), the Dean has, internally in SOEST, distributed some of the tuition revenue according to SSH, which we believe is a good incentive. It is unclear if this practice can continue unless SOEST sees a similar increase from the campus.”

4) “Financial support that the Chair had identified for the [analytical] laboratories is now in jeopardy by imminent State (and hence UHM) budget cuts. Meanwhile, faculty increased submission of research proposals, which is something that is completely under our control and can greatly affect our budget and operational flexibility. NSF funding for a new [heavy isotope] mass spectrometer was recently approved; the biggest challenge remains to attract qualified specialists to run our labs.”

**Ocean and Resources Engineering** – from the 1-year response:

**EAR Recommendation:** “ORE faculty, staff, and students would greatly benefit from consolidating their activities and offices within the same building, rather than being spread-out on campus, as is currently the case.

**Response:** We wholeheartedly agree with this recommendation and continue to work with School and UHM administration to realize our goal of consolidated space for our people and programs. An exciting potential space (ideal for Ocean Engineering, including high-bay space and access) was identified by the UH Manoa Space Recommendation Committee, and progress is being made toward assessing the feasibility of ORE’s use of the space.

**Recommendation:** In view of their hiring plan and the potential implementation of an undergraduate (UG) program, ORE will clearly need more quality laboratory space.

**Response:** We wholeheartedly agree with this recommendation and continue to work with School and UHM administration to realize our goal of sufficient space for our people and programs. The new space being considered (above) could fully meet this need for undergraduate (and graduate) teaching lab space.

**Recommendation:** ORE’s plan to implement an UG program is viewed by the review team as a strong opportunity for growth, both within ORE and SOEST.

**Response:** Agreed. ORE has been working steadily to put the necessary pieces in place to ensure a successful UG program before launching into it. These include: A full faculty body (now secure, with 8 faculty members), sufficient laboratory space and administrative support (in progress), and established relationships and common goals with colleagues in the College of Engineering (CoE, established). We are working with CoE and plan to roll out the program in Fall 2021” [as an Ocean Engineering track within the recently approved BS in Engineering Science – as the MB draft program review also recommends]. Recent hire Justin Stopa is teaching ORE 203: Surf Science and Culture.

**Recommendation:** “The review team also strongly support ORE’s plan to more actively recruit new MS students, who are professionals in the local ocean industry and could be part time students and to better help accepted student applicants find fellowships and scholarships.

**Response:** Agreed. Student recruitment and support are currently a top priority for ORE. The
ORE program [and teaching schedule] has been modified to accommodate professional and part-time students. Several internships with local companies have been revived or newly established. The admissions committee will be forming and implement marketing, targeting, and recruitment strategies.

**Recommendation:** New faculty hiring will be important for ORE to further increase their research impact and visibility, and achieve adequate critical mass to offer important classes

**Response:** Done. ORE extends many thanks for sustained support from SOEST and from UHM administration in our hiring and recruitment efforts. We have successfully hired 3 new faculty members since the 2019 Academic Review, bringing us up to a strong and vibrant group of 8 regular faculty members. We have also brought 2 new cooperating faculty members and 1 adjunct faculty member onboard, all of whom are highly active and supportive of ORE research and programs.”

In short, with these changes made or in progress, including onboarding three new Asst. Profs. in the last 12 months, the prospects are very bright for the future of ORE and the growth of its teaching (including u/grad), research and service programs. They just need some time for these improvements to play out in terms of increased extramural funding, graduate student support, development of the u/grad program joint with CoE, and student pathways to the graduate program thus created. Stopping-out the Ph.D. program would not help save funds – except by encouraging the graduate faculty to leave, which is unwarranted. As just one recent example of extraordinary success, a UH team led by students from ORE placed first nationally in the Department of Energy’s Marine Energy Collegiate Competition (beating out the likes of MIT), with the winning design and presentation of a floating/drifting wave energy converter feeding power via a docking station to an underwater vehicle.

**Oceanography and Global Environmental Sciences** – from the 1-year response:

**EAR Recommendation:** “GES explore securing ABET Environmental Science Accreditation for a track in the degree program

**Response:** The Global Environmental Science (GES) undergraduate program within the Department of Oceanography has reached out to ABET to determine the pathway to program accreditation. The first step is a self-study requiring the program’s curriculum, program educational objectives, and the student outcomes. Once these are compiled, they are sent to ABET’s Applied and Natural Science Accreditation Commission for review by their executive committee. This ensures that the GES Program falls under their general program accreditation criteria and is expected to be pro forma as environmental science programs generally tend to have the baseline requirements for accreditation. This initial review by ABET costs nothing other than the GES program’s time to compile. If all goes well, the next step is a Readiness Review Self Study, which is a much deeper and involved study that the department/program conducts on its academic program. This deep dive is where the effort gets much more serious and detailed. GES Chair Dr. Guidry was slated to begin this effort in the summer of 2020, but the impacts of the pandemic have shifted workload priorities to student and course-related matters indefinitely.”

In short, this remains a high priority (as per the MB draft review recommendations), but one whose implementation has been deferred until COVID pandemic-related changes in course delivery and advising modalities and workload have been accommodated.
Other initiatives in Ocean/GES that are bearing fruit in student interest/enrollment and workforce pathways include the several GES tracks and the approved 4+1 programs joint with DURP, Public Health and, most recently (Aug 18), College of Education – the latter providing a seamless path from the GES BS into the Post-Baccalaureate Certificate in Teacher Education (PBCTE). In an effort to further address Hawaii’s serious shortage of teachers, especially science teachers, a request is currently before the iAVCAA to allow u/grad candidates in GES to apply/enroll in the CoEd PBCTE secondary science track the semester before receiving their BS, such that they will be dually enrolled for one semester, graduate from the BS program, and complete the typically 3-semester PB science teacher education licensure program with one additional year.

In addition to some students choosing the new Graduate Degree in Marine Biology (see below), climate issues in the Department apparently soured graduate student recruitment over the last several years. The appointment of the first Chairwoman of the Department, Margaret McManus, the retirement of certain male faculty, graduate student-postdoc-young faculty mentoring and professional development, and attention to and adoption of a code of conduct, are measures being taken to turn this around.

The latter is part of a School-wide effort. From the 1-year response: “The SOEST Diversity, Equity and Inclusion Council (DEIC) spent months drafting a code of conduct that may serve School-wide standards of conduct. Using this document and that of Earth Sciences, the Deans Office has directed each unit head to convene meetings of their faculty, staff, students and postdocs to consider the issues associated with refining a shared code of conduct. This is as much about the process as the product. The Deans Office recognizes that affirming/living such a policy will only come about as we each develop self-awareness/responsibility, as well as bystander awareness/responsibility, in how we interact with one another - and codify that accordingly. The goal is a unified code of conduct for SOEST by year end, though it is expected that each unit may add their own unique standards beyond the core code.”

**Graduate Degree in Marine Biology (MBGP)**

The MB draft review does not address the MBGP academic program, that is joint between SOEST (HIMB, PBRC and the Biological Oceanography division of the Dept. Oceanography) and CNS (School of Life Sciences), but our 1-year response does. Highlights from that more complete response include:

1) From its initiation in Spring 2013, SOEST graduate students in MBGP grew to 30 by Fall 2014 and are now >50 strong, like ERTH and OCEAN (with another ~20 in CNS). To date, SOEST has awarded 22 MS degrees and 12 PhD’s in the MBGP.

2) The MBGP therefore, which was in provisional status at the time of last year’s EAR, was granted permanent status by the Board of Regents on May 21, 2020.

3) The hire of 5 research faculty (2 tenured and 3 TT) in HIMB over the last two years, each with formal 25% instructional FTE, has created a new capacity to support a core curriculum in the MBGP. In addition, Mahdi Belcaid was recently hired into a joint faculty appointment between ICS in CNS and HIMB in SOEST, and is developing courses in data analytics specifically relevant to MBGP students. Additional marine biology instructional resources would have come from two new hires being recruited in the CNS School of Life Sciences that unfortunately were frozen (swept?). While the curriculum
effort has been slowed with the campus-wide response to COVID-19, we expect the proposal of the new curriculum this academic year, for implementation in Fall 2021.

Other ORU Academic Programs
As well as their contributions to instruction and student research mentoring in the Department-led u/grad and graduate degrees, there are two other academic programs in SOEST overseen by research faculty in ORUs, in addition to the MBGP. The first is the long-running, NSF-funded, Summer REU Program in PBRC, on Environmental Biology for Pacific Islanders. The second is the newly established 15-credit Certificate in Earth and Planetary Exploration Technology (EPET) in HIGP:
EPET 201 Exploration of the Solar System (3)
EPET 301 Space Science and Instrumentation (4)
EPET 302 Space Mission Design (4)
EPET 401 Capstone Project: Producing a Science Satellite (4)

In summary, the quality of the research-led academic programs in SOEST, and the associated scholarship of the faculty, students, postdocs and researchers, is second to none at UH. Though the undergraduate program (150 majors in 3 Departments) is smaller than the graduate program (>200 M.S. + Ph.D. students in 5 graduate programs), they provide bespoke degrees that are critically important to the future of Hawaii.

Concerning Hawaii’s Future:
Associate Dean Chip Fletcher’s climate change perspective and commentary: There is increasing exposure to extreme weather events in Hawai‘i including, and especially concerning, rising incidence of hurricanes. Hawai‘i is also experiencing fundamental changes in foundational climate parameters: long-term declining precipitation and tradewinds, and rising temperatures both in the ocean and the air, and sea-level rise. We can see these playing out in real-time. ORE and ATMO (plus Civil and Environmental Engineering, and Geography and Environment) are the primary sources of STEM training for young people that must deal directly with these problems in their eventual jobs and professional roles. ORE and ATMO are global leaders in monitoring and modeling these hazards. ORE has an international reputation for excellence in coastal wave and sedimentary processes, physics of nearshore circulation and dynamics, storm surge and tsunami modeling, and coastal engineering. Unfortunately, because of sea level rise and increasing storminess, these are growth areas. ATMO is the only source of training for meteorologists ranging from advanced modelers to TV weather men and women. The National Weather Service in Hawai‘i and across the Pacific is staffed and led by atmospheric scientists who received their degrees in the Department of Atmospheric Sciences.

Arguably, no two academic departments, across the entire state of Hawai‘i, are more important to maintaining and enhancing community health and safety given the rising occurrence of physical stressors and shocks associated with climate change.