Graduate Program Review:
Cell and Molecular Biology
Clinical Research
Developmental and Reproductive Biology
Tropical Medicine

John A. Burns School of Medicine
University of Hawai‘i at Mānoa
Final Report May 31, 2016

Review Team

William G. Chismar, Dean of Outreach College, Professor of Information Technology Management, Shidler College of Business, University of Hawai‘i at Mānoa

Terri Goss Kinzy, Vice President for Research, Professor of Biochemistry & Molecular Biology and Pediatrics, Rutgers, the State University of New Jersey

Cynthia Morris, Professor and Vice Chair, Medical Informatics and Clinical Epidemiology, Assistant Dean, School of Medicine, Senior Associate Director, Oregon Clinical and Translational Research Institute, Oregon Health & Science University

Rachel Novotny, Professor and Chair, Intercollege Nutrition PhD Program, College of Tropical Agriculture and Human Resources, University of Hawai‘i at Mānoa

Chris E. Ostrander, Assistant Dean, Director of Strategic Initiatives and External Relations, School of Ocean & Earth Sciences & Technology, University of Hawai‘i at Mānoa
# Table of Contents

Introduction and Review Process .......................................................... 1  
Findings and Recommendations............................................................ 2  
  Common Across Programs ................................................................. 2  
  Cell and Molecular Biology ............................................................... 6  
  Clinical Research ................................................................................. 8  
  Developmental and Reproductive Biology .......................................... 12  
  Tropical Medicine .............................................................................. 16  
Appendix: Schedule for the Review Visit ............................................. 18
Introduction and Review Process

The Review Team members would like to thank Dr. Dasenbrock, Vice Chancellor for Academic Affairs, Dr. Aune, Dean of Graduate Education, Dr. Hedges, Dean of the James A. Burns School of Medicine for their clear support of this process and generous time dedicated to the review. The review team would like to specifically thank Dr. Gerschenson, Director of Research and Graduate Programs, for exceptional dedication to assuring a smooth and thorough review of the programs and Dr. Boulay for her attention to detail and providing additional requested materials and responses to team questions. Their hospitality and helpful input during the review assisted the process greatly.

The 5-member program review team was charged by the Vice Chancellor for Academic Affairs to evaluate eight degree programs within the John A. Burns School of Medicine (JABSOM), an MS and a PhD program in each of the following disciplines: Cell and Molecular Biology (CMB), Clinical Research, Developmental and Reproductive Biology (DRB), and Tropical Medicine (TM). Prior to the site visit, the team was provided with support materials, including, self-study documents, Annual Graduate Program and Assessment Reports, quantitative indicators, research productivity and faculty information, as well as UHM past reviews and small program criteria.

During the 3-day site visit, April 18-20, 2016, the team met with UHM and JABSOM administrators, along with departmental and graduate chairs, faculty, staff, and students from each of the four departments. The Appendix shows the detailed schedule. The Team was also provided tours of departmental laboratories and facilities and was able to visit both the Mānoa and JABSOM campuses.
Findings and Recommendations

The review team’s findings and recommendations are divided by program area along with a set of findings common across all four programs.

Common across programs

While each area is reviewed in detail in the sections to follow, a number of findings cross the programs. We address those findings in this section.

Low enrollment. Using the UH standard for classification of low enrollment, current enrollment below 10 students or fewer than 15 degrees awarded in the past 5 years, 6 of the 8 programs are classified as small; the exceptions being the MS in Developmental & Reproductive Biology and the PhD in Cell & Molecular Biology. Comments on the quality and management of individual programs are in the sections below. However, in all cases, the MS and the PhD programs within a department share a common curriculum and are treated as integrated programs. Thus, if the MS and PhD programs were treated as a single program, issues of resources expenditures on small programs are less of an issue.

The classification of a low enrollment program is an important parameter and worthy of serious consideration. While every program had aspects that met these criteria, it is not clear that graduate and undergraduate programs should have the same thresholds. In addition, the resources required to run a small MS program under a large PhD program are significantly less burdensome that running a small PhD program with a large MS program.

Recommendation: For the purpose of identifying small programs, the MS and PhD programs within the same discipline should be treated as a single program.

Students. During the site visit, the review team met with over 50 students. These meetings were the uniformly engaging and the highlight of the visit. Across the eight programs, the students were generally very satisfied with the curriculum, facilities, and faculty, exhibited a high level of comradery, and showed genuine interest in helping the community. Morale is high and the faculty and staff are to be commended on their service to and support of the students.

As expected, many students face financial challenges and would like to see more financial support. Students felt disconnected from other graduate students at UHM and, surprisingly, seem to have little interaction with students across programs at JABSOM. They felt an unequal treatment between the MD and the MS and PhD students.

Recommendation: Make available after-hours access to the health sciences library on the JABSOM campus as a place to meet and study outside of normal business hours.

Recommendation: To allow easier access between the Kaka’ako and Mānoa campuses, investigate running a university shuttle between the campuses. At a
minimum carefully consider timing of meetings and classes to avoid multiple back and forth between sites.

**Graduate student funding.** Faculty, students, and administrators all raised concerns about funding for graduate students, broadly focused on two areas: First year fellowships for recruiting top quality students and supporting them while they rotate, and continuing support once they join a lab. The first year PhD student support appears to be funded by various mechanisms, all of which seem to be departmental. Support for MS students varies between programs. The later year funding is predominantly from grants and some TAs. This is common and as always subject to changes in national funding. It is admirable that the CMB program started a grant-writing course for students, which appears to be increasing the success of individual fellowships on top of being an excellent educational experience. It is clear other programs are looking to include that model. The pursuit of training grants is important, and the resources required for such large grants are a good investment if focused in areas of strength (with institutes at NIH that support a significant number of focused investigators or for underrepresented students).

**Student recruitment.** With one exception, the programs provided little detail on their recruitment processes and the recruitment seemed passive, relying on web sites. It is important to note that many students identified the web sites as their major way of finding the programs. Some programs have some active processes, including recruitment at national meetings. Overall, the programs seem to recruit separately, and since at least two are distinct in their area, this seems an opportunity to grow the programs by cooperative recruitment. Since a significant number of students are from Hawai‘i, either from local schools or from mainland schools but who went to high school in Hawai‘i, and have reasons to want to be near family, identifying ways to target their recruitment, perhaps with the help of the graduate division, could have a good yield. This would also benefit training grant applications.

**Recommendation:** Investigate opportunities to grow the programs through cooperative recruitment efforts across programs.

**Student career planning.** Career paths for PhD students outside academia is a major topic of national discussion and a priority of the NIH, which recently initiated the BEST grant program related to this. The resources nationally available in this area are growing, as are partnerships between schools with NIH BEST grants and others that have not yet received a grant. This is a key initiative for all programs and an initiative that could potentially be led centrally by the graduate school or cooperatively between the programs. The review materials had little on this topic and, in the one instance it was discussed, it was limited to entrepreneurship. While entrepreneurship is a good topic, there is a far larger breadth of opportunities. In addition, only one program mentioned the use of the Individual Development Plan (IDP) and in another it became clear that students learned more about this from the grant-writing course. This is a well-recognized and free tool. There are national trends to make IDP use mandatory, and NIH now requires a training plan for post docs on progress reports on research grants and strongly recommends the use of the IDP for graduate students (since they cannot mandate it). NSF has similar requirements for clear training plans.
Recommendation: Consider implanting the use of training plans across all graduate programs and placing significant effort into developing career programs utilizing best practices at other institutions, their institutional knowledge and pulling together the various aspects that were discussed during the meetings.

Curriculum. It is great to see a major focus in several programs on biostatistics and bioinformatics training for students. More variable across units was coverage of responsible conduct of research (ethics).

Recommendation: Investigate a shared curriculum across the programs in the areas of biostatistics, bioinformatics, and ethics. Doing so could improve the quality while reducing the cost of the education in these areas across the programs.

Lack of an MD PhD program. The absence of a traditional MD PhD program is an opportunity for the JABSOM to pair MD students with some PhD programs outside the traditional MD PhD joint program path to develop clinical scientists to serve the state. The one MD student interviewed who is in the first year of the PhD is a highly motivated student; her experience can be used to build this path for students outside of establishing a full and funded MD PhD program. Some possibilities are clinical continuity experiences, practice rotations before return to the 3rd year of medical school (with a possible need for preferential scheduling to allow that to happen), exposure to national MD PhD students at national meetings, identification of curriculum overlap that can be leveraged to focus these students on advanced courses for the PhD. Determining the eligibility of these students for an NIH individual fellowship is critical, as this would relieve a financial burden in the 3rd and 4th years of medical school and increase the likelihood this student would go into research rather than practice due to student loan debt.

Program assessment. The assessment process can be quite valuable and several programs clearly took it seriously and made programmatic improvements over the 5 years of the reports the review team was provided. Others repeated the information in several years without changing it. This process should be used for focused improvement after this report to implement appropriate recommendations.

For long term improvements for programs and the graduate school overall, exit surveys at graduation can be a very valuable tool. These are best done anonymously, and can provide ongoing feedback on strengths and weaknesses. Some are done simply by survey monkey or similar tools. The one program that did a student survey and focus groups found this data very informative.

Recommendation: Consider implementing standard student exit surveys across the programs.

Student services support. The students reported either having no problems understanding and complying the UHM policies and procedures, or having very significant problems doing so. The determining factor seemed to be the presence or lack of a supportive staff person to liaise with the UHM Office of Graduate Education. Hiring
a good person in each department may be difficult and, given the relative small numbers of students, unnecessarily costly.

**Recommendation:** Integrate student services, and possibly other administrative functions, across other graduate programs.
Cell and Molecular Biology

Founded in 2000 the Cell and Molecular Biology graduate program integrates MS and PhD programs for students with an interest in health-related research that emphasizes the techniques and approaches of cell and molecular biology. Faculty in the program come from JABSOM, the University of Hawai’i Cancer Center, the College of Natural Sciences, the College of Tropical Agriculture and Human Resources, and the School of Ocean and Earth Science and Technology. In 2009, the program started a Neuroscience Specialization. There are currently 39 students, with 5 students in the MS and 25 students in the PhD programs, 9 of which are in the neuroscience specialization.

Faculty & staff: The leadership within the program appears to be strong and collaborative. With 18 full-time CMB faculty members and numerous affiliate faculty members from across campus, the program faculty is sufficient for the current number of students, and growth. The faculty is active in research and appear dedicated to the success of their students. The administrative support staff received high praise from the students and the faculty. The students mentioned that they have no problems with administrative processes, stating, “we’re spoiled.” There is a question, however, as to whether Dr. Gerschenson in her role as Director of Research and Graduate Programs can also serve as director of an individual graduate program, especially if some of the recommendations in this report are implemented, which will require significant time and leadership; further, there could be a perceived conflict of interest as director of one program.

Students: The students, mostly from Hawai’i, appear motivated, with no major concerns about the program. They like the program’s curriculum and flexibility, and the ability through the lab rotation to find a good fit with faculty members and lab research. A surprisingly few number of students expressed an interest in an academic career; most were planning on careers in industry. In the program’s self study report, the faculty recognized this shift in the career interests of students and responded by building relationships with the Shidler College of Business around entrepreneurship. However, there seems to be no career information on the program’s website or in the CMB Handbook.

   Recommendation: To aid existing students and to help recruit new students, the program’s website and other publications should outline career options for graduates of the program.

With only 5 students, and as few as 2 in recent years, the MS program is very small. However, rather than a stand alone program requiring its own resources, the MS program serves as a mechanism to provided needed training for students wishing to enter the PhD program, but who lack some required background, and the MS does not require additional resources.

   Recommendation: In evaluating small programs, count the MS and PhD programs as a single program.

PhD students receive, and greatly appreciate, funding during their first year, which includes the lab rotations. The faculty, the Self Study Report, and the students mentioned
problems with funding students after the first year and before they can get funded positions in a lab. It appears that the availability of graduate assistantships, both in the college and across campus, is diminishing.

**Curriculum.** The curriculum is appropriate for the program with highlights being its interdisciplinary nature, lab rotations, and the courses in ethics and grant writing. The addition of the neuroscience specialization has been well received by the students and now accounts for about 1/3 of the total students in CMB. The decision to make this a specialization rather than a separate degree program was sound and the existing structure appears to be working well.

**Recommendation:** JABSOM should consider using the CMB ethics and grant writing courses as part of the curriculum in other programs.

**Recommendation:** The lack of a bioinformatics course should be addressed. Again, this course could be common across JABSOM programs.
Clinical Research

In approximately 2000, the NIH invested in a grant mechanism aimed at invigorating the clinical research enterprise through creating a mechanism for clinicians to learn the skills and competencies associated with clinical research. This included grants under a K30 and a similar R25 grant mechanism for minority institutions to develop an educational program that would train clinicians and thereby expand the clinician-scientist pool. By the early 2000s, NIH had funded between 35 and 40 such programs. Within the next 10 years, many of these programs had been rolled into Clinical and Translational Science Awards (CTSA) and an educational and career development program was a cornerstone. In essence, NIH funding spawned a series of academic degree programs to meet the need of the research enterprise to provide pragmatic training in clinical research methods.

Under the CTSA mechanism, a series of competencies were developed to form the framework for these clinical and translational research education programs, ensuring both best practices and standardization among programs offering degrees in this discipline. An important value of these clinical research degree programs is that they form an infrastructure for training grants and individual career development awards (T32, K12, individual K awards).

Three academic degrees are offered across the US in clinical and translational research: a certificate, a master’s degree, and a PhD. A master’s degree is the most common, however a relatively small number of programs with sufficient depth began to offer a PhD degree in the past few years. Using the principles of Bloom’s taxonomy, learners are expected to have a higher degree of accomplishment of the complexity and specificity of the aforementioned competencies with a PhD as compared to a master’s degree. At all institutions, the clinical research educational program is primarily intended for individuals with a terminal clinical degree who intend to pursue grant funding as an independent researcher, usually as a clinician-scientist.

The committee reviewed the clinical research MS and PhD research program at JABSOM and had the opportunity to interview the program leader, Dr. Rosanne Harrigan, as well as 5 faculty members and many students. All were interviewed about their perceptions of the strengths and weaknesses of the program, their perception of the needs of the program, and finally, their relationship to the program. Students were interviewed about their background prior to entering the program, the reason for entering the PhD track, and their intended use of the degree.

The following comprise the program assets and weaknesses.

**Assets**

*Student networking.* The students are extremely bonded as a cohort and are intrinsically quite supportive to each other. It was evident that all students know each other well and provide each other with strong emotional and professional support.
**Student support of faculty and the overall program.** All students were highly laudatory of the program and the value that they perceive to their career. They also were very supportive of Dr. Rosanne Harrigan and Dr. Beatriz Rodriguez in particular.

**Weaknesses**

**Dependence on a cohort model.** While there are inherent advantages in student networking with this model, it yields a small and less efficient program. The program director informed the committee that students not in the entering MS cohort are not allowed to participate in the curriculum. This is unfortunate because many of these courses could be of great value to many clinicians and scientists who could enrich the course discussion and who need to accomplish competencies of clinical research for career development, such as individuals on a T or K award. Desire for this training was specifically cited among Tropical Medicine students. Translational research education is a mainstay of training grant programs and lack of these educational opportunities may impede institutional development.

Last year, only one new student entered the program.

**Lack of a clear educational outcomes for the program.** One way of assessing educational outcomes is to evaluate the graduates of the program. We received a list of approximately 50 graduates with many listed twice, and more than half were noted as having received a grant without notation of funder, title, or amount of funding. In a separate listing provided to us through the Dean’s office, 7 individuals had received funding. No list of publications of graduates was provided. The committee strongly believes that the lack of clarity and focus on educational outcomes has led to a lack of appropriate student career outcomes.

In our interview with students, no one indicated applying for independent or mentored career development funding, or a postdoctoral position. The common theme among students was that the PhD would allow a student “to be taken seriously” in their current job.

**Complexity and depth of the curriculum.** The committee was presented with a number of versions of the expected curriculum for the MS and PhD degrees. From our best judgment, the curriculum includes the following courses: Introduction to Clinical Research and Informatics Applications in Research (2 cr); Legal and Regulatory Issues, Bioethics, and the Institutional Review Board (2 cr); Applied Biostatistics in Clinical Research (3 cr); Applied Clinical Epidemiology and Biostatistics (3 cr); Bioanalytical Methods in Clinical Research (2 cr); and Clinical Research Protocol Development and Scientific Writing (3 cr). This totals 15 credits. The committee was made aware of an additional course in cultural competency although it is unclear if this is outside of the seminar. Additional courses include a seminar (5 credits) plus research credits to complete either the MS or PhD. The program faculty discussed other coursework that could be included; however, it appeared that these were not graduate level courses. This curriculum serves as the foundation for both the PhD and master’s curriculum. It is impossible to judge the quality of the courses because of the nature of the committee’s visit.
As a comparator, the University of Wisconsin requires 35 credits for a master’s degree, of which at least 29 must come from coursework, and 6 from research. Approximately half of these credits come from clinical research methods courses, and the remainder from 2 required courses in biostatistics, plus ethics, scientific presentation, and a 1-credit seminar course. Students are encouraged to broaden their training from other graduate level courses in the basic or clinical sciences of medicine. This is typical of other master’s programs, if not at the low end of required credits. To earn a PhD, students must complete additional advanced coursework, plus either acquire a minor or participate in significant interdisciplinary teamwork. At institutions that offer a graduate certificate, this usually requires 18-20 didactic credits.

**Time to degree.** Nationally, according to the most recent data, the time to PhD averages between 7 and 8 years; there is consensus that this is too long and there is currently an emphasis on shortening this time. However, in contrast to this, the average time to degree in the JABSOM PhD clinical research program is approximately 3.5 years and there was a stated desire to reduce this to 3 years. This time to degree appears to be a direct result of two factors: the program structure in which students attend all classes and seminars on one day of the week, and the low complexity of the curriculum. Moreover, all students interviewed were working while enrolled in the PhD curriculum. We conclude that students are enrolled in the curriculum for an inadequate time period to gain the level of training and experience associated with a PhD degree.

**Complexity and quality of master’s or dissertation research.** After discussion with students currently enrolled in the PhD program, the committee had great concern for the quality of the research product. A significant number of the students were not engaged in hypothesis-driven research. At least four described masters and PhD studies that were solely descriptive; for at least two individuals, publication of a book, inherently a descriptive endeavor, was the expected outcome. This contrasts to the usual dissertation, which results in a manuscript in the biomedical literature. The latter is expected from programs in life sciences as it equips a student with the skills to write research grants.

It is not apparent that there is a common qualifying exam for all students that focuses on the acquisition of skills during the program. Students do appear to have to defend their proposal to move to candidacy. There is no graduate handbook or well-articulated path to candidacy. The final product appears to be the sole assessment for knowledge gained by the student.

**Sufficient faculty.** Despite that this is a relatively small program, it seems the majority of coursework is taught by Drs. Harrigan and Rodriguez; notably, Dr. Harrigan teaches the overwhelming majority of the classes. Of the 5 faculty members that the committee interviewed, 2 do not teach or mentor students, nor do they have funded research; 1 has the state Area Health Education Center (AHEC) contract, which is not a research grant. Moreover, none of the 5 faculty members currently has funded research, and only Dr. Rodriguez has had federal funding for research within the past 5 years. Given that this program teaches clinical research methods, this appears to be a major deficit.

Other faculty at JABSOM and Kuakini mentor the PhD students and serve on dissertation committees; these individuals were described as “individuals that the students work with.”
Dr. Harrigan noted that these faculty members must have a significant research track record and serve on graduate faculty. However, no list of mentors who have served on masters or PhD committee was provided to the committee. This indicated to the committee a lack of quality control.

**Recommendation:** Due to a lack of funded faculty and insufficient appropriate curriculum, it is recommended that the PhD in the Clinical Research program be phased out and the MS program undergo an internal restructuring to enhance the above deficiencies of the program prior to considering continuing this degree. Significant additions are needed to enhance faculty membership with actively funded researchers and to enhance curriculum with clear and appropriate educational objectives, if the program is to be continued. A certificate or restructured Master’s degree program would be attainable with the apparent resources available for this program.
Developmental and Reproductive Biology

The Developmental and Reproductive Biology (DRB) Graduate Program at the University of Hawaiʻi at Mānoa is a relatively new PhD program, started in 2009 when the departments of JABSOM reorganized. There have been changes in the program leadership in that time, and the program appears to have a very strong research focus. The term “immense focus” is used in the self-study and that is a very accurate description and supported by the comments of most of the faculty. The program meets the criteria of a small program, and the faculty expressed concerns their program was in peril due to this policy.

Faculty. The leadership of the graduate program is a mid-career scientist and very sincere in supporting the program. Other senior leaders appeared unhappy with participating in the review process. The program faculty includes a very significant number of junior faculty members, which is both a strength and a weakness. Junior faculty members bring energy to the program, and a strong graduate program helps recruit faculty. However the faculty members have very uneven current funding for their labs. While some faculty members in this program are leaders on major institutional grants, R01 and similar grants are less predominant. There is one P20 and one R01 grant that go past 2016 listed, all other funding of the regular members has either ended or ends in 2016. While there have been some recent national downsings in research funding, this has stabilized, and this funding is critical to recruit and support students. This was conveyed by at least one faculty member, who also conveyed the need to recruit more faculty to the institute. While only a few faculty spoke with the review team, the comments were predominantly focused on research and less on education and career development. It is clear the students have some excellent papers, and this was highlighted by the director and at least one faculty member.

Interactions with the graduate division. The faculty and students had dramatically different views of the relationship with the graduate division. The program leadership felt relationships were good. The students, however, felt they had little direction as to program requirements and expressed frustration with the graduate division, including a student who applied for her MS (required by this program to progress to the PhD) and waited more than 4 months to find out that she lacked 1 credit, which came after the next semester started. This is an issue on the part of the student, mentor, program and graduate division. This may be aggravated by the lack of regular meetings with the student’s faculty committee to assess progress towards the degree. The students and faculty all indicated a dedicated staff person to assist the program would be a benefit.

Recommendation: Generally across the programs (except CMB) student support staff is needed. However, based on the program size and the similarities and importance of a link to the graduate division, it is recommended that such support staff be provided, but shared between programs.

Recruitment. The faculty members feel they lose prospective students because of insufficient funds to bring applicants to campus for visits. Most students felt the web site was not up to par and seem to have ended up in the program more by looking for the faculty than the program. The program does seem to engage the faculty in publicizing the
program at conferences. While allowing the faculty to better evaluate students, the requirement that all students matriculate as MS students before being admitted to the PhD program may be discouraging high quality students from attending the program.

**Recommendation:** Because students in all programs mentioned the website as the major source of information about programs, attention should be paid to updating all the websites, and DRB in particular. The program should consider a more collaborative process, similar structure and organization between programs and highlighting interactions to increase recruitment initiatives.

**Student experience.** The students seem to have found the faculty directly or via the website and enter directly to a lab. They understood they had to enter via the MS program. The rotations are not traditional exposure to choose a lab and mentor, but one week experiences where the students seem to mostly see techniques. The students conveyed they liked the teaching opportunities as a TA and many wanted to pursue teaching as their career. They were, however, dissatisfied with the depth of courses available and indicated that because student numbers were so low, classes were often canceled or would only have 2 students. The students expressed a desire for coursework beyond the introductory courses. The students had some concerns with some courses, which should be teased out with course evaluations. The students stated they do get significant experience in making presentations, including in the journal club seminar course, which was well received and which the students would like to take more than once and have it include scientific communication training. The students felt it was hard to find the handbook and, in progressing to their degree, that their committees also did not know the rules. Students in CMB, Tropical Medicine and DRB all articulated issues with traveling between campuses; however for this program, the fact that the program is truly split between campuses amplifies the issues. The students also wanted more mentorship in broader issues, such as, academic leadership and management skills, and to sit on committees to be more engaged in the academic process.

**Recommendation:** An improved website would address some of the above concerns, as will dedicated staff. For interactions between UHM sites, students indicated that seminars, meetings and courses at the end of the day made travel easier, as they only had to go one way rather than back and forth in a single day. This should be particularly considered for DRB and for courses that are shared between programs. A full curriculum review is required, and should engage student feedback. Courses that can be leveraged between programs are essential, and so are specialized advanced topics. Cooperation and coordination with other programs may help to increase enrollment; for example, cardiovascular training grant students may attend a didactic course or seminar course on heart development.

**Ethical scientific conduct.** The students did not understand the difference between compliance training and research ethics. Many DRB students clearly do research in areas that have significant ethical issues that the students’ should understand. This training is essential and mandatory in most biomedical graduate programs, including in the CMB and TM programs.
**Recommendation:** Ethical Scientific training should be mandatory for DRB students (MS and PhD) and DRB should partner with CMB to use their course and contribute to the teaching.

**Student funding.** The students did not appear to be applying for fellowships, and the faculty indicated they would apply for a T32 grant if someone would step up to be the PI. The program uses clinical training funds to support students and appears to have many TAs. They indicted in several meetings that more TAs would be useful/required for courses taught by the faculty and to support students. With limited funds for students and TAs, the policy of using funds to support all MS students should be reconsidered, when at least some will stop at the MS degree. The program does not want to increase the size of the program much, and funds currently limit that. The low salary of the TAs raised the question of whether TAs who work 9 months teaching could get paid as GAs for the summer to bring more equivalency to stipend levels.

**Recommendation:** A review of TA availability across the JABSOM programs but in particular for DRB is warranted, as is consideration of how the ones currently available are used.

**MS program and the relationship to the PhD program.** Specific issues are apparent with regard to the MS program. First, while the report highlights how training MS researchers who then matriculate to medical school is a positive feature, the small number of faculty the review team met with had a very negative perspective on the MS as a path to the MD degree. The MS students understood that all were required to start in the MS program and, if successful, they could transfer to the PhD program. All MS students are supported with a stipend. This is unique in the JABSOM programs and highly unusual in graduate education. If an MS is required for matriculation to the PhD this should be clear to all applicants, and the program should consider the fairness of this requirement since they accept PhD students into their labs from CMB, which does not have this requirement.

This also means that there is no MS tuition stream to help support graduate program costs, such as recruitment and stipends. Furthermore, if these students are qualified as PhD students when applying this may send a wrong message as to the goal of the program in education versus in obtaining researchers to staff the labs. It was not possible from the data provided to exactly determine how many MS degrees were pursuing terminal degrees versus those in the “pre PhD “ phase of the MS. It appears most of these are pre-PhD, thus this is indeed a very small MS program and, in fact, a small PhD program. It is also not clear the curriculum requires a separate program.

**Recommendation:** In this program and across JABSOM MS programs, determining a path for pre MD students to increase their preparation and competitiveness for medical school at JABSOM and other universities is a goal that would bring in revenue, if set up properly for tuition return, to help fund PhD program costs, especially things like recruitment.

**Recommendation:** JABSOM can review the list of all students who are currently in or recently completed the program and assess the demand for the MS as a terminal degree versus a prerequisite for the PhD program. However, the review
committee feels that even with a combined MS and PhD pool, the DRB program is small. In addition, considering issues of curriculum, student support, and overlap of the faculty with the CMB program, transitioning the DRB program into a specialization within CMB, like Neuroscience appears warranted. This is an efficient way to enhance the student experience and address many of the concern raised above.
Tropical Medicine

The MS and PhD in Tropical Medicine (TM) are research-intensive graduate programs, based in the Department of Tropical Medicine, Medical Microbiology and Pharmacology, focused on basic, translational, and field research on microbial diseases of global public health importance and of special interest to Hawaii and the Asia-Pacific region. Administered within the JABSOM, the TM Graduate Program supports the JABSOM mission to teach and train biomedical scientists. The program is student-focused with strong, collaborative leadership. The program is a high-quality, unique, and valuable program within the UHM graduate education offerings.

Curriculum & student support. Students within the TM program benefit from access to strong facilities (BSL-3/ABSL-3 Biocontainment Core Facility, Biostatistics Facility, and Molecular and Cellular Immunology Core Facility), a rich and comprehensive curriculum, a collaborative cadre of faculty and staff, departmental provision of mentoring and student support services, and a growing infusion of private funding to support student research and scholarship. However, additional effort can be made to liaise the exceptional facilities and work done within TM with private sources of funds, especially related to student support and success. It appears ethics is required in the form of the CMB program course; however this needs to be clear and cover areas in the TM field.

Recommendation: Advance the development and adoption of topical (tropical medicine related) topics within or in concert with the Responsible Conduct of Research (RCR) course currently available.

The unit has fostered a collaborative culture within the TM program that is focused on the dual success of faculty-led research activities and the educational attainment of its graduate students. The TM faculty is satisfied with the quality of students attracted to the TM program and is genuinely interested in ensuring the long-term success of their graduates. Facing the reality of limited academic job prospects, students within the TM program would benefit from exposure to career options outside academia as well as committee-level engagement with each student in the development of an IDP.

Recommendation: Students need seminar/workshop exposure to non-academic careers (biotech, government agencies, WHO, pharma, policy).

Recommendation: While the program indicated the IDP is required, the students seemed unaware; thus all students should develop an IDP with their mentors and committee as a way to pre-plan needs for their professional development and open up avenues for career exploration.

Recommendation: Implement an exit survey of all students to gauge program quality and adopt change based on results (and communicate what has changed).

The faculty and student population is highly diverse, in both gender and ethnicity, and is a strong attractor for international students and scientists. The unit has a strong focus and history of success on in-lab, bench-top research, though does conduct some field research, particularly in Thailand and Cameroon. The program does not offer substantial
opportunity for students to study and conduct research abroad or in clinical settings, a limitation cited by students.

The TM program has been impacted by reduced institutional support in recent years, in particular, by the decline in JABSOM-funded GA positions as the chair’s package reaches an end. Students in the TM program have derived great benefit from a unit-level student support staff position, though that position is currently unfilled.

**Recommendation:** Additional effort to engage foreign governments and private funders to support research, to complement existing COBRE-funded efforts, could lead to expansions in both faculty and student opportunity and support, though the unit must maintain a principle focus on the quality of the education and research offered to its students.

**Recommendation:** TM needs to continue a strong effort at the faculty level to augment P20 funding with additional R- awards, especially to offer additional opportunities for students (i.e. USAID, NSF). TM also needs to invest energy in the acquisition of international private/NGO funding (i.e. WHO, Gates) for research as well as individual student fellowships (Fulbright, Gates, WHO).

**Program size.** By the definition set by UHM, the TM program is considered small, though it graduates high-quality and well-trained students. The coursework taught in the program is of interest to non-majors with ~40% of SSH coming from non-majors. Applicant demand for entry to the MS and PhD programs far outpaces the program yield, which is limited to ensure students have access to sustained GA support.

**Recommendation:** Efforts to expand research funding sources will allow the program to attract more high quality students. However, new programs, such as the certificate program, also will attract more students. Given the sharing of curriculum and other resources across programs, for purposes of the UHM small program evaluation, the TM MS and PhD programs should be treated as a single program.

**New programs.** With the growing worldwide demand for training in tropical medicine, JABSOM has opportunities to provide beneficial TM programs, which will also provide additional revenue. The department has recently developed and gained approval to offer *Tropical Medicine Certificate*, designed for non-research oriented students desiring advanced knowledge without working in a lab. It is aimed largely at the broader Pacific region, though there is substantial potential for the certificate program to generate revenue for the unit in the future.

**Recommendation:** Investigate innovative ways to deliver tropical medicine training to a wider audience. Potential options include hybrid MS and certificate programs with online components combined with intensive, short-term on-campus classes, and a series of short (1 to 3 weeks), noncredit training programs that can stand alone or lead to noncredit certificates.
Appendix

Schedule for the Review Visit
<table>
<thead>
<tr>
<th>Time</th>
<th>Day 1 (Mon 4/18)</th>
<th>Day 2 (Tue 4/19)</th>
<th>Day 3 (Wed 4/20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:30 - 7:45 AM</td>
<td>Taxi Service to Campus</td>
<td>Taxi Service to Campus</td>
<td>Taxi Service to Campus</td>
</tr>
<tr>
<td>8:00 - 8:45 AM</td>
<td>Vice Chancellor for Academic Affairs (Dasenbrook) &amp; Dean of Graduate Education (Aune) MEB 202</td>
<td>Clinical Research -MEB 202</td>
<td>Cell and Molecular Biology - MEB 202 Drs. Marla Berry (Dept Chair) &amp; Mariana Gerschenson (Grad Program Chair)</td>
</tr>
<tr>
<td>8:45 - 9:15 AM</td>
<td>JABSOM Dean Hedges, Pat Blanchette, Director of Research and Graduate Programs Gerschenson, Rachel Boulay MEB 202</td>
<td>Clinical Research Program Coordinator (Nuela Mead) MEB 202</td>
<td>CMBS Program Coordinator (Lyn Hamamura) MEB 202</td>
</tr>
<tr>
<td>9:15 - 9:30 AM</td>
<td>Break</td>
<td>Break</td>
<td>Break</td>
</tr>
<tr>
<td>9:30 - 10:00 AM</td>
<td>Chief Financial Officer - Nancy Foster MEB 202</td>
<td>Clinical Research Graduate Faculty MEB 202</td>
<td>Cell and Molecular Biology Graduate Faculty MEB 202</td>
</tr>
<tr>
<td>10:00 - 11:00 PM</td>
<td>Developmental and Reproductive Biology Drs. Scott Lozanoff (Dept Chair) &amp; Yusuke Marikawa (Grad Program Chair) MEB 202</td>
<td>Clinical Research Graduate Students MEB 202</td>
<td>Break</td>
</tr>
<tr>
<td>11:00 - 12:00 PM</td>
<td>Lunch Meeting - Site Visitors Closed Session for discussion MEB 202</td>
<td>Lunch Meeting - Site Visitors Closed Session for discussion MEB 202</td>
<td>Lunch Meeting - Site Visitors Closed Session for discussion MEB 202</td>
</tr>
<tr>
<td>12:00 - 1:00 PM</td>
<td>Tour KAAKAKO campus Cancer Center &amp; Biomedical Sciences Bldgs.</td>
<td>Tropical Medicine - MEB 202 Drs. Vivek Nerurkar (Dept Chair) &amp; Sandra Chang (Grad Program Chair)</td>
<td>Exit Report VC Dasenbrock &amp; Dean Aune - MEB 202</td>
</tr>
<tr>
<td>1:00 - 2:00 PM</td>
<td>Relocation to Manoa Campus for tour (extra time allowed in schedule)</td>
<td>Tropical Medicine Program Support (Becky, Justin, Cori)</td>
<td>Exit Report JABSOM Dean, Pat Blanchette, Mariana Gerschenson, Rachel Boulay MEB 202</td>
</tr>
<tr>
<td>2:00 - 3:00 PM</td>
<td>Break</td>
<td>Break</td>
<td>Break</td>
</tr>
<tr>
<td>3:00 - 3:45 PM</td>
<td>Developmental and Reproductive Biology Graduate Students Manoa Biomed E125</td>
<td>Break</td>
<td>Writing Time for Site Visitors MEB 202</td>
</tr>
<tr>
<td>3:45 - 4:00 PM</td>
<td>Lab Tour (Institute for Biogenesis Research, Biomed E201-205)</td>
<td>Break</td>
<td>Writing Time for Site Visitors MEB 202</td>
</tr>
<tr>
<td>4:00 - 5:00 PM</td>
<td>Writing Time for Site Visitors Manoa Biomed E125</td>
<td>Writing Time for Site Visitors MEB 202</td>
<td>Writing Time for Site Visitors MEB 202</td>
</tr>
<tr>
<td>5:00 PM</td>
<td>Taxi Service to Hotel</td>
<td>Taxi Service to Hotel</td>
<td>Taxi Service to Hotel/Airport</td>
</tr>
</tbody>
</table>

*Mahalo and Aloha*