To: Patricia Calarco, Dean, Graduate Division  
Elizabeth Watkins, Chair, Graduate Council  

From: Thomas Ferrin, BMI Program Director  

Date: September 29, 2009  

Subject: Designated Emphasis in Bioinformatics for the BMI Ph.D. Degree

I am writing to endorse the addition of a Designated Emphasis in Computational Biology and Bioinformatics to the Ph.D. degree for those students who have completed the rigorous curriculum we now offer in the Bioinformatics pathway of the Biological and Medical Informatics (BMI) graduate program. This memorandum describes a brief history of the BMI program and provides the rationale for why a Designated Emphasis in Computational Biology and Bioinformatics is appropriate for students who have completed the requirements for a Ph.D. degree within our Bioinformatics pathway.

When the BMI program (previously called Medical Information Science – MIS) was re-activated in 1997 after a number of years of hibernation, the program was organized around a single integrated curriculum with six focus areas. Six focus areas proved too ambitious given the relatively small number of faculty committed to teaching courses and mentoring students and thus in 2002 we switched to two “tracks” or pathways for the BMI program, Bioinformatics and Medical Informatics. BMI remains organized around these two pathways today, although the second pathway has since been renamed Clinical and Translational Informatics (CTI).

There has not been parity in the growth for the two pathways. The field of computational biology and bioinformatics has grown rapidly since the late 1990’s and there has been a concomitant increase in the number of faculty at UCSF whose research expertise includes these areas. The completion of whole genome sequences for hundreds of species and the rapid development of new technologies and research initiatives associated with genomes, biological pathways, and structural genomics are further evidence of this growth. NIH research funding in the fields of computational biology and bioinformatics has also increased significantly during this same period.

The Bioinformatics pathway of BMI (henceforth “Bioinformatics” in this memo) has also grown rapidly over the past decade. There are currently 27 students in this program pathway, and over the past ten years 29 Bioinformatics students have been awarded their Ph.D.’s. These same students have published at least 48 first-author papers in refereed journals on the way to their PhD’s. Many of our graduates have gone on to industry jobs in the Bay Area at top-rated companies such as Genentech, Applied Biosystems, Illumina, Genomic Health, and Asuragen. Others have pursued academic careers, including postdoctoral study at Harvard, MIT, UCSC, and UCSF. There are 28 actively engaged research faculty within the Bioinformatics pathway, most of which either currently or recently have mentored students. Criteria for faculty membership within Bioinformatics has become more rigorous and the quality of students within our applicant pool has increased to be on par with that of the best-rated UCSF programs.

The Bioinformatics pathway receives a significant level of financial support from the School of Pharmacy. In fiscal year 2009-10 this level of support is $145,000 and covers such program activities as salary support for our program coordinator, Julia Molla, new student recruitment, partial support for first and second year student stipends and fees, annual student retreat expenses, and many ancillary expenses associated with running the program. This support is
separate from the stipend and fee remission support received from the Graduate Division. Last year, we successfully renewed our Bioinformatics training grant from NIGMS for another five years. This grant provides partial stipend and fee remission support for six first- and second-year students in Bioinformatics. Stipend and fee remissions for students in their third year and beyond are provided either through faculty research grants or individual merit fellowships. Our Bioinformatics students have a great track record in obtaining individual fellowships from funding sources outside of UCSF, including two individual NIH, nine NSF, one NDSEG, one FDA, and one PhRMA Foundation fellowships over the past few years.

In 2005, the BMI Bioinformatics pathway together with the Biophysics graduate group and the emerging Complex Biological Systems (a.k.a. Systems Biology) program, created the Integrative Program in Quantitative Biology – iPQB. iPQB is an umbrella program analogous to the Tetrad program. As with Tetrad, iPQB has joint admissions and curriculum committees, and all applicants to the individual graduate programs (Bioinformatics and Biophysics) are considered to be within a single composite applicant pool. This approach has allowed us to recruit the very best students that apply, and simplifies the situation where students are forced to choose one UCSF graduate program over another before they really know what the often-subtle distinctions are among the programs or even what their true Ph.D. research focus will ultimately be. (It was for many of these same reasons that the Tetrad program was formed.) Other aspects of iPQB include a common core curriculum, student-led team activates such as Boot Camp and the inter-quarter Team Challenges, and a two-day research retreat held each December in Monterey. Key benefits to students of our integrated iPQB curriculum include learning multidisciplinary team-based approaches to problem solving and directly experiencing the advantages of collaborative science – both critical components of the UCSF teaching philosophy.

In summary, the Bioinformatics pathway of BMI has diverged from and grown significantly since the days of our integrated curriculum with the CTI pathway and it is important that the graduates of this pathway be recognized for the additional specialized study they have completed. Thus I strongly endorse approval of a Designated Emphasis in Computational Biology and Bioinformatics for our program.

Sincerely,

Thomas E. Ferrin, Ph.D.
Professor of Pharmaceutical Chemistry and Biopharmaceutical Sciences

Attachments:
- Designated Emphasis proposal
- Appendices, including
  - BMI By-Laws
  - Roster of participating Bioinformatics faculty