Certificate Program in Computational Molecular Biology: Committee Report
February 5, 2014

Overall the Computational Molecular Biology program is a very positive force on campus, bringing together excellent faculty and students in a subject area that is at the cutting edge and rising in importance. The students gain exposure to courses, expertise and faculty in a way that is clearly assisted by the program, and the existence of the program provides corollary benefits in terms of activities not only to participating students, but also to the broader student and research community. Students past and present acknowledge the added value that this program has brought to them in terms of coursework and opportunities for research and interactions. The following recommendations are intended as potential operational changes designed to further improve the program and enhance its impact within the university.

Broadening participation. The program currently has a core group of interested faculty and highly motivated students. There would be clear value in extending the reach of the program to more of the faculty listed as participants and students from a large number of the participating departments. There are some barriers to participation that could be mitigated. The first is that the coursework is rather specific to students interested in Genome Sciences. These students are indeed well served by the high quality course offerings of the core courses GENOME540 and 541. However, these courses might discourage students that are involved in a relevant general area but for whom this coursework is not their first choice. In general, a tightly defined set of core coursework can be useful if it brings together the cohort of students and builds community, but here because students are entering from many degree programs, they generally do not seem to do the courses at the same time. It may therefore be worth considering broadening the possibilities for the central courses to make the program more attractive to other students. It was also observed that there are some logistic barriers to participation from students from other departments because of scheduling of coursework. As Dr Noble has already initiated, continued negotiations with chairs of participating departments might help to alleviate these issues.

Program requirements. Beyond coursework, the program requirements are stated to include a laboratory rotation and a capstone project, as well as participation in the seminar series and symposium. These requirements would benefit from clarification and could be more directly communicated to the students. The committee is enthusiastic about the laboratory rotation, as were past students, while acknowledging that there can be logistic obstacles to this for students from some departments that do not routinely undertake rotations. The program is encouraged both to remain flexible about this requirement, but also to be creative in finding ways to help students to carry it out, perhaps lowering the expectation that the students would perform a wet-lab experiment in favor of simply “embedding” in an experimental lab and collaborating on a data-driven computational project. The capstone project would also benefit from more definition. This project could serve

as an opportunity for a collaborative project within the program, perhaps connected with the rotation. Students from CSE could incorporate it with their qualifying exam project, which is not generally the subject of their thesis.

Activities. The program is at the center of a vibrant community with three weekly activities-- two seminar series and a journal club-- and a yearly symposium. The journal club and one of the seminar series are very student-focused and provide an excellent opportunity for the students to meet and learn from one another. Impressively, all of the students interviewed, although junior, had presented in one or the other of these venues, some more than once. However, students seemed to choose a subset of these activities, generally the ones held closer to them, to attend. More communication about these activities and expectations of attendance is encouraged. It is possible that holding them in alternating locations would increase mixed participation, which would be highly desirable. The committee noted that these activities are positive for students beyond those enrolled in the program. Some students noted that the seminar series could help to satisfy interest in engaging with faculty from FHCRC, ISB and other Seattle institutions. Career development would also be aided by occasional talks from local industry representatives.

Increasing community. A modest financial contribution from the University would have tremendous payoffs in creating much greater cohesion in the program and among the students. Funding for a start-of-year social event, support for the symposium and perhaps a yearly external speaker to raise the profile of the symposium across campus would all be highly effective. Efforts such as these should provide considerable return on the investment by providing outreach opportunities to tap into the external support network of Genome Sciences, CSE and other major departmental players on campus.

Recruiting. The program has great potential to draw students to UW, especially in the absence of a department/graduate program dedicated to Computation Biology, a field of growing importance in the biomedical research community. However, some efforts could be made to enhance its visibility. While CSE includes the program as an option on its admissions webpage, which has helped to alert some students to its presence, the program does not yet appear on the Genome Science webpage, even though GS attracts many computational students. Other participating departments/institutions could be asked to provide a link from their graduate program web-pages. Some thought could also be given to organizing short courses (perhaps with graduate student participation) offered to undergraduates and post-graduates interested in acquiring specialized computational and bioinformatics expertise.

Administrative support. The committee notes with enthusiasm that Genome Sciences has committed time for Brian Giebel to act as program administrator. Mr. Giebel is clearly invested in the program and is motivated to run the communications,

organization, admissions, website and tracking efforts that will ensure the program's success.

Future outlook. Students and faculty see Data Science as an exciting opportunity. Interactions with Data Science will provide more coursework, ancillary events such as boot-camps and workshops, and possibly funding opportunities. Plans are underway to contact NIH about adding additional slots to the current GS training grant for computational students, with the goal of broadening the reach of that training grant beyond GS. The program could also consider trying to initiate efforts to attract external funding, such as an IGERT. Studentships might be available through the Data Science initiative.

Summary. While clearly adding considerable value to student experience, we encourage CMB to further tap its potential to be a stronger, more vibrant, intellectually diverse and visible program that will respond to growing student interest and career opportunities in this area. The actions already taken by Dr Noble, assisted by Brian Giebel, to broaden faculty participation, simplify admissions and systematize student communication are moving CMB decisively in this direction. We anticipate an exciting and productive next phase for the program. We recommend review in 10 years.