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Dr. Rafael Palacios
Coordinator
Undergraduate Program on Genomic Sciences
National Autonomous University of Mexico

Dear Dr. Palacios,

I am writing with my observations regarding your Undergraduate Program on Genomic Sciences. I am familiar with the program from having spoken in your seminar series in Cuernavaca in fall 2006 and also from having had two students from the program undertake research projects in my own laboratory.

My own experience with computational biology education comes from being one of the two authors of the genomic and computational biology graduate program at Berkeley and from active roles in the development of computational biology undergraduate programs in both Bioengineering and in Molecular & Cell Biology at Berkeley. I am therefore familiar with the challenges of building interdisciplinary programs that bridge biology with the mathematical sciences.

With that experience, I can state that what you have constructed in Cuernavaca is truly remarkable. Your curriculum map seems to cover all major areas of modern genomics in a carefully integrated program. It is extremely difficult to develop such a comprehensive program, and the well-honed curriculum ensures that students waste no time with repetitive material and that there are no inadvertent gaps in their knowledge. From speaking with the students, it is clear that the faculty are extremely devoted to their education, investing tremendous efforts in both classroom presentation and research experience. A great strength of the program is the visits from international researchers that you arrange. Unlike most such seminar series elsewhere, which are primarily for the benefit of the faculty, this series is very clearly to benefit the students. From looking at your invitation schedule, it was evident that you have managed to tempt the world's top researchers to come to Cuernavaca, and to engage them in speaking with your students. This exposes the students to the most exciting new areas of genomic science and gives them the opportunity to ask detailed questions.

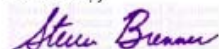
I was tremendously impressed with the students that I met in your program. It is hard for me to tell to what extent their excellence comes from their innate brilliance versus outstanding educational experiences, but the result is clear: your students are clearly world-class. In terms of scientific maturity, many of the students seemed more similar to postdocs than to undergraduates. They had a depth of understanding well beyond what I had anticipated. I ordinarily do not accept students for internships in my laboratory, but because I was so impressed with those I met in Cuernavaca, I did invite two to work in my group at Berkeley. The first student was comparable to the best undergraduate students at Berkeley, making a distinctive positive impression on her classroom teachers and making very substantial progress on research in my lab. The second student has just arrived and is already off to a fast start.

I have two concerns with the program, though I realize both may be ineluctable. The first is that this program offers relatively little flexibility and essentially no breadth beyond what is essential for today's genome sciences. Thus the course program will require frequent revision to avoid becoming dated. There seem to be no courses on chemistry or physics, which may be necessary foundations for new areas of genomic science. More seriously, it is not totally clear that students will have the broad background that will allow them to follow future changes in the field, and they also lack opportunities to pursue advanced coursework in specific areas of interest. Likewise, because the students are at a remote campus, they do not have the cross-fertilization with students from other disciplines that could enrich their educational experience. The yearlong research project and the steady flow of outstanding international researchers to Cuernavaca mitigate these concerns to a considerable degree. Moreover, I do not see any simple way to address this concern without making the training program longer.

The second concern is that while Mexico is doing an outstanding effort at training its undergraduate students in genome sciences, it is less clear that there will be opportunities for these students in Mexico when they ultimately complete all their training and wish to take permanent research positions in academia and industry. It is appropriate for students to gain a diversity of training internationally, but I would personally like to see a richer array of options for outstanding young Mexican scientists as principal investigators in their home country.

I look forward to opportunities for further interactions with your excellent program and students.

Sincerely,



Steven E. Brenner
Associate Professor

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