**Proposal for a change in the Calculus requirement for the BS major and more**

Part 1: Should calculus be required for a BS degree at UConn?

Part 2: Should Statistics be an alternative to Calculus for the BS degree?

Part 3: Should Statistics for Daily Life be part of the BA degree

I have been thinking about these questions for many years and have come to the conclusion that calculus should not be the only math requirement for the BS major. Partly, this is personal because in my 30+ years of working in the molecular biological sciences, I have never used the calculus that I learned in high school. I have discussed this issue with colleagues in a number of departments, and in my informal survey, while there are those who use calculus in their work, the vast majority do not, nor do they feel that they took something away from their experience with calculus that informed their life and careers. It was a tool to learn to manipulate.

If I had found calculus to have enhanced my understanding of the sciences or life as a citizen in some way, then even if I did not use it in my field, I would argue that it is important for a BS degree. However, I do not feel that I learned anything that gave me a fundamentally different view of the world. A good example is calculus in physics. UConn teaches introductory physics with calculus and physics without calculus. I would argue that the students that take physics with calculus have no better understanding of the laws of nature than those who take it without calculus. In most Biology courses, it is not necessary or required and in most Chemistry courses I doubt it is ever used. So why do we require it? Historical artifact? A right of passage? We had to take it as students so we force our students to do the same?

I am not arguing that calculus is not important. It absolutely is, and there are courses that require a background in calculus to deal with the subject matter. Rather I am arguing that it is not something fundamental, like learning about DNA and genes is universal and fundamental to the biological sciences. You can do many (most?) subjects at UConn knowing nothing about calculus. As an educated citizen of the world, you need to know algebra and perhaps trigonometry, but you do not need to know calculus.

I would argue that the same cannot be said for statistics. My suggestion is not to remove the calculus requirement from the BS major but to provide an alternative. Over my years as a scientist, I have come to appreciate my lack of training in statistics. I have never taken a statistics course, but I should have. As a citizen of the world, I have come to appreciate the importance of statistics in daily life as well as my life as a scientist. We are constantly being bombarded with statistical information or conclusions drawn from statistical analysis and most people don’t understand the meaning, nuance or complexity of the information. As a scientist, I become more knowledgeable about statistical analysis, but I have no formal training. Even our graduate students in MCB do not get formal statistical training. I think that every student, BS or BA, MS or PhD should have a course in statistics, either for life as a citizen or for life as a scientist. There is no discipline of science that does not utilize statistics extensively, yet it is not a required course in most department majors. I think the major reason is that we do not offer the appropriate courses and the Statistics department does not seem to tailor their courses to other disciplines. The Statistics Department does not teach a single course that we would recommend for a major in the biological sciences. It actually would make more sense to teach discipline specific statistics courses in appropriate departments.

In conclusion, I would argue that the CLAS Dean should work with departments to offer appropriate statistics courses either tailored to specific program areas by departments, or through the Statistics department so that we can alter the BS major to have the option of allowing Calculus or Statistics to satisfy the BS major math requirement. Further, I argue that someone should develop a “statistics in daily life” course that should be part of the BA requirements.

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