

Bursting the Boundaries of Scientific Discoveries: A Colloquium for Undergraduates

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Nature and Importance of Project

Undergraduate students entering science majors at the University today are highly motivated, usually pursuing pre-professional programs or seeking to enter the workforce. They graduate with much knowledge in specialized fields such as genetics, neuroscience, and bio-based products engineering. This extensive scientific knowledge provides students with the academic background that can be just the beginning of a long, successful career advancing science into the future. However, many graduating students are not aware of many of the societal implications of their disciplines. With progress, often comes controversy and unintended consequences.

Although we have liberal education requirements for all undergraduates, many science students could benefit from supplements that would stimulate creative thought and inform more about the societal impacts of science. It is important to understand controversies that may exist with scientific breakthroughs and those that already exist. For instance, when a cure for HIV is discovered, what kinds of societal implications might be expected? Many pre-professional students might only question the scientific methods involved in a cures development but would not critically see the weight such a cure could carry.

Proposal

Our aim is to supplement the formal science curriculum with colloquia that address ethics, social implications, and public awareness of scientific achievement. The colloquium would consist of three segments. First, a student speaker would present background information about the topic, along with controversies that have come about, or might arise. Second, a minimum of two experts on the topic would speak and address the social and ethical issues raised by past, present, and future science. Points of view might be argumentative, sparking debate among the student audience. This debate makes up the final segment of the colloquium. Students might raise issues and offer thoughts on the subjects, much like a debate. The colloquium intends to stimulate undergraduates to think about the societal implications of the scientific breakthroughs that they may one day be a part of.

Students will leave the colloquium with new information. They will be provided with summaries of the major points discussed, including references. Also, students will leave with newly acquired knowledge and, we hope, an inspiration to critically consider the implications of scientific work and their own work. Undergraduates will also be able to connect outside of the classroom with University faculty with. Furthermore, they may leave with energy and ambitions to use science to make beneficial social changes. Together these can be a powerful combination for young students with fervor for making a difference in today's world.

The possible topics are limitless, including those such as cancer research, stem-cell policy, the use of bio-fuels, genetic therapy, health care disparities, or race-associated research. The two proposed colloquia would enhance and supplement the current curriculum by critically analyzing social implications of scientific advances.

A wide variety of undergraduate students will be targeted to attend, those with a scientific background and those from outside of the scientific community such as philosophy and political science students. This mix of students and faculty should provide for a diversity that will make for interesting discussion and debate.

The impetus for this proposal is driven by several undergraduate biology students who are very enthusiastic to start this colloquia program. They are anxious to start a type of outreach that will affect the world beyond the University by better informing our undergraduates. Because this proposal is backed by the College of Biological Sciences (CBS) Student Board (the primary student-governing body in the College), this colloquium could have a lasting affect on the University in years to come. It could become a regular event for the Board and raise awareness and motivate undergraduates in the future. An on-going colloquia series is an innovative approach to serving CBS undergraduates and a new direction for the CBS Student Board.

From our experience working with undergraduate groups, the best time of day to offer the colloquia is over the dinner hour (late afternoon or early evening). We also know that providing a light dinner (such as subs or pizza) will increase attendance and interest in the event. We are purposely proposing to invite local faculty or other experts because we want undergraduates to have an opportunity to briefly connect with University faculty. This may lead to further interactions in the future. Finally, we will conduct a short evaluation of each colloquium in order to improve future offerings.

The College of Biological Sciences Student Board is providing some matching support and students are excited about the opportunity to take part in this proposal. If our colloquium is well received, we plan to publish the model in the *Journal of College Science Teaching* so that other institutions could use our model to also inspire their undergraduates.

Work plan

Summer 2007

- ◆ Determine topics
- ◆ Contact potential speakers
- ◆ Confirm speakers
- ◆ Reserve dates (potentially Oct. 11 and Nov. 17, 2007)
- ◆ Arrange facilities
- ◆ Design publicity

Fall 2007

- ◆ Publicize colloquia
- ◆ Design colloquia evaluation form(s)
- ◆ Arrange food/beverage

- ◆ Arrange final technical details for speakers
- ◆ Hold colloquia

Spring 2008

- ◆ Complete evaluation of colloquia
- ◆ Write report to Consortium

Biographies

Kathryn Hanna, Ph.D., Associate Professor, Biology Program:

Dr. Hanna's primary focus during her 35+ year career on the faculty of the University of Minnesota has been undergraduate education. Currently she is the Director of the Biology Colloquium Program (a student-led sampler class for beginning biology students); an instructor of freshman seminar courses; the faculty sponsor of biology internships; and the faculty advisor for two, very active, student clubs (the Forensic Science Club and Biology Hoopla Club). She has an interest in educating students in non-traditional ways. For example, the Forensic Science Club has invited many practicing forensic scientists to speak to students during club events, the Biology Colloquium Student Leaders have gained extensive leadership experience through retreats and being assigned leadership positions, and internship students benefit from an academic approach to career development through the hands-on internship course.

Dr. Hanna has extensive experience (through her current responsibilities and previous administrative roles) with successfully organizing events such as the colloquia proposed. She is familiar with enlisting guest speakers and arranging facilities, and understands the logistics involved to host a successful event. Working with enthusiastic students in sponsoring colloquia on science and its societal implications fits well with other responsibilities and expertise.

Justin Miles, CBS Undergraduate Student:

Not long ago I became aware of the concept of social implications caused by scientific discovery while I began to learn more about biofuels. This knowledge was heightened during the fall of 2006 when I took an honors seminar for the College of Biological Science. This class opened my eyes to a new concept that I believe all undergraduates should have a background in, the social impacts and societal conflicts brought about by revolutionary discoveries. Thus, this supplemental education colloquium will benefit students like me that need more to solidify their education before entering the professional world. I know that this colloquium is something that I can not only handle, but do a good job planning. My role as the Biochemistry club president and a youth leader at a local church has shown me what it takes to be a strong leader. I have experience as an ambitious undergraduate, and also a desire to teach fellow undergraduates. I was a Biochemistry 3021 teaching assistant for two semesters and have experience in leading and guiding discussion sections and review sessions. This proposal also imitates my initiative to teach preventive medicine, a subject that I teach as an intern at Hopkins High School health classes. One day I aspire to become a physician that is

not only active with his patients, but also one that is assertive with his community and active in public policy issues.

Sean Polster, CBS Undergraduate Student:

Throughout my education, I have always had a passion for the life sciences, but my true motivation has come from the social implications that the sciences can have on a population. How science affects the greater community, is a question that escapes many science-based classes' curriculums. As President of the College of Biological Sciences Student Board, I have set an initiative to expand supplemental education activities that explore social implications of life sciences. The CBS-Student Board has put on seminar activities that have drawn a significant portion of the student body with great enthusiasm and feedback to support a proposal such as this one. I have worked as a teaching assistant with both Justin Miles and under the direction of Dr. Kathryn Hanna in the Biology Colloquium class. We have had great success in the past of working together and providing supplemental educational opportunities. My future aspirations are to become a physician and work with underserved populations in a medical and policymaking capacity.