

Finding answers raises questions

U.Va.'s Human Biology program

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In the last few decades, societies around the world have devoted hundreds of billions of dollars to unraveling the mysteries of the human body. We know more than ever before about issues such as how the human body develops and sustains itself and how genetic and environmental factors cause disease.

The problem is we're not quite sure what to do with this knowledge. The new Distinguished Majors Program in Human Biology, which will graduate its first students in May 2004, is designed to provide the perspective that will help.

Alleviating human suffering and needless loss of life is an admirable goal, but the process of converting scientific breakthroughs into better treatments and improved health quite often is a source of religious, political and economic controversy. This country is currently immersed in a fierce debate about the proper provenance of human cloning and stem cell research. Genetic testing has generated concerns about privacy and discrimination. Concepts of intellectual property, brought to the fore by the sheer expense of this research, conflict with the long-held view of science as an open forum.

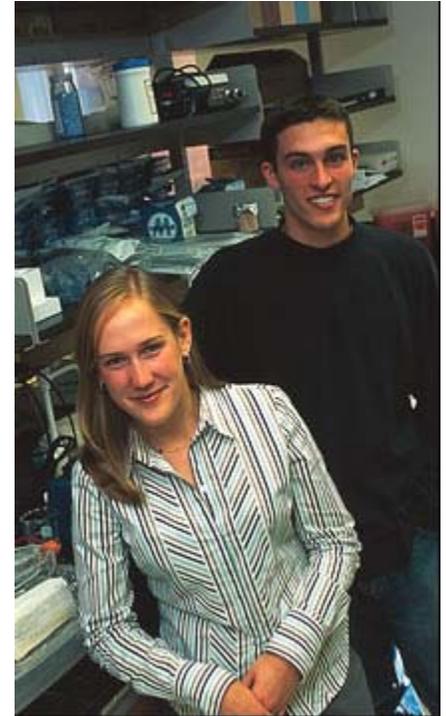
"Most biologists lack the training in the social sciences and humanities to provide the leadership needed to build consensus on these issues, while our leaders and opinion-makers are not well versed in biology," said Rob Grainger, the W. L. Lyons Brown Professor of Biology and current co-director of the program. "Our society needs people capable of bringing to bear an interdisciplinary perspective, and U.Va., given the ideals of its founder and the interests of its current faculty, is ideally equipped to train them."

An interdisciplinary major with disciplinary rigor

The major evolved out of a confluence of circumstances. When Grainger became chair of the Faculty Senate in 2001, he chose the theme Science and Society as a focal point for his tenure. In conjunction with the Institute for Practical Ethics, the Senate sponsored a year-long series of events focusing on the broad implications of scientific research as well as a pair of well-attended seminars, one on Genetics, Ethics and Society and the other on Global Health Policy and Ethics.

Encouraged by the response-130 students signed up for Genetics, Ethics and Society alone-a group that included ethicists James Childress and Ruth Gaare Bernheim as well as biologists Michael Wormington and Lynn Davis explored the possibility of developing a new major.

"The program we envisioned would include rigorous training in biology, while immersing students in the different kinds of knowledge and mental constructs that characterize the social sciences and humanities," said Childress, the Hollingsworth Professor of Ethics and director of the Institute for Practical Ethics. "Our



Human Biology majors Jessica Tarleton and Shep Nickel.

Photo by Stephanie Gross.

goal was to create an interdisciplinary major that reflects the strengths of the underlying disciplines.”

Students take the same core courses that biology majors take and choose from the same selection of upper division courses. To this they add a required course, Theology, Ethics and Medicine, and four courses in a concentration such as Bioethics, or Science, Technology and Public Policy. In addition, they are required to take part in a research project under the guidance of a University faculty member, write a thesis and take the Biology and Society capstone course at the beginning of the fourth year.

“The capstone course is an essential part of the program,” Childress observed. “It’s an opportunity for all students in each class to come together, focus on a variety of current issues and integrate the knowledge they’ve gained in the major. It complements the thesis, which gives them the opportunity to dive deeply into a specific topic.”

Energetic self-starters

“The types of students attracted to the program are creative, energetic self-starters,” noted Bernheim, the institute’s executive director and an assistant professor of medical education. The variety of thesis projects they undertake highlights their creativity and their diverse interests. For instance, Jessica Tarleton (Human Biology ’04) traveled to Bangladesh as part of a team assembled by microbiology professor Dr. William Petri to study the human response to *Entamoeba histolytica*, the parasite causing amoebic dysentery. “My project builds on work Dr. Richard Guerrant has done in Brazil to assess the effects of amebiasis and other diarrheal diseases on mental development in children,” Tarleton said. Her trip was funded by a Harrison Undergraduate Research Award.

Another student, Robert “Shep” Nickel (Human Biology ’04), asked Dr. Joseph Wagstaff, associate professor in pediatrics, biochemistry and molecular genetics, if he could work in his laboratory. “I went online and looked at the research going on in the Health System,” Nickel said. “I found 10 prospects I thought interesting and met with three faculty members. They were all willing to take me on. I was surprised how easy it was to get involved in their research.”

Wagstaff studies the mechanisms that cause two genetic disorders — Prader-Willi Syndrome and Angelman Syndrome. Most cases of these diseases involve a missing segment of DNA in chromosome 15; Prader-Willi can occur if the defective chromosome is inherited from the father, while Angelman can occur when the damaged chromosome is inherited from the mother. Nickel is writing his thesis on DNA methylation, a process that is implicated in this difference. His work last summer was funded by the Summer Science Scholars Research Program through the Center for Undergraduate Excellence.

Educating students to serve society

Nickel has taken courses in philosophy and sociology like Research Ethics, Justice and Health Care that complement his interest in genetics, and he has found them both challenging and rewarding. “They exposed me to a way of thinking that was new to me,” he said. In the case of Tarleton, the distinguished major program provided a structured way for her to pursue an established interest in international health. “My interest in medicine and health goes beyond the issues that people face in the more developed countries,” she said.

But not only can this interdisciplinary perspective be personally rewarding, it can also have real benefits for society. The program’s adviser and founding director, associate professor of biology Michael Wormington, points out that many of the students in the major plan to become physicians. “As a result of their training, they are likely to have a better appreciation for the nonscience aspects of medicine than

their peers," he said. Grainger added that students who go on to do research in biology will be better scientists for their understanding of the societal impact of their work.

Furthermore, graduates of the Human Biology major will have the background needed to resolve the many complex issues that advances in medical science have raised. As Bernheim pointed out, "This group of students, at home at the intersection of science and society, can serve as translators for people from different disciplines and help them find common ground."

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