

WEISS SUMMER RESEARCH PROGRAM
 IN THE NATURAL SCIENCES, HUMANITIES, SOCIAL SCIENCES, ARTS AND ECONOMICS



PROFESSOR
Daniel Klinghard
 Director, J.D. Power Center for Liberal Arts in the World

HIGHLIGHTS

Thank you for empowering novel and important research. Contributions to the Weiss Summer Research Program have a profound impact for both our student participants and the ongoing research of their faculty mentors. Unrestricted support ensures expanded access, and helps students of diverse backgrounds participate in this formative program.

Unique in scale and scope at a liberal arts college, the Weiss Summer Research Program provides Holy Cross students the opportunity to work on an in-depth research project with a faculty mentor, comparable to that which graduate students

experience in large research universities. Across all disciplines, our students complete cutting edge research at the highest level, work alongside distinguished faculty and contribute to scholarly developments in their respective fields.

- ▶ Students are admitted based upon application and project proposal
- ▶ While this is traditionally a 9 week, residential program, due to the COVID-19 pandemic, the format was shifted to accommodate remote research associates this year
- ▶ 64 students participated
- ▶ 36 faculty members guided student research

"We are incredibly grateful for your support that helps Holy Cross to form a new generation of scholars. Students look forward to conducting in-depth research alongside experienced faculty mentors, and many faculty members depend on this assistance for their scholarly work. Thanks to you, we were able to foster many projects again this year, even as the format shifted to a remote program in these most unusual circumstances. Topics were wide-ranging, and a number of projects incorporated study of the COVID-19 pandemic. Many thanks for all that you have made possible."

– Prof. Daniel Klinghard



STUDENT:

Katie Knippler '22

FACULTY MENTOR:

Susan Elizabeth Sweeney, Ph.D.
 Monsignor Murray Professor in the Arts and Humanities

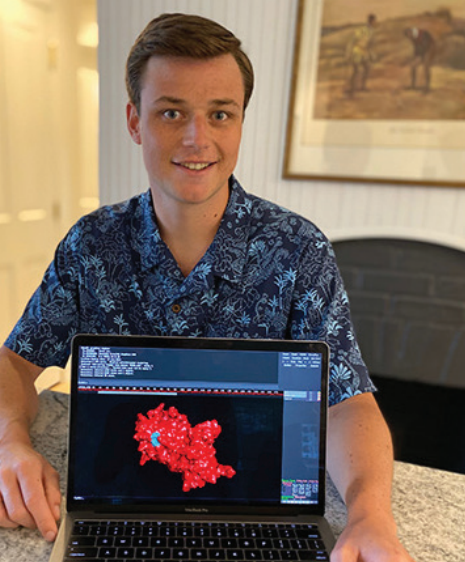
"I'm spending this summer exploring the concept of home in the poetry of Elizabeth Bishop, an American poet born in Worcester. I'm interested in pursuing this topic because Bishop lived in various countries and cities and wrote about her relationship to these places in her poetry. I'm curious to learn about which of these places Bishop considered home."

This summer research experience has influenced both my short- and long-term plans. I was accepted into the College Honors Program this past year, and I am considering writing my senior thesis on the meaning of home as it is expressed in transnational poetry. This opportunity also helped me to sharpen many skills that I think are beneficial to a potential career in law or academia."



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STUDENT:

Charlie Millard '22

FACULTY MENTOR:

Ann M. Sheehy, Ph.D.
Professor of Biology

"In the "Sheehy Lab," we research a cellular innate system of defense against HIV infection, specifically the role of a human protein called APOBEC3G in decreasing viral replication. APOBEC3G can mutate HIV to the point at which the virus is incapable of effectively replicating. In a classic example of an evolutionary arms race, HIV has evolved to counteract the antiviral effect of APOBEC3G. However, exploring ways to liberate APOBEC3G from viral regulation could provide novel therapeutic options. Our research is currently focused on an unusually potent form of APOBEC3G protein which has more significant antiviral activity. This summer we have sought to determine why this version of APOBEC3G has increased antiviral power in the hope that the insights we gain can be applied in the design of new HIV treatments that would harness an existing innate defense.

I've known since high school that I want to pursue a career in molecular biology and biological engineering, but this opportunity has strengthened my convictions, while also steering me to the specific subfield of biology I hope to pursue. Working with Prof. Sheehy on a daily basis, performing extensive reviews of scientific literature, and working with computer models of the APOBEC3G protein has deepened my knowledge of and interest in immunology and more specifically immunoengineering, which seeks to harness the body's defenses and tailor them to new purposes, such as the treatment of diseases like cancer or more efficient methods for healing wounds. My work with Prof. Sheehy this summer has allowed me to become proficient in the modeling of proteins, an extremely valuable skill as an immunoengineer, and I hope to one day use the skills I have cultivated this summer in the design of proteins that may help slow the biological aging process. This unique, online experience has allowed me to expand and strengthen my skill set, and my newly acquired expertise should help me pursue my career goals in the field of immunology."

"I'm spending the summer researching a fascinating and important topic. What a lot of people don't know, and what might surprise them, is that a large number of people in the Nazi regime were physicians. Learning that and thinking about it in the context of the Holocaust and mass murder, which is devoid of all medical ethics, raised the question for us about the correlation between studying ethics and studying medicine. How was it that people who took an oath to protect human life became enticed with the idea of ending it? We're thinking about that idea in the context of today's medical students by studying medical school curriculums from across the country—using universities similar to Holy Cross—and seeing if there's a correlation between those institutions that have courses on the Holocaust and medical bioethics and outcomes for students who are "successful" in the medical field they pursue. For students who are taking detailed courses in medical ethics and then going in to healthcare or STEM fields, is there a difference in the way they're approaching their studies? Their patients? How they participate in clinical trials? We're in the beginning stages, but we believe that if students are not that well informed about medical ethics, things like the Holocaust can happen again.

As a neuroscience major in the health professions advising program, I already knew I wanted to go in to medicine, but I am still in the process of figuring out what it is that I want to do with going to medical school. I knew I was interested in research, but I also liked working with people, so I may also want to work in a hospital. Through this experience, I know that research is something I want to continue to do. It changed my trajectory and made me interested in what other things I can do with research, such as looking more into the psychological effects of denial."



STUDENT:

Tatiana Thompson '22

FACULTY MENTOR:

Daniel B. Bitran, Ph.D.
Professor of Psychology

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