SHARPLESS: THE RENOVATION

Our 100-year old Biology & Psychology building, whose stately façade features beautiful stone work and spectacular windows, was revamped and re-imagined allowing us to meet the future needs of our disciplines.

Wide open lab configurations for better visibility and collaborative work, cozy nooks and study spaces, and a new microscopy suite are just a few of the new and improved features of this incredible building.
The Marian E. Koshland Integrated Natural Sciences Center (KINSC) catalyzes and facilitates programs that maintain Haverford’s position at the leading edge of academic excellence in the sciences.

To achieve this end, the KINSC promotes scientific scholarship involving close collaboration between faculty and students and provides opportunities for these activities to expand beyond the borders of the Haverford campus.

The KINSC is unique among Haverford’s three academic centers in that it is both a building and a program. The 185,000 square foot building is the epicenter of natural science research at Haverford. It was constructed to facilitate sharing of ideas, instruments, and expertise across disciplines and to contribute to a climate of cooperative problem solving and investigation.

The KINSC includes the departments of Astronomy, Biology, Chemistry, Physics, Psychology, Mathematics and Statistics, and Computer Science. To supplement the efforts of the departments, the KINSC supports interdisciplinary interactions. In addition to directly funding students and faculty, the Center supports academic activities initiated with outside grants and individual faculty awards.

The KINSC funds individual research projects and sponsors symposia, seminars, curricular initiatives, student conference and research travel, courses, and scholarly projects that go beyond the bounds of a single discipline and involve students and faculty from multiple departments.
The range of programs supported by the KINSC is limited only by the imagination of the Haverford science community.

Currently, the KINSC supports the following activities:

- Summer research opportunities for students on-campus or at other institutions
- Fall research symposium, showcasing work by students from Haverford, Bryn Mawr, Swarthmore, and other area colleges
- Travel for students to pursue research during the academic year with collaborators in labs either within the USA or abroad
- Travel for students to attend conferences, to present research or to gain experience applicable to future careers (in collaboration with the Green Fund)
- Student and faculty training in new science-related techniques
- Special projects initiated by science faculty
- Events, such as research talks, film screenings and panels
- Annual career panel for science majors, in collaboration with the Center for Career and Professional Advising
- Annual Student Scientific Imaging Contest
- Mentoring and Student Teaching Program (MAST)
- Research and travel for science students from groups under-represented in the sciences, through the Access and Achievement Fund.

We are committed to supporting a wide variety of creative ideas in the sciences; students should not feel limited by the categories listed.
KINSC BY THE NUMBERS:

2017

RESEARCH & CONFERENCES

 Students received funding for training/workshop travel
 Students received funding for international research travel
 Students received summer funding through the Frances Velay Women’s Science Research Fellowship
 Students received funding as KINSC summer scholars
 Students received funding to attend off-campus conferences
 Students performed summer research with faculty in the KINSC
 Students performed academic year research with faculty in the KINSC

*Student research opportunities are funded through the KINSC and through individual faculty grants from the NSF, NIH, and more.

NATURAL SCIENCE MAJORS

 Students

 *This figure captures Juniors and Seniors who have declared a major in the sciences. Students do not declare majors until the end of the sophomore year.

30
On-campus faculty supervising student researchers

100%
Science majors who graduate with research experience

$5.5 M
External funding for research by our natural science faculty

KINSC 2017 | 5
In 2017, the KINSC supported 23 students for **10-week summer research projects** at Haverford and at other colleges and universities across the country. Thirteen of these students worked with faculty on-campus, while ten worked off-campus in locations such as Scotland, Canada, Florida, Pittsburgh, Massachusetts, Washington State, as well as in the Philadelphia area. Selected student profiles from the 2017 Summer Scholars are featured on pages 17 - 19.
STUDENT RESEARCH FUND
The Student Research Fund provides travel support for research conducted outside of the Philadelphia area. The KINSC funds domestic or international student research during breaks in the academic year. Preference is given to those applying for support related to senior thesis research. Students traveling to present their research may also receive support from the Louis Green Fund, administered by the Provost’s Office.

ACCESS AND ACHIEVEMENT ENDOWED FUND
The Access and Achievement Endowed Fund supports diversity in the sciences and provides an additional source of funding for science students from underrepresented groups to attend conferences, perform research, take off-campus courses, attend workshops, and participate in activities that will enhance their scientific experience as students at Haverford. Ten students received funding for research through the Access and Achievement Endowed Fund in 2017.

INTERNATIONAL TRAVEL STIPENDS
KINSC faculty maintain collaborations with scientists at other institutions throughout the world, creating opportunities for our students to travel abroad in the course of their research. International travel stipends are provided by the KINSC or through external funding for faculty projects. In 2016-17, ten Haverford students traveled internationally to perform research.

Amy MacDonough ‘17 traveled to Nara, Japan for the International Conference on Functional Programming.
Gabriel Given ’17 traveled to Vancouver, Canada for the APS Division of Nuclear Physics meeting.
Shantal Taveras ’18 traveled to Glasgow, Scotland for summer research on Cross-Cultural Facial Expression Recognition.
Russell Nicholson ’18 traveled to Bermuda for his summer research project: "Detection, Isolation, and Mechanism of Action Determination of Algicidal Compounds produced by Marine Bacteria."
Anna Schrecengost ’18 traveled to Bergen, Norway this summer for research on the Mining of Ocean for Antibiotic Adjuvants from Marine Microbes.
Winn Koster ’18 traveled to Toronto, Canada for summer research testing frugal inflationary models with cosmological data.
Ben Frost ’19, Gabriel Braun’19, and Brett Pogostin’18, traveled to Lund, Sweden with Prof. Karin Akerfeldt for summer research on the formation and characterization of a semenogelin I peptide Hydrogel.
Rosalind Xu ’18 traveled to Berlin Germany with Prof. Casey Londergan to attend the conference on Conformation Ensembels from Experimental Data and Computer Simulations.
**2016-17 STUDENT CONFERENCE TRAVEL**
Conferences students attended with funding from the KINSC:

- The Association for the Sciences of Limnology and Oceanography, Honolulu, HI
- NERM, Binghamton, NY
- 229th Meeting of the American Astronomical Society, Grapevine, TX
- APS Division of Nuclear Physics, Vancouver, Canada
- Tapia Conference, Austin, TX
- Society for Neuroscience Conference, San Diego, CA
- CURE REU Symposium, Arlington, VA
- Anxiety Disorders SIG ABCT Conference, NYC, NY
- MAA MathFest, Columbus, OH
- Optical Society of America Annual Meeting, Rochester, NY
- Underrepresented Minorities in Physics, College Park, MD
- Microbiome in Health and Disease, Keystone, CO
- APS Conference for Undergraduate Women in Physics, Princeton, NJ
- Lesbians Who Tech, San Francisco, CA
- American Physical Society Annual National Convention 2017, New Orleans, LA
- American Chemical Society National Meeting, New Orleans, LA
- Consortium in Undergraduate Computational Chemistry, Greenville, SC

**2017 FALL RESEARCH SYMPOSIUM**
Every year, the KINSC hosts a fall research symposium showcasing the summer work of students from Haverford, Bryn Mawr, Swarthmore, and other area colleges.
APRIL FOOLS’ DAY:
A KINSC TRADITION

Students celebrated April Fools’ Day by decorating the KINSC in a variety of themes. This year, the building was transformed into scenes from *The Simpsons* and Dr. Seuss books.

PUBLIC POLICY FORUM

Haverford’s second annual Public Policy Forum, which took place on campus March 21, was a day-long event co-sponsored by the Center for Peace and Global Citizenship, the Koshland Integrated Natural Sciences Center and the Center for Career and Professional Advising, and involved the participation of faculty members, students, and alumni from many different departments of the College. This event featured panels on topics such as law, health care, and international and domestic policy.

A NEW MAJOR:
ENVIRONMENTAL STUDIES

Expanding on our popular Environmental Studies Minor, the new major will cultivate students’ capacity to identify and confront key environmental issues through the lenses afforded by multiple disciplines. Since 2011, Haverford, Bryn Mawr and Swarthmore colleges have cooperated to offer a Tri-College Environmental Studies Minor, involving departments and faculty in the natural sciences, the social sciences, the humanities and the arts, encompassing historical, cultural, economic, political, scientific and ethical modes of inquiry. Students and faculty together explore the interactions among terrestrial and marine systems, local and global environments, and human societies.
Thanks to a new partnership between the Center for Peace and Global Citizenship and the Koshland Integrated Natural Sciences Center, students from Jonathan Wilson’s “Economic Botany” class spent spring break in Trinidad and Tobago on an experiential-learning study tour.

Assistant Professor Jonathan Wilson’s “Economic Botany” course was already a unique experience. Bringing together 100-level students and 300-level biology majors, the class is a multidisciplinary exploration of the co-evolution and co-domestication of plants and humans. With Michael Pollan’s *The Botany of Desire* as a guide, the environmental biologist and his 18 students examined case studies of sugar, chocolate, bananas, tea, citrus, and coffee, among others, as a way to appreciate the complex, and intertwined, histories of humankind and plants. But for 10 of Wilson’s students, “Economic Botany” also took them on the adventure of a lifetime.

Thanks to a collaboration between the Center for Peace and Global Citizenship and the Koshland Integrated Natural Sciences Center, more than half of Wilson’s 18-person class were selected, via a rigorous application process, to spend spring break in Trinidad and Tobago on a field study tour, experiencing firsthand the plants they studied in the classroom flourishing in their natural habitats.”The main learning goal for the course is to get students to understand the botanical, social, and cultural history of the food and the plants they learn about,” said Wilson. “It’s looking at the history of humans domesticating plants, but also plants domesticating humans to spread themselves around the globe because they’re useful to people as food, as clothing, as fibers. But there’s a practical, hands-on type of learning from being ankle-deep in the mud on a trail going through a cacao grove. The knowledge and insight you get from that experience is complementary to what you learn in a lecture or from reading a book.”

The trip was a result of a personal collaboration between CPGC Program Manager Stephanie Zukerman and Wilson that brought together Zukerman’s intercultural expertise and local contacts with Wilson’s tropical botany experience.

The group spent nine days on the islands, visiting the San Antonio Green Market, a hummingbird sanctuary, renowned nature preserve Asa Wright Nature Center, and two cacao cultivation facilities. The group hiked in rainforests—both during the day and at night—enjoyed world-famous bird-watching, and were overwhelmed with the biodiversity they got to view up close.”There is something magical about falling asleep to torrential rain and waking up to a cacophony of tropical bird calls,” said Gabriel Oppler ’17, a biology major who is conducting his senior thesis research in Wilson’s lab. “Sure enough, my favorite part was waking up at 5:30 a.m., before the sunrise, to watch as bats, then hummingbirds, then larger birds flocked to the veranda at Asa Wright Nature Center. I had my trusty camera around my neck and coffee in my hand and, along with my classmates, sat still and silent for two hours as nature woke up around us.”
“... there’s a practical, hands-on type of learning from being ankle-deep in the mud on a trail going through a cacao grove.”
“The CPGC’s Zukerman, whose family hails from Trinidad, travels to the islands annually and is currently conducting research for a master’s thesis on ethnic relations in the region. She spent a year planning the study trip with Wilson, taking advantage of her island contacts to offer the students unparalleled access to local guides and academics and even discounts at a breathtaking eco-resort in the rainforest. Because of her CPGC work and her history with the islands, her role, as she saw it, was to make sure the students experienced the local culture, which dramatically impacted their understanding of the local plants.”

When you’re studying conservation and ecology [in a place], you have to learn the local culture and how their society understands these things and what the power dynamics are,” said Zukerman. “Almost every local who spoke with us started off with the history of Trinidad and Tobago, including its history of slavery and indentured servitude. It’s a living history for them as a post-colonial society.” Through Zukerman and Wilson’s collaboration on cultural and scientific topics, over the course of the field study trip, students gained not just hands-on experience with the tropical flora and fauna but also an understanding of the history of the islands and how that affects the plants and people.

“A story we were told many times over was the story of how sugar cane fueled the importation, first of slaves from Africa, and then of East Indian indentured laborers,” said Alana Tartaro ’17, a psychology major and environmental studies minor. “This story of the way a tropical plant, because it was desired by people who could not grow it in their climate, took over a country and forced people into slavery is a common narrative in our class.”

Because Wilson’s course includes students from across the disciplinary spectrum—including comparative literature majors, social scientists, and fine artists—each person’s takeaway was different. Though every student expanded their biology and botany knowledge, some were more affected by what they uncovered about the globalized food industry, the history of the islands, the local agricultural economy, or the sights and sounds of the diverse tropical ecosystem.

“The things I remember most vividly are tastes and textures,” said Tartaro. “I remember the taste of the pulp of cacao fruit, the feel of tropical rain, and the smell of fresh nutmeg.”

“The students were engaged the entire time,” said Zukerman. “They were filling their journals with notes, sketching plants. It was a thrill to see how engaged they were and how much they learned.”
For Wilson, the trip reached its zenith during a pair of rainforest hikes, in less than perfect weather, on the trip’s last day. Not only did those hikes perfectly illustrate the differences between an untouched “primary-growth rainforest” that had been preserved since 1776 and the “secondary rainforest” that had once been partially logged, but they also proved that the students—even the non-biology majors or scientists—had synthesized all of the course information Wilson had been presenting and understood it in a sophisticated way.

“[The non-majors] began to ask advanced questions along with the science students,” he said. “Having that moment on the hike was everything I hoped the trip would be. The students achieved a depth of understanding that was really advanced, and that made me very proud. And the students were so tough and Haverfordian about [the experience]. It was pouring rain that day, but they were smiling and laughing.”

The spring break trip offered Wilson’s students an opportunity for experiential learning—a chance to amplify and emphasize his course content in a real-world setting. The 10 students who made the more-than-2000-mile trip brought a Haverford classroom to the tropics, and, more importantly, they brought the myriad lessons learned in Trinidad and Tobago back to campus with them, changing the course of their semester and perhaps even their futures.

“The most important thing I learned is how to see differently,” said anthropology major and health studies minor Ellie Greenler ‘17. “I learned how to look at a vast wall of green rainforest around me and pick out key characteristics of the plants that help me gain information about them. Suddenly the wall stops being just a wall and starts being an array of lycophytes, epiphytes, bryophytes, and ferns. … The ideas that we talked about in class were talked about again in Trinidad and Tobago, but, more importantly, they were seen.”

“Support from the KINSC was essential to the success of this Study Tour. It allowed Haverford students to meet foresters, farmers, naturalists, scientists, and citizens from Trinidad and Tobago—and to experience its rich biodiversity firsthand. I’m grateful for the KINSC’s support for a unique, interdisciplinary opportunity to connect Haverford’s students with the global community.” -- Assistant Professor Jon Wilson
There are many things a student can expect to take away from a science course at Haverford: an expanded interest in a subject, comfort with unfamiliar lab techniques or experimental approaches, mastery of key skills and theories. But a co-author credit on a scientific publication isn’t usually one of them. For the 16 students in the inaugural “Biochemistry Superlab” course, however, that’s exactly what they got.


In addition to its entire class of co-authors, the paper is noteworthy because it characterizes not just the results of their biochemistry research, but also how the class itself was designed to facilitate such research.

“Biochem Superlab,” launched in 2015 by Charkoudian and Fairman and taught by other teams of two since then, integrates original research into the context of a junior-year biochemistry course. It was designed specifically to encourage students to generate their own hypotheses and create their own experiments to test them; there are no “canned” experiments with expected results for the students to perform, just an overarching question created by the two co-teaching professors to guide the research. Students from across the sciences take the class—with preference given to biochemistry concentrators—and professors from the Departments of Biology and Chemistry team-teach it, addressing interdisciplinary interests.

“The philosophy of ‘Superlab’ is that it gets students to think independently, critically, and creatively about projects in ways that then feed into teaching them how to do their own independent research, like the senior thesis,” said Fairman, a professor of biology.
The professors treat their students like working scientists, demanding they conceive their own hypotheses and requiring them to practice communicating their findings via weekly group meetings, oral presentations, and the revision of manuscripts and proposals. Charkoudian and Fairman even offered networking opportunities for the students with professionals in the field.

"When reading a paper related to the project, we would actually invite the lead author in to come talk with the students," said Charkoudian, an assistant professor of chemistry, "and the students would interact with that person. We even had the class read about that person’s background to see how they got from being a college student to where they are today."

The 2015 “Superlab” was focused on questions related to the reactions bacteria accelerate, or catalyze, to make molecules that humans use for pharmaceutical purposes—specifically in the interactions between enzymes that catalyze a reaction called “beta-hydroxylation.”

"It only occurs at certain sites on the molecules, and we are interested in how the enzymes place the hydroxyl groups at the right sites," said Charkoudian. “We took the enzymes responsible for installing that hydroxyl group and the enzyme responsible for carrying the molecule, and were able to recreate the hydroxylation reaction. Then the students went in and they started to change things. They would mutate part of the protein, or they would change part of the molecule to see when the enzymes would stop functionally interacting with each other. They wondered, ‘Are there specific protein interactions that will facilitate the reaction to occur?’”

The PLOS Biology paper covers these findings alongside a detailed account of how the class was structured and run, which is unusual. In the world of academic journals, there are those that specialize in scientific research and others that report on educational pedagogy, but rarely does one do both.

“We wrote to the editors in advance,” said Charkoudian. “We said, ‘We want to have a sort of hybrid narrative where we discuss both our research findings and the pedagogical findings under the umbrella of a single paper, would you be open to publishing to this sort of paper?’ And we got the green light before submitting it.”

In fact, co-authoring the paper as a class became an additional part of the students’ scientific education. “We’ve taken them all the way through the process of submitting an article, explaining the peer-review process, having all the students involved in reading those peer-review comments and helping us form a rebuttal letter and revise the manuscript,” said Charkoudian. “So they really had the opportunity to ‘peek beyond the curtains’ and see how it all works.”

“The teacher-scholar model, which consists of teaching and research is something I don’t think is valued as much as it should be,” said Fairman, who hopes that the template laid out in their PLOS Biology paper will be replicated at other institutions.

“We at Haverford value that, and I think we are looking to take a lead in the scientific community to make that part fully appreciated.”

The Superlab students weren’t the only ones who co-authored a paper in a scientific journal this year. George O’Hara ’18, a double major in Russian and chemistry, combined his interests by joining an epidemiological research project that resulted in a paper in PLOS Medicine’s recent special issue on HIV/AIDS. The epidemiological paper mines recently published Russian National Surveillance data to show how severe the HIV/AIDS epidemic has become, particularly across six provinces in eastern and western Siberia, which had been previously unreported. And it concludes that the epidemic’s continuous growth is a failure of public policy.

Read more: http://hav.to/2hk
The Mentoring And Student Teaching program (MAST) is a long-standing outreach program at Haverford College. The program provides laboratory experiences and writing tutorials for 40-50 Philadelphia area high school and middle school students who come from backgrounds traditionally underrepresented in the sciences. The young students come to the Haverford campus for ten Saturdays in the spring semester and spend mornings in the lab pursuing scientific experiments and afternoons working on writing skills. Haverford and Bryn Mawr College students prepare the course curricula, devise and teach the science labs, and work with small groups of high school and middle school students as writing tutors.

On Dec. 1, large groups of local community members and their children gathered at Haverford College’s Strawbridge Observatory to see the Seven Sisters, the star cluster known as the Pleiades.

“I loved how excited people were to look through the telescope,” said Emily Harrington BMC ’20, a Haverford astrophysics major. “The Pleiades is an open star cluster 444 light years away. The cluster is made up of hot, bright blue stars formed from a cloud of hot gas about 100 million years ago.”

At the final observing event of the fall semester, Harrington gave a talk on dark matter to the crowd before the stargazing began. “People had a lot of questions,” she said. “It made me so happy, and I enjoyed hearing what piqued their interest. The kids that come are very curious and intuitive and so, so sweet. I would love to make astronomy, and science in general, more accessible to the public, especially kids, so that experience was great.”

The KINSC is happy to support this student-run outreach program.
“I really enjoyed learning to prove the results we used in class — it felt like I was advancing my own knowledge and participating in a larger discourse from inside the classroom.”

Braeden Reinoso ’18

MAA Mathfest

This past summer, I conducted research in knot theory at Williams College, and I presented some of my findings at MAA Mathfest in Chicago thanks to generous funding from the Haverford KINSC. I was investigating a relationship between topological invariants of knots and geometric properties of those knots in various 3-manifolds (i.e., in spaces that “look” locally like three-dimensional space). I’ve been considering pursuing a Ph.D. in math for as long as I’ve been at Haverford, but going to Mathfest truly solidified graduate school as my main focus. At Mathfest, I was able to present my research to other mathematicians in my field and attend talks and lectures from some of the leading researchers in a variety of fields that I’m interested in. I even received an award recognizing my talk as one of the best undergraduate research presentations at the conference. The research I was doing this past summer was especially exciting because it was connected to work I had done the previous two summers with Josh Sabloff in the Haverford math department.

Charlotte Eisenberg ’19

Summer Internship at Davidson College

This summer I received funding from the Velay Fellows Program that allowed me to spend time on campus at Davidson College and complete research in sports analytics. The funding allowed me to dedicate my whole summer to research and to be on location in order to work with my advisor in person. I was able to collaborate with other professors in North Carolina, present my research at two local data analytics firms and meet with the analytics staff at the Charlotte Hornets NBA team. My project this summer was creating a logistic regression model for NCAA Division I basketball games that produces tables of probabilities forecasting the likelihood that each team will advance to each round of the March Madness tournament. Evaluating the method with Brier scores, I demonstrated probabilities that were slightly more accurate than FiveThirtyEight’s predictions over the past five years (as well as all eight other published predictions that I tested). Being introduced to the field of sports analytics, first from a colloquium talk at Haverford and then from working with the speaker (who became my advisor) on a project over the summer has informed my plans for after college. I realized that this field is wonderful intersection of my interests in mathematics and athletics. Meeting the analytics staff at the Hornets particularly influenced me, as I would love to work for a professional sports team in the future.

“I was able to collaborate with other professors in North Carolina, present my research at two local data analytics firms and meet with the analytics staff at the Charlotte Hornets NBA team.”

Charlotte Eisenberg ’19
**Chloe Wang ’19**  
*Association for the Sciences of Limnology and Oceanography Aquatic Sciences Meeting*

While there isn’t an aquatic sciences department at Haverford, I secured funding through the KINSC to travel to Honolulu for five days of immersion in these fields. In a session intended for students giving their first conference talk; I spoke about research I conducted at Woods Hole Oceanographic Institution on microbe-mineral interactions at deep-sea hydrothermal vents. Professor Helen K. White and I also co-presented a poster on plastics research from a Haverford Chemistry lab course, and met the person who developed the method we used. We also spoke with a sociologist and ecotoxicologist who are working together to study plastic, and they invited me to write a post for their research group blog. As a Chemistry major with a strong investment in my interdisciplinary Environmental Studies minor, I was particularly interested in presentations addressing relationships between science, social science, policy, the public, and environmental management – and new transdisciplinary graduate programs for students wanting to work at such intersections. I gained a better sense of the paths taken by people whose careers interest me, and the many things one can do with a Masters or PhD degree.

**Graham Peet ’19**  
*Neurobiology Research Internship at Haverford College*

I spent this past summer working in a lab on Haverford’s campus where we use zebrafish as a model to study the molecular neurobiology and genetics of startle habituation and other behaviors. Specifically, I got to work with a high degree of independence on both molecular cloning of transgenes which we use to edit the genome of the fish as well as on a neural imaging project that I am continuing to work on during the regular school year. This neural imaging technique which we use will allow us to better identify the neurons and neural circuitry involved in the behaviors we study. As a Haverford student, I was able to vacillate between major departments (for me it was political science, chemistry, or biology) for my first two years before I decided on my major. The KINSC funded research that I carried out this summer has turned out to open doors for me as a student researcher, and has given me the opportunity to develop as a scientist in ways that I did not expect only a year ago.

**Brett Pogostin ’18**  
*The American Chemical Society National Meeting*

After working in Dr. Karin Akerfeldt’s lab for two years, I was awarded a travel grant from the KINSC to attend the American Chemical Society National Meeting in San Francisco to give an oral presentation on my work. Not only was I able to gain valuable presentation experience, I sat in on other talks and explored my own interests in science. After meeting many faculty from institutions around the country at the conference, I have become certain I want to pursue a graduate degree in Chemistry or Biological Engineering to continue developing biomaterials that can improve the quality of life of patients and the general public. I was awarded second place for my presentation amongst all the other undergraduate presenters in the Division of Polymer Chemistry. Although winning awards is always nice, in practice it meant much more to me than a piece of paper and a small monetary prize. It affirmed the hours I had poured into my research and demonstrated to myself that I have what it takes to succeed as a researcher.
Sofia Massaro Tieze ‘17
Santa Fe River Turtle Project
With support from the KINSC, I traveled to Ichetucknee Springs State Park to volunteer for the Santa Fe River Turtle Project, which seeks to promote conservation of the Santa Fe River ecosystem through its study of turtle population dynamics. I spent two days snorkeling in the river—a beautiful and otherworldly landscape of ethereal grasses and tangles of tree roots—and catching turtles by hand to tag them and document their species, age, and various other parameters. I gained an appreciation for these graceful (and devilishly speedy!) creatures, learned all about turtle biology and spring ecosystems from Prof. Matthew Carrigan’s impromptu car ride lectures, and was awed by director Dr. Jerry Johnston’s tales of wrangling crocodiles in Costa Rica. As I took this trip in my senior spring, in the midst of writing my thesis, I was accustomed to feeling like a colleague amongst my professors, and experiencing the individual attention and deep scientific engagement that such relationships offer. I was met with similar trust and respect (as is the Haverford way) while volunteering. It was therefore incredibly rewarding to work, and swim, alongside such talented, passionate and intelligent scientists. This excursion fell outside of the scope of my previous biology courses at Haverford, which were primarily molecular, cellular, and neurobiology focused, and it was a refreshing reminder that my love of nature and travel could be combined with my intellectual pursuits. Although I am working in a microbiology laboratory now, this trip gave me the fieldwork bug, and it has inspired me to seek out future opportunities to get my hands dirty.

Reilly Milburn ’19
Research internship at the University of Florida
I received funding through the KINSC Summer Scholars Program to pursue astrophysics research with former Haverford professor Desika Narayanan at the University of Florida. This research gave me the opportunity to gain valuable coding knowledge. Much of my work this summer was aided with use of HiPerGator, the University of Florida’s supercomputer. As you can imagine, simulating whole galaxies requires an exorbitant amount of computing power. Some of the simulations would take a full day to run to completion. Even bigger projects can take as long as multiple days, or even weeks. It really gives you an idea of how vast the Universe is. Being trusted to use the nation’s third largest university supercomputer was a little daunting given my status as an undergraduate researcher, but it was super cool! My research has definitely excited me for a potential future career in astrophysics. Being able to carry out my work in a university setting allowed me to work alongside graduate students, sit in on graduate thesis defenses, and gain a better understanding of what graduate and post doctoral work in astrophysics looks like.

“Being trusted to use the nation’s third largest university supercomputer was a little daunting given my status as an undergraduate researcher, but it was super cool! ”
– Reilly Milburn ’19
For more information about studying in the natural sciences at Haverford College, please visit: haverford.edu/KINSC

KINSC Steering Committee

Helen White  
Director, Koshland Integrated Natural Sciences Center, Associate Professor of Chemistry and Environmental Studies

Marielle Latrick  
Associate Director, Koshland Integrated Natural Sciences Center

Kate Heston  
Instructor in Biology

John Mosteller  
Assistant Vice President for Academic Resources

Jeff Tecosky-Feldman  
Senior Lecturer of Mathematics and Statistics

Kristen Whalen  
Assistant Professor of Biology

Student Advisory Committee  
This committee is appointed each year and meets regularly with the Program Coordinator and annually with the Steering Committee as a whole.

Xiwen Jia ’19  
Helen Jung ’18  
Isfar Munir ’18  
Richard Phillips ’18  
Yixuan Zhou ’20

COVER PHOTO BY:  
Assistant Professor of Biology Kristen Whalen  
This photo was taken on a class trip to the Camden Adventure Aquarium as part of her biology course “Advanced Topics in Biology of Marine Life” which challenges students to confront issues relevant to human impacts on oceans and asks them to engage in a conversation about the best strategies and practices to mitigate these effects based on scientific knowledge.

Read more about this, and other unique and interesting Haverford College courses on the Haverblog: blogs.haverford.edu