

From the Banks of **PARADISE**

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BIOCHEMISTRY AND AFRICANA STUDIES MAJOR DANIELA DENY '18 spends her second summer in Smith's summer research fellowship program, known as SURF. "I had a feeling I would thrive in this environment," she says, "but now I've really seen the evidence." *Photographed by Sam Masinter on July 20, 2016.*



Katie Blackford '17 spends much of the summer in the lab working on new methods for creating steroids.

SCIENCES

Summer in the lab

Students revel in the chance to collaborate with faculty on meaningful research

ON A MORNING IN JULY, SALLY KYALE '19 IS IN a Ford Hall lab preparing samples for the day's experiments, which may one day lead to cancer treatments with fewer side effects. That day may be a long way off, but for now Kyale is grateful for the chance to spend long summer days doing important scientific research. "I am able to get deeply involved in research and come to a better understanding of techniques used in the lab—things you can't get into during normal class time," she said. "It's been eye opening, and has made me fall that much more in love with the sciences."

Kyale, of Kenya, participated this summer in Smith's longstanding and growing summer research fellowship program. Known as SURF, the program gives students the opportunity to

↑ SURF students like Katie Blackford, above, can pursue their own research and are twice as likely to go to grad school. Blackford is aiming for a Ph.D. in organic chemistry.

work intensively with faculty, designing and running experiments and receiving one-on-one mentorship. Patricia Marten DiBartolo '89, faculty director at the Clark Science Center, describes it as intensive, authentic and transformative.

"We used to think a science education meant you had to jump through a lot of hurdles in the classroom to finally get to that point where you were ready to do research and to ask authentic questions that matter to you," DiBartolo said. "We are trying to turn that model on its head by pulling students in very early in their academic careers to connect them to questions that they own, that matter to them and for which they see the broader societal reach."

Since it began in 1967, the program has grown

from a handful of students to about 150 participants each summer, across all the sciences. SURF students earn a \$4,000 stipend for working 10 full-time weeks in labs or on research sites. “It gives students a sense of what it might be like to be a graduate student or a postdoc in a particular area or question,” DiBartolo said. In fact, SURF participants are twice as likely as other students to go on to graduate school.

SURF has supported a range of faculty and student research projects, on subjects like artificial intelligence, the health of Paradise Pond (see sidebar), astronomy and disease eradication. “Faculty research isn’t separate from what’s happening with students; it’s integral to what’s happening with students,” said Margaret Lamb, administrative director at the Clark Science Center. “SURF helps faculty to create students as collaborators.”

Here, a few SURF students describe their summer research.

Sally Kyale '19

Biochemistry and anthropology major (intended)

PROJECT: Synthesis and Structural Analysis of Cisplatin-modified DNA 9-mer

FACULTY MENTOR: Elizabeth Jamieson '94, associate professor of chemistry

CAREER ASPIRATION: “Pursue more research and go on to medical school.”

WHAT I AM LEARNING: “Platinum has long been used in anti-cancer treatment; we are taking strands of this, fixing them onto DNA and trying to observe the type of structures they form so we can improve upon this anti-cancer activity. One outcome would be the reduction of side effects



Sally Kyale '19 takes a selfie with lab partner Sheng Tian '18.

in cancer treatment. I am from Kenya, a country where women are not very much appreciated in the sciences. This opportunity has shown me how women can be empowered given the right opportunities. You must believe in yourself, believe in your capabilities, believe in your own knowledge and never shy away from asking.”



Katie Blackford '17 works alongside chemistry professor Kevin Shea. She intends to turn her research into a thesis project.

Katie Blackford '17

Chemistry major

PROJECT: Organic Chemistry: Development of a Tandem Diels-Alder/Pauson-Khand Reaction for the Synthesis of Tetracycles

FACULTY MENTOR: Kevin Shea, professor of chemistry

CAREER ASPIRATION: “I want to get a Ph.D. in organic chemistry and work for a pharmaceutical company to make new drugs.”

WHAT I AM LEARNING: “I am trying to make steroids in a new, efficient way, which is so important for the pharmaceutical industry. I will have put almost three years into this project by graduation. I’m learning tenacity and not to get discouraged. I am learning to get comfortable making my own decisions, coming up with my own ideas and procedures and not just following rules. Meanwhile, there are so many beautiful mountains and rivers and so much natural beauty here that I didn’t experience growing up in the Maryland suburbs.”

Daniela Deny '18

Biochemistry and Africana studies major

PROJECT: Protein Engineering for Therapeutic Uses

FACULTY MENTOR: Sarah Moore, assistant professor of engineering

CAREER ASPIRATION: “Before this summer I was premed and was only considering research. Now I am planning to work solely in medical research.”

WHAT I AM LEARNING: “I explore a lot of different techniques within the diverse work of bioengineering. I am interested in gynecology and am now

Sarah Moore, left, reviews the work of Daniela Deny '18, who says she thrives doing independent research.



working on cancers that target areas that pertain to that field. My mentor allows me to have freedom, which has allowed me to learn about how I work best—doing my own work instead of being in an environment where I

am receiving orders. I have learned how to make my own protocols. It's such an amazing experience for these professors to open their doors for you to do research in their labs—they're filled with so much knowledge.”



Sarah Myerson '17 works on an engineering education website for children. Her faculty mentor is engineering professor Glenn Ellis.

Sarah Myerson '17

Psychology and education and child study major

PROJECT: Through My Window, an online engineering education website

FACULTY MENTOR: Glenn Ellis, professor of engineering

CAREER ASPIRATION: “I am getting licensed to teach elementary school.”

WHAT I AM LEARNING: “I look at writing from children who have

completed an artificial intelligence learning adventure. I get a firsthand look at how clearly their ideas are changing and their curiosity is emerging—it shows that our curriculum is getting them truly excited to learn.

ONLINE: teamthrough-mywindow.org

with other disciplines I wouldn't normally interact with. Smith in summer is wonderful. There is community and opportunities you can really focus your attention on.”

SURF gave me a lot more responsibility on my own and the opportunity to work as a member of a team

—ELIZABETH SOLOMON

PARADISE LOST—AND FOUND

When Paradise Pond was partially drained this summer, three SURF students were keeping watch to see if a new technique would rid the pond of built-up sediment. They were part of a two-year project to explore alternative ways to remove pond sediment without expensive dredging operations that can disrupt the Paradise Pond and Mill River ecosystems. “Moving away from dredging is a move in the right direction,” said Emma Harnisch '18. “We want to achieve a more natural flow.”

The project—involving students and faculty from geosciences, biological sciences and engineering—employed a sluicing technique that harnessed the power of stormwater to move unwanted sediment downstream. The pond was drawn down in July so that bulldozers could push sediment to the river channel, where a good rainstorm could carry it downstream. Sediment builds up quickly, making it difficult for rowers and paddlers to get around, said geosciences professor Robert Newton, director of the Center for the Environment, Ecological Design and Sustainability.

Throughout the summer, Harnisch, Sally Carttar '18 and Lizzie Sturtevant '18 monitored the water's speed and sediment content. “Paradise Pond will come back even better than before,” Carttar said.—BARBARA SOLOW