Tufts University | School of Arts and Sciences

The Russell L. Carpenter Fund for Teaching and Research in Biology

prepared exclusively for Russell F. Carpenter and Cynthia McFadden

Barnum Hall, home of the Tufts University Department of Biology, circa 1925

Tufts UNIVERSITY | School of Arts and Sciences

Letter from the Chair

A consummate teacher and scholar, Russell L. ("Bud") Carpenter opened minds to the wonders of nature for more than 30 years at Tufts. The thrill of scientific discovery continues for many students through the fund that bears his name: the Russell L. Carpenter Fund has supported Summer Research Interns since 2002, allowing some of Tufts' best undergraduates to devote themselves full-time to research. This intense commitment offers students a window into professional scholarship with all its trials and all its joys. It can be a summer to test one's tenacity and to revel in the creation of new understanding. It's easy to get hooked!

Among the many exceptional students who have worked as Carpenter Summer Interns, we see a group of motivated, impassioned, and ardent scholars who continue Bud Carpenter's tradition of learning and discovery. This support has been critical, both academically and financially, for many of these students. The Carpenter Interns have a unique opportunity to envision a future in the community of research. The Biology department is deeply grateful that these students can launch their careers with this support.

Juliet A. Fuhrman, Ph.D.
Associate Professor and Chair of Biology

FUND BACKGROUND

The Russell L. Carpenter Fund for Teaching and Research in Biology at Tufts University was established in 1983 by Dr. Cynthia McFadden and Dr. Russell F. Carpenter in honor of their father, distinguished Tufts alumnus and Professor of Zoology, Russell LeGrand "Bud" Carpenter, A24, H77.

Bud first entered Tufts as a student in 1920, intending to study English. But thanks to the inspiring lectures of Tufts biology professors Herbert Neal and Fred Lambert, Bud decided to study biology and a lifelong passion began.

After graduation in 1924, Bud attended Harvard University, eventually earning a doctorate in zoology. He taught at Columbia University, in the College of Physicians and Surgeons, before eventually deciding to return to his alma mater.

Professor Russell L. Carpenter sitting at P.T. Barnum's desk, ca. 1955

For the thirty years that was his teaching career at Tufts (1938 – 1968), Bud was a much-loved, well-respected professor. His research eventually led to the creation of Radiobiology Research Laboratory, where he served as director and principal investigator. Bud also established the Tufts University Barnum Collection, which included letters and personal mementos of P.T. Barnum and acted as the collection's curator.

Bud was also a loyal and dedicated alumnus. For almost seventy years, he was secretary of the Class of 1924. He was the inaugural editor of the Tufts Alumni Review, president of the New York Tufts Club, and a member of the Tufts Alumni Council. He received the Tufts Alumni Distinguished Service Award in 1942 and served on the committees in charge of redesigning the Tufts Seal and the Tufts Chair.

Professor Carpenter retired from Tufts in 1969 and, in 1977, Tufts presented him with an honorary degree, recognizing his life-long dedication to his alma mater, both professionally and personally.

CARPENTER INTERNS

The Russell L. Carpenter Fund for Teaching and Research in Biology at Tufts University is a fitting tribute to Bud. Since the first research grant was awarded in 2002 there have been 13 Carpenter Summer Interns at Tufts. Those students represent the same spirit of discovery and passion for science that Bud Carpenter embodied. Today's students – the 2010 Interns – are no exception.

Carpenter Interns
Danae Schulz, A04
Rachel Zunder, A05
Quazi Al-Tariq, A05
Emily Pfeil, A05
David Strochlic, A06
Cailin Joyce, A06
Kristen Earle, A07
Stephen Rawlings, A07
Faith Hester, A07
Camille Petersen, A07
Nicole Cherng, A10
Jonathan Moy, A09
Lauren Verra, A10
Daniel J. Slate, A11
Ryan Morrie, A12

Daniel Slate is currently a rising senior at Tufts, majoring in Biology with a minor in Entrepreneurial Leadership. Dan has worked with Dr. Barry Trimmer at Tufts Biomimetic Devices Laboratory for the past year, studying the body properties of caterpillars that can be adapted to locomotion for soft-bodied robots. He will be writing a senior honors thesis this coming year.

Ryan Morrie will be a junior in the 2010 fall semester and majors in Biology, although he is considering a possible second major in Math. Ryan has spent this past semester working with Dr. Dany Adams and Dr. Michael Levin on the role of an ATPase subunit in neural tube closure, using an amphibian model system.

Past Carpenter Summer Interns have gone on to study genetics, cancer and neuroscience. They are attending medical school, enrolled in rigorous graduate programs or working in the industry.

Rachel Zunder is a graduate student in the Department of Molecular and Cell Biology at the University of California-Berkeley. She is studying the epigenetic mechanisms by which the information in a genome is expressed in a manner that is stable and heritable through cell division. **Quazi Al-Tariq** graduated from New York University School of Medical in 2009 and went on to a residency at Lenox Hill Hospital in New York.
Emily Pfeil graduated from Johns Hopkins School of Medicine in 2009. She is now a resident in internal medicine at Hopkins Hospital. **Faith Hester** returned from Teach for America in summer 2008 to participate in the National Science Foundation's Research Experiences for Teachers program. She is currently teaching high school in Arizona. **Camille Petersen** is a Junior Specialist at the University of California-San Francisco Department of Orofacial Sciences. She works at the UCSF Department of Dentistry, studying tooth development in mice. Camille will start her Ph.D. program at Stanford this fall 2010.

On the pages that follow, we hear from a few Carpenter Interns in their own words.

DANAE SCHULZ, A04

Back in 2002 I was lucky enough to receive the inaugural Carpenter Internship, which allowed me to spend a summer conducting genetics research in the lab of Dr. Catherine Freudenreich. At the time, I had an inkling I might want to go on to do research full time, but I wanted to make sure by doing a test run, getting my feet wet in a bona fide research lab, an altogether different beast from the sorts of experiments one does in lab classes.

The first few days proved incredibly challenging; I had no idea how to do anything and nearly everything confused me, despite having taken an entire course on genetics. After a week I was seriously thinking of bailing. I stuck with it however, and by week three I was up and running with an exciting research project of my very own. By week 10 I was hooked. Despite all the associated frustration with the daily trials and tribulations of doing experiments that often fail, the feeling of gratification in finding something truly novel surpassed all my expectations.

I continued to work in Dr. Freudenreich's lab for an additional two years and, upon graduating, entered a Ph.D. program at the University of California, Berkeley in Molecular and Cell Biology. Having just filed my dissertation, I am looking excitedly forward to starting my postdoctoral work at Rockefeller University in New York.

"I will be forever grateful for the opportunity this fellowship gave me to discover how well I am suited to biological research. I can truly say that it helped me to come up with concrete goals for my future, and ultimately played a pivotal role in shaping my life path."
Danae Schulz

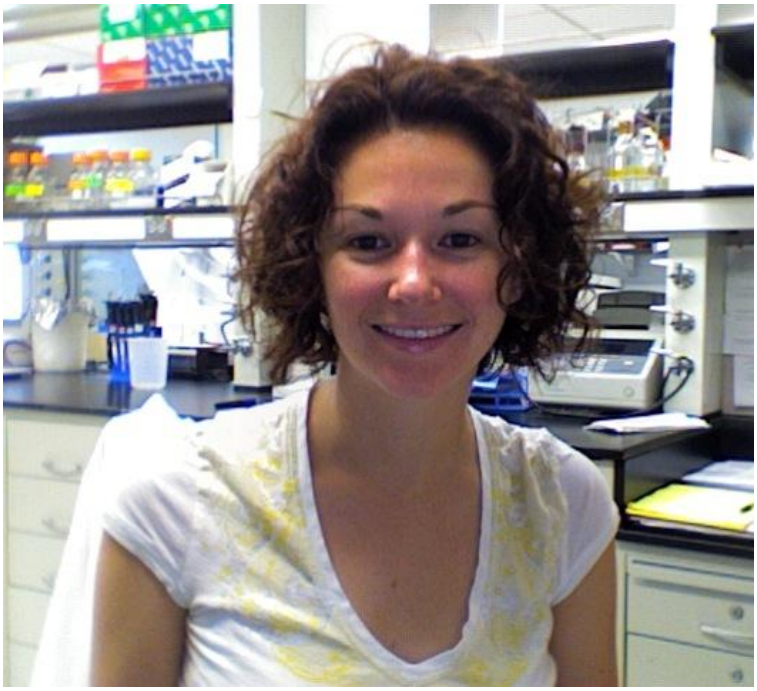
DAVID STROCHLIC, A06

Receiving the Russell Carpenter Research Internship in 2004 was an integral part of my Tufts experience, and, ultimately had a profound impact on my career. I worked in the laboratory of Professor Michael Romero throughout my four years at Tufts. While Dr. Romero was able to support me from his grant for the summer after my freshman year, it was the Carpenter Internship that allowed me to continue in the lab during the summer following my sophomore year.

That summer was critical to my development in the lab – I designed and initiated a research project that I ultimately worked on throughout my final two years at Tufts. These experiments resulted in two publications in peer-reviewed journals, presentations at local and international conferences, and pushed me toward a career in academic science.

After working as a research technician for two years at the Dana-Farber Cancer Institute, I enrolled in the Ph.D. program in Neuroscience at Harvard University, where I am currently a second year student. I am studying how the brain controls body weight and food intake.

CAILIN JOYCE, A06



I developed an interest in science at an early age, and knew that I wanted a career in genetics. So when I applied to Tufts I paid a visit to the Biology department where I met Dr. Catherine Freudenreich. I admired her research accomplishments and hoped to work in her lab as an undergraduate. As a sophomore she granted me that opportunity. I began researching a handful of genes that were thought to be important for maintenance of repetitive DNA sequences. About a year later, as my project picked up speed, I decided to apply for the Carpenter Internship.

This Internship allowed me to spend the summer at Tufts focusing entirely on research, an experience that was instrumental in my decision to pursue research as a career. During my senior year at Tufts, I finished up my coursework, completed my senior honors thesis in Catherine's lab, and was accepted to the Ph.D. program in Molecular Genetics and Genomics at Washington University in St. Louis.

I am currently in my 4th year of graduate school, studying the role of small RNAs in the inflammatory skin disease psoriasis in Dr. Anne Bowcock's lab. I expect to earn my Ph.D. in the next few years, at which time I would like to pursue a career in academic research and teaching. Ultimately, I'd love to follow in Catherine's and Dr. Carpenter's footsteps and end up at a great university like Tufts.

"Thanks so much for endowing this summer internship and playing such an instrumental role in my scientific career." Cailin Joyce

KRISTEN EARLE, A07

Thanks to the Carpenter Fund, during the summer of 2006, I was able to conduct research in the Mojave Desert on the effects of capture, captivity and translocation on the avian stress response. This work was the bulk of my senior honors thesis and was later published in the journal *General and Comparative Endocrinology*.

The Internship was significant to me not only because it facilitated my work, but also because of the great sense of accomplishment and pride I felt at having earned a grant to conduct my own independent research for the first time.

After completing my senior year at Tufts in spring 2007, I went on to work at the National Institute of Allergy and Infectious Diseases for two years as a post-baccalaureate fellow, studying nutrient acquisition by the malarial parasite Plasmodium falciparum. It was there that I discovered my passion for infectious diseases and host pathogen interactions.

This past fall, I enrolled in the Microbiology and Immunology Ph.D. program at Stanford University. For my thesis lab, I am working with Dr. Justin Sonnenburg, where the focus is gut microbiota. I have also been fortunate enough to receive a couple fellowships this year. My department nominated me for the Stanford Graduate Fellowship which I received in the fall, and this past spring I received the National Science Foundation's Graduate Research Fellowship.

STEPHEN RAWLINGS, A07

I really appreciated receiving the Carpenter Internship in the summer of 2006. Thanks to the Internship, I was able to work with one of the best professors at Tufts for the whole summer and I compiled a sufficient corpus of data to complete a senior honors thesis in my last year at Tufts. I truly consider those ten weeks to have been among my happiest and most fruitful times at Tufts.

I am currently in my third year of the M.D./Ph.D. program at New York University School of Medicine. Having finished the two pre-clinical years of medical school, I am now doing research towards my Ph.D. My project is to explore novel genes that restrict HIV production in infected human cells and identify mechanisms to cripple the virus in its life-cycle.

We recently published a paper detailing our findings on one of these genes. I credit the outstanding research environment at Tufts and the truly remarkable professors in the Department of Biology, in particular, for my desire to go into research and my ability to present an attractive portfolio when I was applying to graduate programs. The Carpenter Internship in Biology was an integral part of that development and I continue to appreciate the generous support it gave me.

NICOLE CHERNG, A10

I received the Carpenter Internship the summer after my sophomore year (2008). The stipend allowed me to continue research in Dr. Sergei Mirkin's molecular biology and yeast genetics laboratory in which I had already spent one year. It also allowed me to dedicate myself full-time to my research, which is focused on determining the molecular mechanisms responsible for neurodegenerative diseases caused by unusual DNA structures.

Those ten weeks over the summer provided me an opportunity to gain insight on my project in addition to continuing research throughout my junior and senior year. I participated in a senior honors thesis my senior year in which I presented my work in the laboratory, including the results obtained from the summer I received the Internship, and received high honors. I graduated in May 2010 with a Bachelor of Science in Biology and Biomedical Engineering, Magna Cum Laude with high honors thesis. In the fall, I will be attending University of Massachusetts Medical School.

LAUREN VERRA, A10

I received the Carpenter Internship in the summer of 2009. As I write this, I am about to graduate from Tufts in a few weeks, and I will be applying to medical school this summer, 2010. I am also currently seeking a job working in a clinical research setting for next year. The Carpenter award was a very important part of my undergraduate experience because it allowed me to get a large portion of my thesis research completed before senior year.

I defended my thesis a few weeks ago, and I received the highest thesis honors and a grade of A+. My research experience so far has also been invaluable in getting my foot in the door for job interviews. Last summer was one of my favorite summers during college, and I really appreciate the opportunity given to me by this Internship.