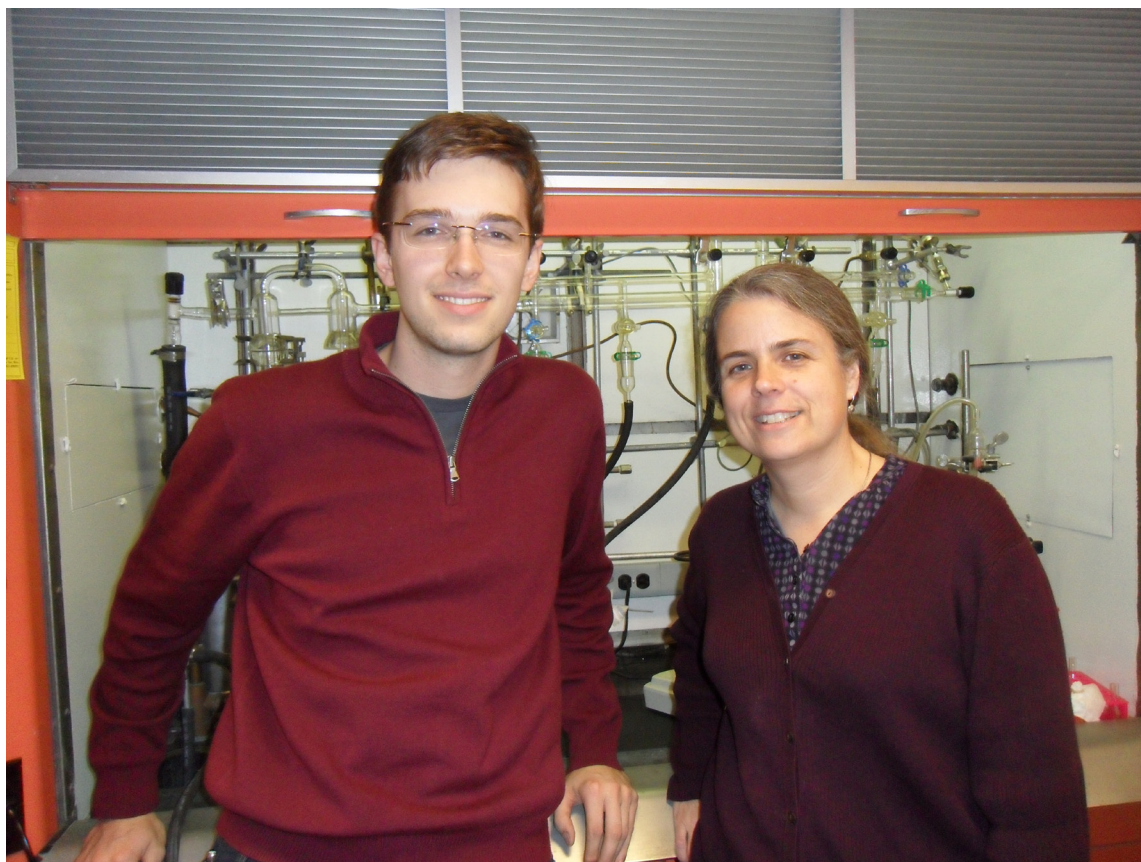


AROUND THE UNIVERSITY: MENTORS AND THEIR STUDENTS

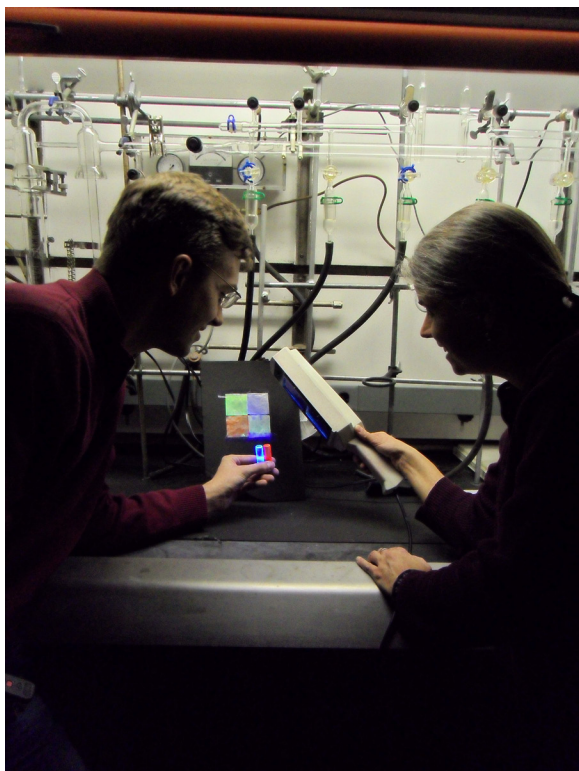
Professor Cassandra Fraser and Ruffin Evans



Professor Cassandra Fraser is a Professor of Chemistry and Biomedical Engineering at the University of Virginia. She was a Radcliffe Fellow at Harvard University, serves on the editorial advisory board of *ACS Applied Materials and Interfaces*, was a recipient of the Cavaliers' Distinguished Teaching Professor award, and was named a National Associate of the National Academies for service to the nation. Professor Fraser is one of U.Va.'s exemplary researchers, especially in her interaction with undergraduates. She is proactive in selecting the students who join her research group in reaching out to those who have demonstrated superior academic performance in introductory level Chemistry courses. Ruffin Evans is one of the undergraduates who work in her lab; he started in his first year at U.Va. Professor Fraser believes that there is no specific time when one can or should begin researching. She says, "My philosophy is that you give people opportunities and see what they are capable of contributing ... You set the bar high and they can jump as high as they want." Ruffin is currently a fourth-year double major in Chemistry and Physics,

and has been awarded numerous research awards and fellowships as well as the Barry M. Goldwater Scholarship in 2010.

The approach in the Fraser lab is to always seek out opportunities, a motto which Ruffin has followed. On one occasion, Ruffin, Professor Fraser and the lab's creative thinking culminated in a two and a half week trip to China in the summer of 2009. The idea to visit China was initiated as a proposal for the Double-Hoo Grant, which is awarded to pairs of undergraduate and graduate students intending to pursue joint research projects. Professor Fraser, Ruffin, and Guoqing Zhang, an outstanding graduate student in the lab, felt that the experience of going to China to exchange ideas and share their research at a number of major universities would be a valuable one. Eventually, summer research awards and support from the Office of Vice President of Research helped cover costs for the trip. Professor Fraser says, "In planning the trip, I told our hosts that I would like for my students to give talks too, to gain experience." Both Ruffin and Professor Fraser recall the



trip to China with Guoqing as generous guide and host, as an incredible experience, especially because it allowed Ruffin, then a second year undergraduate, along with Guoqing, to give scientific talks at the prestigious University of Science and Technology of China, to an audience of more than one hundred distinguished scientists and students.

Professor Fraser believes that “really good students should have the chance to take initiative, and take the lead on something and that is a big part of science.” Therefore, when she and her team began exploring computational areas, she asked Ruffin to lead the initiative. Ruffin now teaches graduate students in the Fraser lab how to perform computational analyses. This leadership experience was invaluable to Ruffin. The opportunity arose given Ruffin’s interest and study of physics; he has since decided that he will likely pursue graduate coursework in physics. To this Professor Fraser says, “My job is to support the students to become really strong at what they want to be” and, therefore, she encouraged Ruffin to explore other interests, while he maintains his relationship with the Fraser lab through his computational research. Ruffin adds, “I’ve learned skills here that I would probably never have learned in a physics lab, but that I may well use. Even the simplest chemistry techniques have many applications.”

When asked about the advice they would give to undergraduates, Ruffin replied, “Get involved as early as you can and apply for everything. It is hard to be too ambitious. Once you have the opportunity to do research, really give it your all because no mat-

ter what you do in the future, that is probably what people are going to be looking for. People want good researchers.” Professor Fraser echoed that sentiment and advises students to look for mentors who are supportive and give students unique opportunities.

In terms of research at the University, Professor Fraser stressed that the key is to take initiative and be intellectually curious. She adds, “Research makes what you are learning in the classroom more alive, because you might think it is a fixed body of knowledge and you are just learning that body of knowledge, but there were people who asked questions and did experiments to discover and find that and in fact, it is much more dynamic than that. When you realize that, and have an idea what it takes to make discoveries and generate knowledge and share insights yourself, you have a much better appreciation of things.”

Additionally, Professor Fraser discussed the importance of broadening the concept of research and thinking independently. Professor Fraser believes that “research—even scientific research—can take many forms. It could be in a lab but you might have a question about some science question related to society. You can do a lot of research by just reading and learning, and talking to people too, and I think it is important and valuable for everyone to formulate their own questions. What are you curious about – not just what your advisor is curious about - and how would *you* go about addressing those things? And that could be coupled to a lab but it doesn’t have to be.” Ruffin added that students should benefit from both teaching and research aspects of the University. He says, “It is very important for undergraduates to be a part of that and combine the teaching function with its research function. That is how, ultimately, human knowledge can move forward.”

The University of Virginia, in the words of its founder Thomas Jefferson, is based on the “the illimitable freedom of the human mind.” Getting involved in research is a small step towards pursuing that freedom and engaging the mind. Therefore, let us enquire relentlessly, explore persistently and make the most of the resources that we have and the opportunities that we can create from them.

Upasana Bhattacharya