

COLUMBIA CHEMISTRY DEPARTMENT PRESENTS

CHEMISTRY NEWS

SUMMER 2022



Chair's Welcome

Interview with Neel Shah

Interview with James Valentini

Introducing Makeda Tekle-Smith

Q&As with Talha Siddiqui and
Sarah Hansen

Faculty News

Student Awards



COLUMBIA|CHEMISTRY

Welcome from the Chair



Dear Friends and Alums,

I write as Department Chair to share a few pieces of good news from our department. We're eager to hear from you also, if you have news to share in our next edition!

Warmly,

Ann McDermott
Chair of Chemistry and Esther
and Ronald Professor of
Biological Chemistry



Interview with Professor Neel Shah

The Chemistry Department welcomed Professor Neel Shah to the faculty as Assistant Professor in July 2018. Professor Shah's research and teaching interests are in Organic Chemistry and Biological Chemistry.

Professor Shah became interested in chemistry during his early college years at New York University. His father was a cardiologist who inspired him to study medicine. He found that he enjoyed and did well in the chemistry courses, which led him to a work-study position in the lab of Professor Kent Kirschenbaum.

"That was a transformative experience for me," Professor Shah recalls. "He let me be very independent, and I got to pursue my own projects while receiving a lot of one-on-one guidance. By the end of my time at NYU, I was pretty confident that I wanted to be a chemistry researcher."

Professor Shah went straight from NYU to graduate school at Rockefeller University, where the program was heavy on biological sciences, but the graduate program was largely unstructured.

However, it worked in Professor Shah's favor, as he learned that he thrived in this type of situation.

"I think that I just like being really exploratory. At Rockefeller, I didn't feel cornered, which helped me learn a lot. Students there are asked to be quite independent. From a research perspective, that always suited me."

Professor Shah's sponsor, Professor Tom Muir, moved his lab from Rockefeller University to Princeton University during Professor Shah's studies, allowing Shah to split his time between the two universities.

From Rockefeller University, Professor Shah moved to the University of California, Berkeley, for a post-doctoral fellowship with Dr. John Kuriyan.



ABOUT

Neel lives with his wife, Jennifer Shah, who is Manager of Patient & Community Outreach for the Leukemia and Lymphoma Society. He lives near Columbia University's campus with his two children. His family loves the area's abundant parks, playgrounds and museums.

His lab worked on understanding the structures of proteins, how they dictate what they do in cells, and specific proteins involved in information transfer and cell signaling. This work allowed him to bring all three stages of his training together. As Professor Shah put it, "It was very much a biology lab but with a molecular perspective."

So what does Shah do now in his lab at Columbia?

Continued on page 3

Interview with Professor Neel Shah (*continued*)

Continued from page 2

“We do a variety of things. We like to ask both the big-picture mapping questions and the focused, molecular-level questions. Sometimes, we’re a chemistry lab applying chemistry to solve biological problems, and sometimes we’re a biology lab using chemical tools,” Shah said.

Shah currently focuses on better understanding cell signaling proteins because most of them are proteins that misbehave in human diseases such as cancer and immune disorders. He uses various methods to map the interactions between proteins, trying to figure out how these proteins interact, when these interactions happen, and what structural changes occur.



The Shah Lab

“If we can identify interesting protein interactions, we can understand what they look like, then we can design new molecules that either enhance those interactions or disrupt those interactions,” Shah noted. “This could be the starting point for the design of therapeutics.”

While most of Shah’s work is in the realm of the basic sciences, he acknowledges that ten or twenty years down the road, basic science research may have wide use cases. It may potentially be an immediate next-step application to a societal problem.



The Shah Group

Congratulations to Alison Doyle, Recipient of the 2022 Chinweike Okegbe Service Award



Alison Doyle received the 2022 Chinweike Okegbe Service Award, which is presented annually by the Arts and Sciences Graduate Council to three members of the GSAS community (students and non-students) for service to the Columbia graduate community. Selections were made entirely by graduate student representatives from GSAS based on student nomination letters, which highlighted Alison’s dedication to her position as Director of Academic Administration in the Chemistry Department and the support that she gives to Chemistry graduate students.

Interview with Professor James Valentini

Columbia Chemistry Professor James J. Valentini has been Dean and Vice President of Undergraduate Education for more than a decade. As he prepares to step aside from that role on June 30 and return to teaching and research in the Chemistry Department, Jim reflects on his years at the helm of Columbia College.

Jim's deanship was unprecedented: He is the first chemistry professor to serve as Dean of Columbia College. The previous dean had resigned suddenly in 2011, leaving a position that needed to be filled quickly. Jim says, "The president [Lee C. Bollinger] asked me if I would be willing to be interim dean and I said yes because, one, I cared a lot about Columbia University and I cared a lot about Columbia College. And I agreed to it because they needed a dean."

He became dean on the same day that he was offered the job. "When this happened, I had no plan or expectation of continuing. But once I was dean, I realized that I liked doing this and people thought I was pretty good at it, and so when they had a search for a permanent dean, I said, 'Yes, I'll be considered.'" He has been dean ever since. "I just fell into it," he says. "I saw a lot of opportunities, not for professional advancement, but just to get things done."

Nicknamed "Deantini," Jim's popularity among students was immediate and remarkable. In one anecdote, when his position was made permanent in 2012, *BWOG: Columbia Student News* penned the headline "Deantini is Now CC Dean Forever."

What is special about Columbia to Jim? "It's really that I have spent most of my professional life here, as has my wife," he says. "I came to Columbia in 1990. My wife came in 1991 and we met here in 1994. We both have a great commitment to Columbia. I have great regard for the students and



faculty and I think that Columbia should be the #1 ranked university in the world." Jim is married to Da Ponte Professor of Italian Teodolinda Barolini.

During his tenure as dean, he focused on creating research opportunities such as the Columbia College Science Research Fellows Program. At the same time, he has encouraged undergraduate students not to think of a major as a limitation, but rather as the starting point for one career or many careers. He uses examples of chemistry students who have gone on to successful careers "to convince students not to make decisions about their future professional endeavors in the narrow way that a major 'must' lead to a particular career."

He also spearheaded the launch of a new initiative called "My Columbia College Journey," which gives students a framework for reflecting on their undergraduate careers and identifying how they're

Continued on page 5

Interview with Professor James Valentini (*continued*)

Continued from page 4

growing and developing skills across different areas. It consists of thirteen core competencies such as “civic and individual responsibility,” “critical thinking,” “quantitative literacy,” and “teamwork and collaboration.” The project is highly meaningful to Jim, who says, “It’s about awareness. It’s about empathy.”

Another new program, “Live Well I Learn Well,” promotes a healthy campus culture for undergraduates. It is organized into seven well-being categories, including intellectual, physical, relational, career, financial, emotional and spiritual.

Jim plans to use the knowledge and skills that he acquired as Dean of Columbia College when he

returns to the department. He wants to capitalize on the relationships that he’s built to benefit the Chemistry Department and science more generally. For his return to the classroom, he is interested in developing an interdisciplinary course with other schools and departments on color theory and perception.

When Jim became dean, he needed to write a letter to the students. He recalls, “To our new students, I wrote, ‘Welcome to the greatest college in the greatest university in the greatest city in the world. And to our continuing students, let’s just say welcome back because you already know the rest.’ That was an audacious statement, but I believed it then and I believe it now.”



*Ann McDermott, Gerard Parkin, Socky Lugo, Ruben Gonzalez,
Emilia Warlinski-Tokiwa, Joseph Ulichny*

Congratulations to Socky Lugo! Socky retired in May after 34 years of supporting the undergraduate program as an administrator. We will miss her and wish her the best!

Welcome Professor Makeda Tekle-Smith

The Chemistry Department is pleased to announce that Makeda Tekle-Smith joined the faculty as Assistant Professor in August 2022.

Makeda has been a departmental colleague for many years. She received her PhD under Professor James Leighton in 2019. In addition to conducting research during her five years as a graduate student, she served as a lead teaching fellow, a founding member of the Columbia Laboratory Environment and Energy Network, a co-founder and co-president of the Initiative for Diversity in Engineering and Science (IDEaS), and as a mentor to other students in several capacities. She was a postdoctoral researcher at Princeton University and University of California, Los Angeles for three years.

Originally from Santa Barbara in Southern California, Makeda began her studies as an undergraduate at Pomona College. Her undergraduate research there with Professor Cynthia Selassie focused on medicinal chemistry, in particular, on developing anti-malarial drugs. This sparked her interest in organic chemistry. She explains, “In my first chemistry class, when they brought up malaria and how organic compounds found in nature could be used to treat it, I found it fascinating. Then I came to Columbia for graduate school and joined Jim Leighton’s lab which is focused on the total synthesis of natural products. I really loved diving into more complex molecule synthesis and understanding physical organic chemistry principles.”

In Jim Leighton’s lab, Makeda worked on total synthesis of complex natural products, (non-aromatic polyketides) and also developed silicon lewis acids for an enantioselective synthesis mostly for the allylation of carbonyl compounds.

Makeda then went to Princeton to work in Professor Abby Doyle’s lab. In the summer of 2021, when the lab moved from Princeton to U.C.L.A., Makeda moved with it. “I got to spend a year closer to my family in the California sunshine.”

She’s now setting up her lab at Columbia. It will be



focused on organic chemistry. “Using organic chemistry principles to solve challenging synthetic problems is the overall goal of my lab and specifically within that, I am really interested in developing chiral catalysts and new synthetic methods, as well as using non-covalent interactions to control selectivity in organic transformations.” She’s excited to work with undergraduate, graduate, and postdoctoral students. Initially, she is teaching graduate-level organic chemistry and synthetic methods.

What drew her back to Columbia? “The Chemistry Department itself and the incredible culture that has been cultivated here. Some of my fondest memories are of being with my graduate student cohort, playing softball and soccer, learning together and just spending time in the Chemistry Department. It was a fantastic place to learn and to live. I also love New York City. I feel like you can live here forever and never do everything there is to do.” She’s also happy to have abundant travel connections to her mother and brother in Santa Barbara, her father in Ethiopia, and her grandmother in Costa Rica and the Bronx.

INTRODUCING TALHA SIDDIQUI, PH.D.

Q: What attracted you to a career in teaching?

In graduate school, I had to be a teaching assistant because my advisor did not have enough funds for me. But after a year or so I realized I really loved it. I loved showing people who wonderful, logical and connected chemistry really is to our world.

Q: What is your favorite part of working with students?

That 'ah-ha' moment they have when everything clicks in their head! Their faces just light up because they understand a concept or come up with the answer to a really difficult question on their own. The happiness and confidence on their face is just wonderful and priceless.



Q: What drew you to Chemistry?

Two of my three older sisters are chemists who work for Johnson & Johnson. Chemistry was always talked about in my house. In high school I wanted nothing to do with chemistry, but I had to take it as a requirement. But the longer I was in the class the more I realized I actually enjoyed it. In college I really enjoyed all my STEM classes and I even conducted research on silicon wafers as sensors and new materials for catalytic converters.

Q: Hardest challenge in working with students?

Students who have a preconceived notion that this class is really difficult and they can't do it. Students who don't give this class a chance or doubt their own ability to excel in this class.

ABOUT

Tahla was born in Hyderabad, India but moved to the USA when she was 8 years old. She attended college at Bryn Mawr and graduate school at New York University, where she received her doctorate in 2014. In her free time she loves reading books about the origin of the universe, cooking, and weightlifting.



Undergraduate Poster Session hosted by Professor Luis Avila

Q: A positive memory with a student?

I had a student in my Organic Chemistry class. She was very shy, quiet but very bright. In this particular class, I had a few male students who were very vocal about how well they were doing in this difficult subject. After one hard exam, when they all got their scores back, the group of male students asked if anyone managed to get above a 85, since that was the highest score in their group. I said yes, one student did. It was the very shy student. I did not mention her by name because I wanted to respect her privacy. Later she came up to me privately and said she couldn't believe she scored higher than the group of male students. "As I am taking this class I am starting to believe I can do anything." Seeing her actually believe in herself was a joyous event to witness. My best stories all revolve around students realizing that they can master this subject and that they do belong in the STEM field.

- TALHA SIDDIQUI



Makeda Tekle-Smith and Ann McDermott attend the Women in Chemistry Happy Hour



Allyson Li, Cassandra Chartier, Ann McDermott, Nicholas Ide, Korak Ray



Angelo Cacciuto, Laura Kaufman, Joseph Ulichny, Tim Berkelbach

INTRODUCING SARAH J.R. HANSEN, PH.D.



ABOUT

Sarah was born in El Salvador. She got her Masters from Teachers College and her Ph.D. from Columbia University. She has been teaching for 19 years and has been in the Chemistry Department for 17 years. In her free time she likes to swim, bike, and hang out with her 6 year old daughter.

Q: What attracted you to a career in teaching?

I really enjoy chemistry and the process of how we teach/learn/communicate about the chemical phenomenon. In addition to teaching I use eye tracking to study visual problem solving with chemistry representation. Studying how students make sense of the images we teach with and developing research based teaching strategies are what I love about teaching and discipline based educational research.

Q: What drew you to Chemistry?

I decided to study chemistry while working in an EPA analytical lab as an undergraduate. I really enjoyed the lab work and instrumentation involved.

Q: Favorite part in working with students?

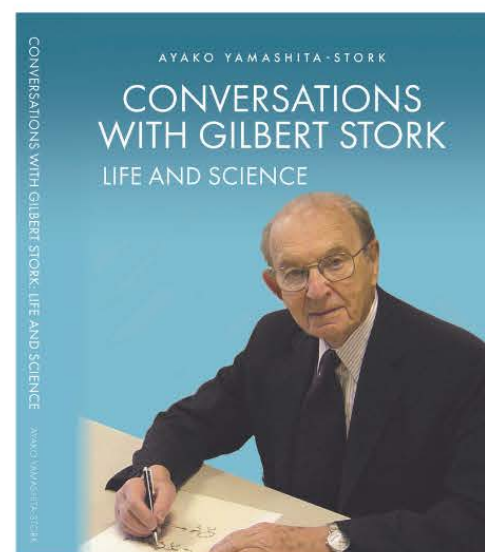
I love the opportunities I get help my students out in class. I get to listen closely to students and then support them through framing & solving problems using chemistry concepts.

Q: Positive memory including students?

During the pandemic we mailed equipment kits to students so they could learn techniques and carry out experiments on their own. It was extremely rewarding to see how confident, independent, and skilled they became despite having online instruction.

*Conversations with
Gilbert Stork: Life and
Science* by Ayako
Yamashita-Stork (N.
Charleston: Palmetto,
2021) is available.

Contact Alison Doyle,
kd2530@columbia.edu



Faculty News

Recently-tenured Associate Professor Timothy Berkelbach is the recipient of a 2022 Department of Energy Early Career Research Program Award for his proposed study titled, "Ab Initio Vibrational Dynamics of Strongly Anharmonic Materials."

Associate Professor Luis Campos is the recipient of a 2022 Cottrell Plus SEED (Singular Exceptional Endeavors of Discovery) Award.

Assistant Professor Milan Delor is the recipient of a 2022 Beckman Young Investigator Award.

Assistant Professor Makeda Tekle-Smith and Lecturer Christopher Eckdahl have joined the faculty.



Tim Berkelbach and Milan Delor



Makeda Tekle-Smith, Christopher Eckdahl

Congratulations to our Student Awards Winners

Columbia Chemistry celebrated its 2022 student award winners with an awards ceremony and reception on May 16. The winners of this year's graduate and undergraduate student awards include:

The Hammett Award:

Sean Treacy (Rovis)

The Pegram Awards:

Tea Crnkovic (Cornish)

Samuel Greene (Berkelbach) Nicole

Mandel (Kaufman)

Kaia Parenti (Campos)

Benjamin Bechand (Sames)

Amirhossein Jafariyan (Cornish) Daniel

Shlian (Parkin)

The Jack Miller Awards:

Shan-wen Cheng (Delor)

Joleen Csuka (Stockwell)

Caroline Dudley (Rovis)

Andrew Johns (Shah) Samantha

Goldschmidt (Rovis)

Taruna Neelakantan (Stockwell) Justin

Powers (Chio)

Iris Sybesma (Kaufman)

Jack Tulyag (Delor)

The Thomas J. Katz Prize

Philip Raftopoulos (Sames)

The Richard Bersohn prize

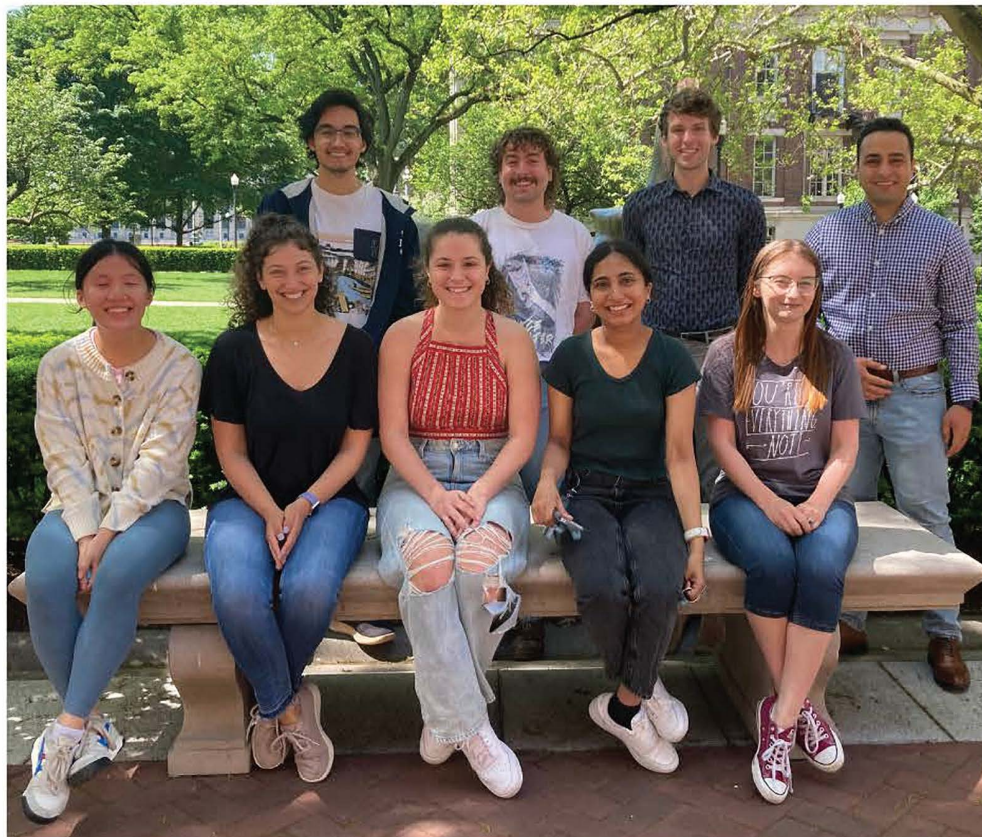
Jocelyn Zhang (Campos)

The Brian Bent Award

Myria Chen (Cornish)

The Chandler Society Award

Myria Chen (Cornish)



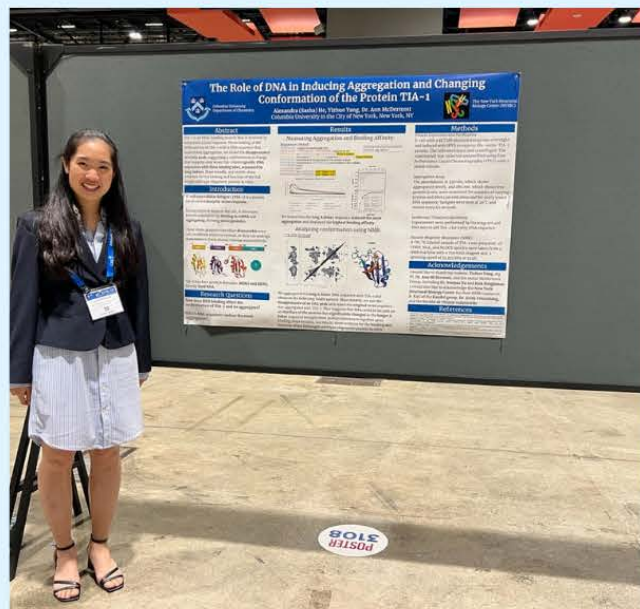
From left, Top: Jack Tulyag, Andrew Johns, Benjamin Bechand, Amirhossein Jafariyan, Bottom: Allyson Li, Samantha Goldschmidt, Caroline Dudley, Taruna Neelakantan, Tea Crnkovic



Jocelyn Zhang, Philip Raftopoulos, Myria Chen

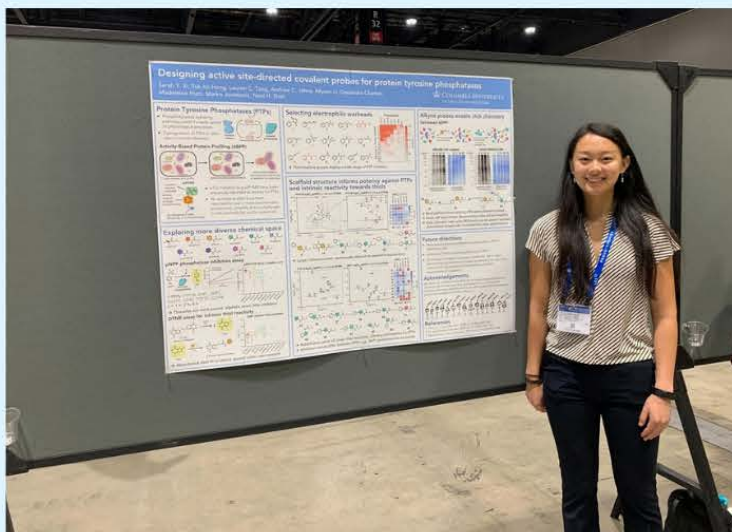
Undergraduates attend the 2022 American Chemical Society Conference in Chicago

We are very pleased to announce an generous gift from Harry Gray and Rich Eisenberg, and matching funds from Columbia College, that supports a new program "The Gray & Eisenberg Undergraduate Chemistry Research Fellowship" allowing selected undergraduate researchers from the Chemistry department to present their work at a conference. This year four students went to the ACS meeting in Chicago in August, had a terrific time and did a great job presenting! Bravi to Sarah Xi (Shah group), Victoria Comunale (Gonzalez group), Sasha He (McDermott group) and Collin Else (McDermott group). We are looking forward to sending more undergraduate students this spring.



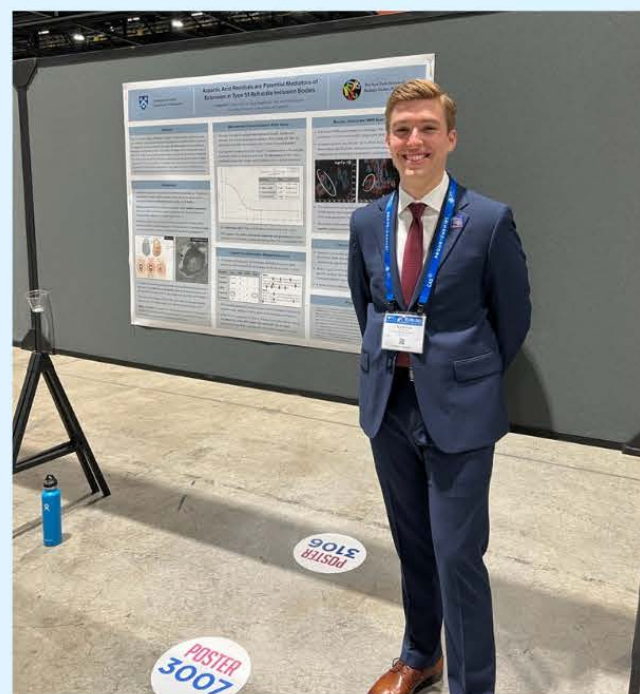
Sasha He

"We had a great time presenting and listening to other talks. We also had a chance to explore Chicago a bit."



Sarah Xi

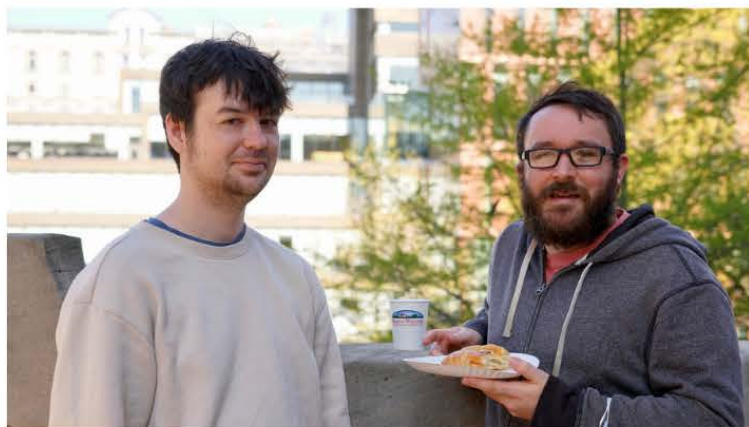
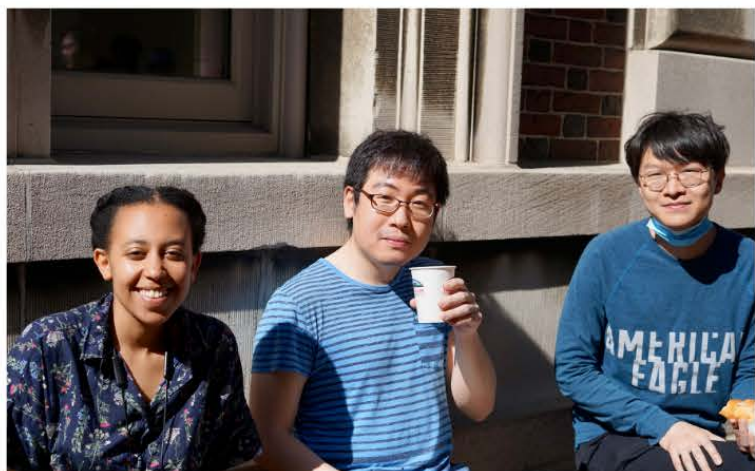
"I personally had a blast at ACS and really enjoyed listening to talks and meeting different people. I think it was great that they sent some undergraduate students and I hope that they keep doing so in the future, especially because there's a pretty big undergrad presence at ACS."



Collin Else

Department Life





JOIN US!

Send an email to chemistry@columbia.edu to join the alumni mailing list, and find Columbia University Department of Chemistry on LinkedIn, Facebook and Twitter!



STAY IN TOUCH!

Share your important updates and experiences in your career and life after Columbia! Send an email with your updates to our Graduate Program Manager, Sheila Skaff at sms2281@columbia.edu.