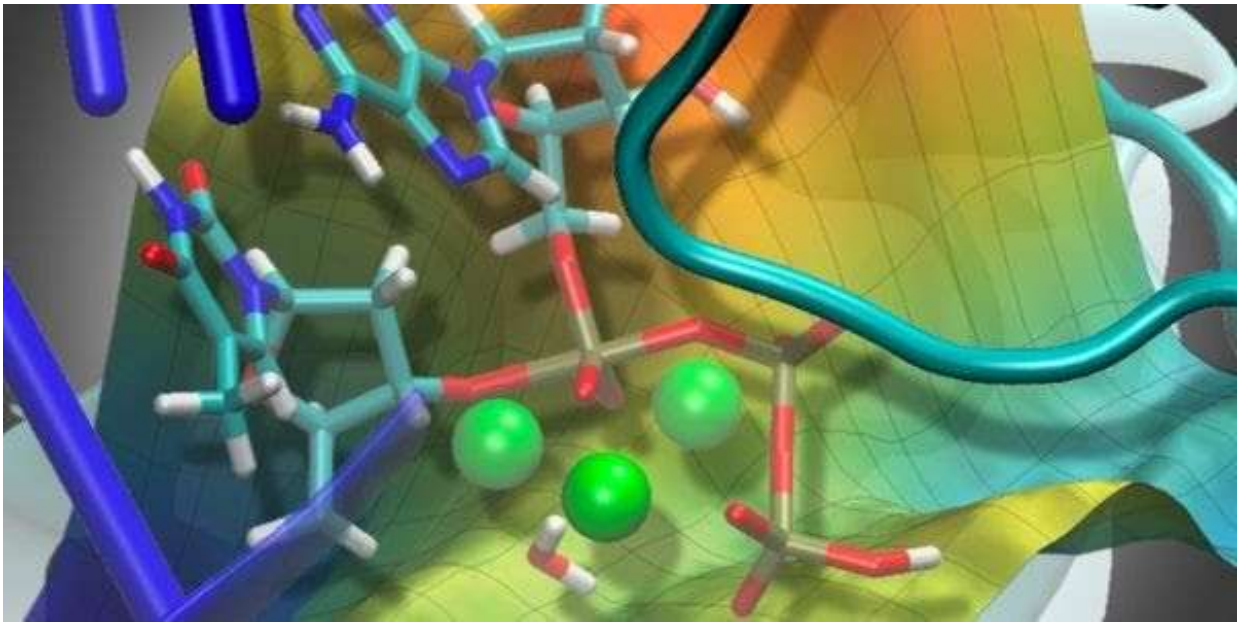


BU Chemistry Alumni News

Dear Alumni,

Greetings from the Chemistry Department of Boston University! As the 2019/2020 academic year ends, I am excited to share some of the highlights of the Chemistry Department's events, activities, awards, and news items.

I hope that this newsletter finds you all healthy and happy. I want to start by saying that the Department of Chemistry is thriving. As you will see from the highlights included here, this year, we have garnered increased extramural funding for our ground-breaking research in Chemistry. We celebrated the awarding of the prestigious Sloan fellowship to Ksenia Bravaya. And some may think the Beeler lab connections are "out of this world." With the turn of the academic year, our own Malika Jeffries-El was named Associate Dean of the Graduate School of Arts & Sciences.

Chemistry is a community, and this year we were able to dedicate SCI 103A as a Chemistry Learning Lab. This room became the permanent meeting and tutoring spot for the Chemia group and the place where office hours happened for instructors and teaching fellows. And well…just a place to hang around and talk Chemistry. On the teaching front, have a look at Prof. Straub's new book that targets the math needed for molecular sciences.

In May, we had a wonderful celebration on Zoom to send our most recent graduates out into the world. Although our well-wishes were online, they could not have been more heartfelt. It was wonderful to see our Chemistry graduates sitting on sofas, with family on either side, taking it all in. We had a student speaker and a guest alumnus to inspire us. Please click on the links below and share the experience!

As you know, this year has not been without its challenges. But I am proud to say that our faculty turned on a dime to reconfigure their classes for online teaching on returning from Spring break. We finished our undergraduate honors research with an online research symposium, and even though not as many experiments were done because of the lab shut down, the results abounded. Our department was also able to contribute PPE to BU School of Medicine to support medical care. The Grinstaff, Schaus, and Porco labs forged ahead during this time with research directed at combatting COVID-19.

We'd love to hear from you as well. I invite you to send us a note about your current activities to include in the "Alumni News" section of our website!

Karen Allen

Department Chair

Chemistry Department Fast Facts Academic Year 2019/2020

- # of New Grants: 12
- $ of New Grants: $7,038,181
- # of Active Grants: 60
- $ of Active Grants: $46,144,916
- # of New Ph.D. Students Enrolled in Fall 2019: 22
- Ph.D.s Defended: 11
- # of Undergrads Graduated: 28

Events and News

Professor Aaron Beeler and Astronaut Richard Linehan.

International Space Station Research

On Thursday, September 19, Aaron Beeler hosted members of NASA & ISS-NL to discuss groundbreaking research and developments taking place on the International Space Station.

Beeler Lab's platform

Professor Aaron Beeler's lab developed a flow chemistry platform that provides a safe approach to studying chemical reactions on the International Space Station (ISS) and the effects of microgravity on reaction processes. These studies will provide a blueprint of how to best implement synthetic chemistry in microgravity environments and pave the way for synthesis and manufacturing of pharmaceuticals, materials, and biologics in space. On March 6, SpaceX CRS-20 launched the Beeler Lab's platform to study chemistry at the ISS National Lab.

COVID-19 Shutdown

It was with great sadness that BU had to close down the campus following Spring Break in response to the COVID-19 outbreak but our professors rose to the occasion, delivering quality lectures. Click to read a BU Today article featuring Professor Binyomin Abrams teaching during the COVID-19 shutdown.

Virtual Graduation

Due to the COVID-19 shutdown we hosted a virtual graduation for our Chemistry students this May, but that didn't stop us from having a wonderful demonstration lead by one of our postdoctoral associate lecturers, Dr. Cameron Crane. Click here to watch his *Elephant Toothpaste Demonstration*. Following tradition, we had an inspirational alumnus address by Darren Lipomi, now a Professor at UCSD. Watch the address here. A sentimental reminiscence of the class of 2020's time together as chemistry majors was presented by Manaswni Dhingra.

BU Chemistry Faculty Highlights

Professor Ksenia Bravaya Receives Sloan Award

Professor Ksenia Bravaya has been named a 2020 Alfred P. Sloan Research Fellow in Chemistry. The Sloan Research Fellowships are extraordinarily competitive awards involving nominations of the very best early-career scientists from the United States and Canada.

Dr. Bravaya's research program in Theoretical and Computational Chemistry focuses on developing new electronic structure models for treating technologically and biologically interesting processes whose quantitative theoretical description is at the frontier of current computational capability. Her research follows two major thrusts: (i) developing models for describing electron capture by complex molecules that often proceeds through metastable, auto-ionizing states (so-called "resonances"), and (ii) predictive simulations of electron transfer in biomolecules, for example, processes at the heart of redox chemistry in proteins.

Professor Xi Ling Received an NSF CAREER Award

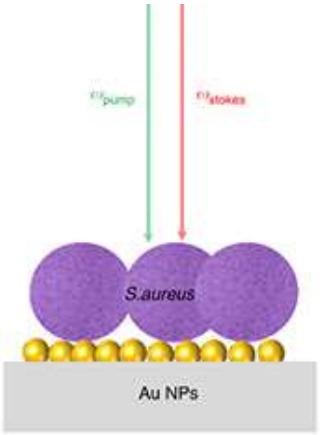
Professor Xi Ling has been awarded a highly competitive NSF CAREER award. This five-year award will fund her work on the chemical mechanism (CM) of surface-enhanced Raman scattering through a quantitative test of state-of-the-art CM theory in designed molecule/two-dimensional crystal systems. The project also includes an education plan and outreach programs to improve the quality, retention, and diversity of STEM students.

Mark Grinstaff "Mega Macromolecules" Published in Nature Communications

An international team of scientists led by Dr. Jayachandran Kizhakkedathu (University of British Columbia, Canada), Dr. Mark Grinstaff (Boston University, United States), and Dr. Janne T. A. Mäkelä (University of Eastern Finland Finland) published the first report of synthetic globular polymers of several million molecular weight. These spherical single polymers are similar in size to proteins and are up to 50 nm in diameter. The study in Nature Communications, entitled "Mega macromolecules as single molecule lubricants for hard and soft surfaces" summarizes the results of a collaboration between the scholars, and sets the stage for new opportunities in the design, synthesis, and evaluation of mega polymers for biomedical applications.

Qiang Cui Published in National Academy of Sciences

Groundbreaking work of the Cui lab in Chemistry, recently published in Proceedings of the National Academy of Sciences uses free-energy calculations to probe the microscopic chemical mechanism by which a base is added to a growing strand of DNA during DNA replication. The new mechanistic understanding will impact future studies on DNA replication, gene expression, and gene editing.

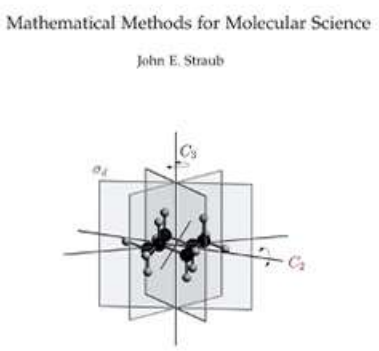


Chemistry Faculty Collaboration

Three investigators from the Department of Chemistry have published a paper pushing the limits of Ramen spectroscopy, "Plasmon-enhanced stimulated Raman scattering microscopy with single-molecule detection sensitivity". The findings, published in Nature Communications is a collaboration between the Cheng, Ziegler and Yang groups. The work pushes the sensitivity of stimulated Raman spectroscopy, a label-free chemical imaging system for biomedical applications, down to single molecule level- a milestone in the field.

John Straub Publishes Mathematical Methods for Molecular Science

It is widely acknowledged that the traditional calculus sequence required of most molecular science majors, consisting of a year of differential and integral calculus and possibly a semester of multivariate calculus, does not provide the mathematical background needed for success in the quantum mechanics and statistical thermodynamics courses that follow.



The textbook Mathematical Methods for Molecular Science is designed to support a one semester course that builds on the introductory calculus sequence and covers critical topics in multivariate calculus, ordinary and partial differential equations, and linear algebra. Published through a Creative Commons license, the full textbook is available for download.

David Coker Awarded Funding by the US Department of Energy

The Coker group was awarded funding from the DOE for his project “Control of Energy Transport and Transduction in Photosynthetic Down Conversion.” The overall goal of the funding is to develop new Quantum Information Systems and to advance research in the material and chemical sciences.