

# Pratik Kumar, PhD

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## EDUCATION & RESEARCH EXPERIENCE

<b>HHMI-Postdoctoral Associate</b> , Janelia Research Campus Joint position with Luke D. Lavis and Martin J. Schenrmann (NCI/NIH)	2019–current
<b>PhD, Chemistry</b> (Chemical Biology Training Program) Stony Brook University, NY (w/ Scott T. Laughlin) Cyclopropene-neurotransmitters and caged-cyclopropenes for bioorthogonal labeling	2013–2019
<b>Marine Biological Laboratory</b> , Woods Hole, MA Optical Microscopy and Imaging in the Biomedical Sciences course	Aug 2018
<b>MS &amp; BS, Chemistry</b> IISER-Kolkata, India (w/ Rituparna S. Roy) Conformational studies of gramicidin inspired alternating LD peptides	2008–13
<b>Diploma, Chemistry</b> JNCASR, Bangalore, India (w/ Jayanta Haldar) Synthesis and aggregation properties of biodegradable, cationic gemini-surfactants	2009–12 (summers)
<b>Scientists Teaching Science</b> Online course on learning styles and effective instructional strategies for teaching STEM subjects	Apr–Jun 2020
<b>Science Communication courses/training</b> at Alan Alda center for Communicating Sciences, SBU Using digital media (2018), Improvisation for scientists (2016), Distilling your message (2015)	

## ACADEMIC AWARDS & FELLOWSHIPS

<b>Maria Tzamarioudaki Memorial Award for Outstanding Doctoral Student</b> , SBU	2019
<b>Outstanding Service</b> award, Department of Chemistry, SBU	2019
<b>New York State Graduate Student Employee Union (GSEU)</b> Professional Development Award	2019
<b>The Histochemical Society</b> Travel Award	2018
<b>Marine Biological Laboratory</b> Scholarship	2018
<b>Distinguished Travel Award by Graduate Student Organization</b> , SBU Nominated by the Dept. of chemistry and then selected from the pool of all departmental nominations	2018
<b>ACS Biological Chemistry</b> Travel Award	2017
<b>ICB&amp;DD-Best poster</b> Award, Institute of Chemical Biology & Drug Discovery, SBU	2017
<b>SUNY Research Foundation</b> Professional Development Award	2017
<b>ACS Interdivisional Sci-Mix</b> , ACS-San Francisco One of the 18 (out of ~200) posters selected from the ACS Biological Chemistry division	2017
<b>3MT-People's Choice</b> Award (3-minute thesis), SBU	2017
<b>Departmental Distinguished Research Award</b> , SBU	2016
<b>German Research Foundation Travel Award</b> , Lindau Nobel Laureate Meeting, Germany	2013
<b>Dept. of Science &amp; Technology (India) Travel Award</b> , Asian Science Camp, South Korea	2011
<b>POCE Fellowship</b> , JNCASR, India	2009–11
<b>Dept. of Science &amp; Technology (India) INSPIRE Fellowship</b>	2008–13

## PATENT

1. Scott T. Laughlin, **Pratik Kumar**, Ting Jiang, Wei Huang. Compositions and methods for modular control of bioorthogonal ligation. Patent application PCT/US2019/063714, Filed Nov 2019.

## PUBLICATIONS (ORCID iD: 0000-0002-9516-0212)

1. **Pratik Kumar**, David Shukhman, & Scott T. Laughlin. Stable cyclopropene-containing analog of the amino acid neurotransmitter glutamate. Tetrahedron Letters, 2019, 60, 1476–1480.

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2. **Pratik Kumar**, Omar Zainul, Frank Camarda, Ting Jiang, John Mannone, & Scott T. Laughlin. Second generation caged cyclopropenes with improved kinetics for controlling bioorthogonal reactivity. *Organic Letters*, 2019, 21, 3721-3725.
3. Ting Jiang, **Pratik Kumar**, Wei Huang, Wei-Siang Kao & Scott T. Laughlin. Modular enzyme- and light-based activation of the cyclopropene-tetrazine ligation. *ChemBioChem*, 2019, 20(17), 2222-2226.
4. **Pratik Kumar** & Scott T. Laughlin (Invited Book chapter). Modular activatable bioorthogonal reagents. *Methods in Enzymology*, 2019, 622, 153-182.
5. **Pratik Kumar**, Ting Jiang, Omar Zainul, A. Preston, J. Farr, S. Li, Pavit Suri, & Scott T. Laughlin. Lipidated cyclopropenes via a stable 3-N spirocyclopropene scaffold. *Tetrahedron Letters*, 2018, 59, 3435-3438.
6. **Pratik Kumar\***, Ting Jiang\*, Sining Li, Omar Zainul, & Scott T. Laughlin. Caged cyclopropenes for spatiotemporal control of bioorthogonal reactivity. *Organic & Biomolecular Chemistry*, 2018, 16(22), 4081-4085. **Featured on RSC blog** ([rsc.li/2LAHrOW](https://rsc.li/2LAHrOW)): "Reactivity Caging Strategy for Controlling Bioorthogonal Reactivity"
7. **Pratik Kumar**, Omar Zainul, & Scott T. Laughlin. Inexpensive multigram-scale synthesis of cyclic enamines and 3-N spirocyclopropyl systems. *Organic & Biomolecular Chemistry*, 2018, 16(4), 652-656.
8. **Pratik Kumar**, David Shukhman, & Scott T. Laughlin. A light-activatable, cyclopropene-containing analog of the amino acid neurotransmitter glutamate. *Tetrahedron Letters*, 2016, 57, 5750-5752.
9. Jiaul Hoque, **Pratik Kumar**, Vinod K. Aswal, & Jayanta Halder. Aggregation properties of amide bearing cleavable gemini surfactants by small angle neutron scattering and conductivity studies. *Journal of Physical Chemistry B*, 2012, 116(32), 9718-9726.
10. Jiaul Hoque, Padma Akkapeddi, Venkateswarlu Y., Divakara SSM Uppu, **Pratik Kumar**, & Jayanta Halder. Cleavable cationic antibacterial amphiphiles: synthesis, mechanism of action, and cytotoxicities. *Langmuir*, 2012, 28(33), 12225-12234. **Indian news** ([bit.ly/2t5yzJT](https://bit.ly/2t5yzJT)): "Scientist Invents Biodegradable Detergent"

### SELECTED ORAL PRESENTATIONS

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1. Activatable cyclopropenes for spatiotemporal control of bioorthogonal reactivity (Invited talk). **New York Academy of Sciences—Chemical Biology Symposium**, NY, USA. 2018.
2. Modular activatable cyclopropenes for spatiotemporal control of bioorthogonal reactivity. **HHMI-Janelia Research Campus** (1 min, 1 slide talk). 2018.
3. Activatable bioorthogonal reactions for biology (Invited talk). **SUNY-Suffolk community college**, Department of Natural Sciences, NY, USA. 2018.

### SELECTED POSTER PRESENTATIONS

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1. Light- and Enzyme-Activatable cyclopropenes (Invited poster). **ProbeFest 2018, HHMI/Janelia Research Campus**, VA, USA. 2018.
2. Caged cyclopropenes for spatiotemporal control of bioorthogonal reactivity. **Tri-Institutional Chemical Biology Symposium, Rockefeller University**, NY, USA. 2018.
3. Caged cyclopropenes for spatiotemporal control of bioorthogonal reactivity (Invited poster). At both **Gordon Research Seminars & Gordon Research Conference on Bioorganic Chemistry**, NH, USA. 2018.
4. Caged cyclopropenes for spatiotemporal control of bioorthogonal reactivity (poster). **NERCBI and Yale Chemical Biology Symposium**, CT, USA. 2018.
5. 3-N spirocyclopropenes provide spatiotemporal control of bioorthogonal reactivity (poster). **Institute of Chemical Biology & Drug Discovery Symposium** by SBU & ICAHN school of medicine on "Frontiers in chemical biology and drug discovery", NY, USA. 2017. Best poster award
6. Cyclopropene neurotransmitters for bioorthogonal imaging of neural circuits (Invited poster). **New York Academy of Sciences—Chemical Biology Symposium**, NY, USA. 2017.
7. Caged cyclopropenes for spatiotemporal control of bioorthogonal reactivity (Invited poster). At both **Gordon Research Seminars & Gordon Research Conference on High-Throughput Chemistry and Chemical Biology**, NH, USA. 2017.
8. Cyclopropene neurotransmitters for bioorthogonal imaging of neural circuits (Invited poster). **New York Academy of Sciences—Chemical Biology Symposium**, NY, USA. 2017.

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9. Cyclopropene neurotransmitters for biorthogonal imaging of neural circuits. At both **253<sup>rd</sup> ACS National Meeting & ACS interdivisional Sci-Mixer presentation**, CA, USA. 2017. Selected for the ACS-Interdivisional poster-session from the division of Biological chemistry
10. Cyclopropene analogs of neurotransmitters for illuminating neural circuits. At both **17<sup>th</sup> Chemistry Research Day & 9<sup>th</sup> ICB&DD symposium**, SBU, USA. 2015.
11. Fluorescent boronic acid probe as transsynaptic tracer of neural circuitry. At both **16<sup>th</sup> Chemistry Research Day and 8<sup>th</sup> ICB&DD symposium**, SBU NY, USA. 2014.

### MENTORING EXPERIENCE

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#### 3 PhD (rotation and 1<sup>st</sup> year of their PhD)

Wei Huang (Chemistry/Chemical Biology, co-authors on two manuscripts)	Nov 2017–Dec 2018
Wei-Siang Kao (Chemistry/Chemical Biology, co-authors on two manuscripts)	Nov 2017– Dec 2018
Ting Jiang (Chemistry/Chemical Biology, co-authors on four manuscripts)	Nov 2016–Dec 2017

**3 PhD rotation students:** Lei Chen, Yilin Ma, Beilei Jiang 2016, 2017

**1 MS-thesis student:** Sining Li (Chemistry, co-authors on three manuscripts) Jan 2016–Apr 2017

#### 5 Undergraduate students:

Nayarit Tineo (Biology, worked with Omar Zainul through SBU-INSPIRE program)	Spring 2018
John Mannone (Chemistry, awarded URECA summer research fellowship)	Nov 2017–Apr 2019
Frank Camarda (Pharmacology, co-authors on two manuscript)	Nov 2017–Apr 2019
Omar Zainul (Pharmacology, and co-authors on four manuscripts)	Sep 2016–Apr 2018
Awarded URECA summer research fellowship and Sigma-Xi Undergraduate Research Award	
David Shukhman (Biochemistry, co-authors on one manuscript)	Aug 2014–Apr 2016

**1 High School student:** Pavit Suri (W.T. Clarke high School, co-author on one manuscript) Summer 2017

### TEACHING EXPERIENCE

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**Graduate assistant, NMR facilities, SBU** 2018, Spring 2019

Trained undergraduate, graduate, and postdoctoral trainees on setting up and analyzing <sup>1</sup>H, <sup>13</sup>C, COSY, and DEPT NMR on 400/500/700 MHz NMR instruments. Also, performed routine maintenance such liquid-nitrogen/helium refills.

**Graduate assistant, Mass spectrometry facilities, SBU** 2018, Spring 2019

Trained undergraduate-, graduate-, and postdoctoral-trainees on how to run and analyze liquid samples on ESI-mass spectrometer; run and obtain high-resolution mass-spectra of liquid samples; run solid samples on TLC-inject mass spectrometer; and properly maintain mass spectrometers.

**Teaching assistant, Advanced organic chemistry lab, SBU** Spring 2015

Led ~4 lectures on NMR and weekly laboratory course for ~30 chemistry-majors on how to set up multistep organic reactions; monitor the progress of reactions; purify reaction intermediates; analyze GC data; acquire and analyze IR data; analyze <sup>1</sup>H & <sup>13</sup>C NMR data; report spectroscopic and experimental data; and follow proper lab-safety techniques.

**Teaching assistant, Undergraduate organic chemistry lab, SBU** Fall 2013–Spring 2014

Led a weekly laboratory course for ~30 pre-med students on how to set up organic reactions; isolate and purify an reaction product; analyze GC data; analyze IR data; report experimental data; and follow proper lab-safety techniques.

**High-School Chemistry, India** Fall 2012, Summer 2013

Taught chemistry to ~35 high schoolers from low-to-moderate income background for 8 h/week

### PROFESSIONAL SERVICE & LEADERSHIP ROLES

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**Reviewer** for Organic & Biomolecular Chemistry, RSC

**Co-Chair, Gordon Research Seminars-Bioorganic Chemistry** 2021

**Vice-Chair, Gordon Research Seminars-Bioorganic Chemistry** 2019

**President, Graduate Chemical Society, SBU** Apr 2017–Apr 2019

**President, Student Invited Speaker Committee, Stony Brook Chemistry** Spring 2017

**Moderator** (& organizer), Grad. Chemical Society career panel on non-academic careers Spring 2016

**Moderator** (& organizer), Graduate Career Association career panel on entrepreneurship Fall 2015

**Vice-President, Graduate Career Association, SBU** Fall 2015–Spring 2016

**Senator** for Chemistry at Graduate Student Organization, SBU 2015–Spring 2018

**Public Relations officer, Graduate Chemical Society** Spring 2015–Apr 2017

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### OUTREACH

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<b>Volunteer</b> , Janelia RESET team	Spring 2020
Teaching biology labs (~once/month) at nearby diverse and low-income elementary schools	
“Life as a scientist and career in scientific research”	2018
Interaction with undergraduates at SUNY-Suffolk Community College, NY, USA	
<b>Science Fair Judge</b> for WAC Lighting Foundation Invitational science fair, NY	2017, 2018
<b>Science Competition Judge</b> for 5th Annual Nassau County science fair, NY	2017
<b>3MT</b> (3-minute thesis) <b>Judge</b> , SBU	2017
Graduate Chemical Society <b>research photo contest</b> winner, SBU	2016, 2017
Graduate Chemical Society competition in conjunction with the department of chemistry on research day	
Founder, <b>BrainChem</b> (currently with ~500 subscribers)	2016—current
A page for non-scientists where we explain interesting tidbits about chemistry and ecology using simple graphics.	