

## Pratik Kumar, PhD

HHMI Postdoctoral Associate, Janelia Research Campus, Ashburn, VA, USA

[www.pratik-kumar.com](http://www.pratik-kumar.com) | [kumarp3@janelia.hhmi.org](mailto:kumarp3@janelia.hhmi.org)

### EDUCATION & PROFESSIONAL APPOINTMENTS

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<b>Postdoc</b>	HHMI Janelia Research Campus, VA, USA	Luke Lavis/Martin Schnermann (NCI/NIH)	2019–	
<b>PhD</b>	Stony Brook University, NY, USA	Chemistry	Scott Laughlin	2019
<b>MS/BS</b>	IISER-Kolkata, India	Chemistry	Rituparna Roy	2013
<b>Diploma</b>	JNCASR, Bangalore, India	Chemistry	Jayanta Haldar	2012
	Marine Biological Association, Plymouth, UK	Electrophysiology & Imaging (virtual)		2021
	HHMI Janelia Research Campus, VA	Scientists Teaching Science		2020
	Marine Biological Laboratory, Woods Hole, MA	Microscopy (OMIBS)		2018
	Alan Alda center for Communicating Sciences, NY	Science Communication		2015–18

### HONORS & AWARDS

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<b>Outstanding Doctoral Student</b> , Maria Tzamarioudaki Memorial Award, Stony Brook University	2019
<b>Outstanding Service</b> award, Department of Chemistry, Stony Brook University	2019
<b>New York State Graduate Student Employee Union</b> Professional Development Award	2019
<b>The Histochemical Society</b> Travel Award	2018
<b>Marine Biological Laboratory</b> Scholarship	2018
<b>Distinguished Travel Award</b> by Graduate Student Organization, Stony Brook University 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>Best poster Award</b> , Institute of Chemical Biology & Drug Discovery, Stony Brook University	2017
<b>SUNY Research Foundation</b> Professional Development Award	2017
<b>ACS Interdivisional Sci-Mix</b> , ACS-San Francisco One of the 18 posters (out of ~200) selected from the ACS Biological Chemistry division	2017
<b>3MT-People's Choice</b> Award (3-minute thesis), Stony Brook University	2017
<b>Departmental Distinguished Research Award</b> , Stony Brook University	2016
<b>German Research Foundation Travel Award</b> , Lindau Nobel Laureate Meetings, 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>INSPIRE Fellowship</b> , Department of Science & Technology, India	2008–13

### PATENT

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Scott T. Laughlin, **Pratik Kumar**, Ting Jiang, Wei Huang. Compositions and methods for modular control of bioorthogonal ligation. WO2020113077, 2020.

### PUBLICATIONS ([Google Scholar](#) | [ORCID](#))

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#### In preparation

- Pratik Kumar**, Jason Vevea, David Solecki, Edwin Chapman & Luke D. Lavis. Multifunctional fluorophores for imaging and manipulating proteins in living cells. In preparation.
- Pratik Kumar**, Made Budiarta, Markus Sauer, Luke D. Lavis, & Gerti Beliu. Far-red emitting fluorogenic tetrazine dyes for protein cross linking. In preparation.
- Pratik Kumar**, Jonathan Grimm, Brian English, Katie Holland, Ariana Tkachuk, & Luke D. Lavis. Photoactivatable rhodamines dyes for single molecule imaging. In preparation.

#### Published

- Pratik Kumar** & Luke D. Lavis. Melding synthetic molecules and genetically encoded proteins to forge new tools for neuroscience. Annual Review of Neuroscience, 2022, 45, 131–50.
- Sambashiva Banala, Ariana Tkachuk, Ronak Patel, **Pratik Kumar**, Timothy Brown, & Luke D. Lavis. 2,7-Diaminobenzopyrylium dyes are live-cell mitochondrial stains. ACS Bio & Med Chem Au, 2022, [Accepted](#).

## Pratik Kumar, PhD

3. **Pratik Kumar**, David Shukhman, & Scott T. Laughlin. Stable cyclopropene-containing analog of the amino acid neurotransmitter glutamate. *Tetrahedron Letters*, 2019, 60, 1476–1480.
4. **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.
5. 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.
6. **Pratik Kumar** & Scott T. Laughlin (Book chapter). Modular activatable bioorthogonal reagents. *Methods in Enzymology*, 2019, 622, 153–182.
7. **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.
8. **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**: “Reactivity Caging Strategy for Controlling Bioorthogonal Reactivity”
9. **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.
10. **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.
11. Jiaul Hoque, **Pratik Kumar**, Vinod K. Aswal, & Jayanta Haldar. 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.
12. Jiaul Hoque, Padma Akkapeddi, Venkateswarlu Y., Divakara SSM Uppu, **Pratik Kumar**, & Jayanta Haldar. Cleavable cationic antibacterial amphiphiles: synthesis, mechanism of action, and cytotoxicities. *Langmuir*, 2012, 28(33), 12225–12234. **Indian news**: “Scientist Invents Biodegradable Detergent”

### SELECTED ORAL PRESENTATIONS

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#### Invited

1. **Sabarmati Young Researcher Seminar Series**, Biological Engineering, IIT Gandhinagar (virtual) 2021  
Multifunctional fluorescent dyes as molecular tools beyond imaging
2. **Project SEED, American Chemical Society** (virtual) 2021  
Illuminating biology through fluorescent dyes
3. **SUNY-Suffolk Community College**, Department of Natural Sciences, NY, USA 2018  
Activatable bioorthogonal reactions for biology

#### Conference

4. **IndiaBioscience YIM and PDF Meeting** (virtual) 2022  
Chemical tools for imaging and manipulation of living systems
5. **Chemical Biology and Physiology**, Oregon Health & Science University, OR, USA 2022  
Multifunctional fluorophores as molecular tools beyond imaging
6. **Annual Janelia Symposium**, HHMI-Janelia Research Campus, VA, USA 2022  
Multifunctional fluorophores as molecular tools beyond imaging
7. **International Conference on Nanoscopy**, Leibniz Institute of Photonic Technology (virtual) 2021  
Multifunctional fluorophores as molecular tools beyond imaging
8. **Dana-Farber Cancer Institute**, Chemical Biology Symposium, Flash talk (virtual) 2021  
Multifunctional fluorophores as molecular tools beyond imaging
9. **IndiaBioscience YIM and PDF Meeting** (virtual) 2021  
Chemigenetic multifunctional fluorophores
10. **Probe Fest**, HHMI-Janelia Research Campus, Flash talk, VA, USA 2018  
Modular activatable cyclopropenes for spatiotemporal control of bioorthogonal reactivity
11. **New York Academy of Sciences**, Chemical Biology Symposium, NY, USA 2018  
Activatable cyclopropenes for spatiotemporal control of bioorthogonal reactivity

### SELECTED POSTER PRESENTATIONS

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## Pratik Kumar, PhD

1. **Gordon Research Seminars & Gordon Research Conference**, Bioorganic Chemistry, NH, USA 2022  
Multifunctional fluorophores as molecular tools beyond imaging
2. **EMBO/EMBL**, Seeing is Believing: Imaging the Molecular Processes of Life, VA, USA 2021  
Multifunctional fluorophores as molecular tools beyond imaging
3. **HHMI-Janelia Research Campus**, ProbeFest, VA, USA 2018  
Light- and enzyme-activatable cyclopropenes
4. **Rockefeller University**, Tri-Institutional Chemical Biology Symposium, NY, USA 2018  
Caged cyclopropenes for spatiotemporal control of bioorthogonal reactivity
5. **Gordon Research Seminars & Gordon Research Conference**, Bioorganic Chemistry, NH, USA 2018  
Caged cyclopropenes for spatiotemporal control of bioorthogonal reactivity
6. **NERCBI and Yale Chemical Biology Symposium**, CT, USA 2018  
Caged cyclopropenes for spatiotemporal control of bioorthogonal reactivity
7. **Icahn School of Medicine–Mount Sinai & ICB&DD–Stony Brook University** symposium on 2017  
Frontiers in Chemical Biology and Drug Discovery, NY, USA | **Best poster award**  
3*N*spirocyclopropenes provide spatiotemporal control of bioorthogonal reactivity
8. **New York Academy of Sciences**, Chemical Biology Symposium, NY, USA 2017  
Cyclopropene neurotransmitters for biorthogonal imaging of neural circuits
9. **Gordon Research Seminars & Gordon Research Conference**, High-Throughput Chemistry 2017  
and Chemical Biology, NH, USA  
Caged cyclopropenes for spatiotemporal control of bioorthogonal reactivity
10. **ACS National Meeting & ACS interdivisional Sci-Mixer presentation**, CA, USA 2017  
Cyclopropene neurotransmitters for biorthogonal imaging of neural circuits
11. **Stony Brook University**, Chemistry Research Day, NY, USA 2015  
Cyclopropene analogs of neurotransmitters for illuminating neural circuits
12. **Stony Brook University**, Chemistry Research Day, NY, USA 2014  
Fluorescent boronic acid probe as transsynaptic tracer of neural circuitry

### PROFESSIONAL SERVICE & LEADERSHIP POSITIONS

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**Reviewer** | **Journals**: Journal of Materials Chemistry B, RSC Organic & Bimolecular Chemistry, ChemBioChem.

**Meetings**: European Molecular Imaging Meeting (2021), Gordon Research Seminars-Bioorganic Chemistry (2022), 70<sup>th</sup> Lindau Nobel Laureate Meetings

**Organizer**, Adobe Illustrator workshop for scientists, Janelia June 2022  
**Moderator** (& organizer), ASCB Webinar on “How to approach new collaborations” June 2022  
**COMPASS Associate**, American Society for Cell Biology (ASCB) 2022–  
**Co-Chair**, Gordon Research Seminars-Bioorganic Chemistry 2022  
**Officer**, Janelia Association of Research Scientists 2021–  
**Moderator**, 70th Lindau Nobel Laureate Meeting Open Exchange Sessions 2021  
**Discussion leader**, Gordon Research Seminars-Bioorganic Chemistry 2019  
**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

### 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

## Pratik Kumar, PhD

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  $^1\text{H}$  &  $^{13}\text{C}$  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.

### MENTORING EXPERIENCE (TOTAL = 15)

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**2 Postdoc** (1<sup>st</sup> year of their Postdoc):

Guoqiang Yu

Feb 2022–

Jianping Zhu

Dec 2021–

**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** 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

### OUTREACH

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**Project SEED Speaker**, American Chemical Society

2021

**Science Coach**, American Chemical Society

2020

Developed chemistry demos/lectures focused on current research for high-school students

**Judge**, Annual Biomedical Research Conference for Minority Students (ABRCMS)

2020

**Janelia RESET team**, Volunteer

2020

Biology demos/labs (1/month) at nearby diverse and low-income elementary schools

**“Life as a scientist and career in scientific research”**, Suffolk Community College, NY, USA

2018

**Science Fair Judge** for WAC Lighting Foundation Invitational science fair, NY

2017, 2018, 2021

**Science Competition Judge** for 5th Annual Nassau County science fair, NY

2017

**3MT (3-minute thesis) Judge**, SBU

2017

Graduate Chemical Society **research photo contest** winner, SBU

2016, 2017

**Co-Founder**, BrainChem (~500 subscribers)

2016

A page for non-scientists where we explain interesting tidbits about chemistry and ecology using simple graphics

**High-School Chemistry**, Volunteer, Patna, India

Fall 2012, Summer 2013

Taught chemistry to underprivileged, primarily Hindi-speaking high schoolers preparing for an exam in English