

Shalini Gupta

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EDUCATION

- 2022 **Massachusetts Institute of Technology (MIT)**, Cambridge, MA
PhD in Biochemistry (GPA: 5/5)
- 2016 **Indian Institute of Technology (IIT) Kanpur**, India
Bachelor of Science in Chemistry (DEPARTMENT RANK 1, GPA: 9.7/10.0)

RESEARCH EXPERIENCE

- 2017 - 22 **Graduate Research, Massachusetts Institute of Technology (MIT)**
Advisor: Prof. Stephen P. BELL
- Investigated how eukaryotic DNA helicase enzymes are loaded on DNA.
 - Developed 4 novel single-molecule FRET assays to monitor multiple protein-protein and protein-DNA interactions in helicase loading.
 - Added a new direction to the lab by extending the total number of interactions deciphered in multi-protein binding events.
 - Expressed and purified multiple proteins in yeast and bacteria.
 - Fluorescently labeled peptides and over 40 large protein complexes.
 - Built 15+ DNA templates to study origin-DNA sequence requirements.
 - Implemented an internal library of MATLAB scripts for kinetic analysis.
 - Collaborated across institutions with Jeff Gelles's lab at Brandeis.
 - Supervised a lab technician in implementing a new labeling technology.
- 2014-16 **Undergraduate Project, IIT Kanpur, India**
Advisor: Prof. Nisanth NAIR
- Investigated how the drug aztreonam can treat antibiotic-resistant infections by escaping hydrolysis by bacterial β -lactamase enzymes.
 - Performed computational QM/MM simulations to study mechanism.
- 2015 **Summer Research, University of California, San Francisco (UCSF)**
Advisors: Prof. William DEGRADO and Prof. Michael GRABE
- Performed computational molecular dynamics simulations to study the mechanism of function of a designed Zn²⁺ transporter protein.
- 2014 **Summer Research, National Center for Bio Sciences (NCBS), India**
Advisor: Prof. Yamuna KRISHNAN
- Developed a molecular sensor for the signaling molecule cyclic-AMP.

PUBLICATIONS AND CONFERENCES

- Gupta S, Friedman LJ, Gelles J, Bell SP. *An ORC Backflip Enables Bidirectional Helicase Loading*. eLife 2021; 10:e74282. Selected for eLife Insight (top 15%).
- Amasino A, Friedman LJ, Gupta S, Gelles J, Bell SP. *ORC Phosphorylation Prevents Stable Mcm2-7 Ring Closing during Helicase Loading*. Manuscript in preparation.
- Awasthi S, Gupta S, Tripathi R, Nair NN. *Mechanism and Kinetics of Aztreonam Hydrolysis Catalyzed by Class-C β -Lactamase: A Temperature Accelerated Sliced Sampling Study*. J. Phys. Chem. B, 2018, 122 (15), pp 4299-4308.
- Presented at five conferences (2017-22) - one talk and four posters.

TECHNICAL SKILLS

Biochemical assays: fluorescence microscopy, protein-protein and protein-DNA binding affinity, order, kinetics via co-localization and smFRET, ensemble binding

Protein biochemistry: bacterial and yeast expression, AKTA protein purification, size-exclusion chromatography, ion-exchange, affinity-based purification, fluorescent modification via enzyme-based strategies (Sortase/Sfp), SNAP/CLIP

Programming languages and software: MATLAB, HTML, Adobe Illustrator, Pymol, VMD, Unix, LaTeX, ImageJ, Prism, Snapgene, Benchling

AWARDS AND FELLOWSHIPS

MIT | MathWorks Science Fellowship (2020-22)
Graduate Woman of Excellence (2019)
NSF GRFP Honorable Mention (2018)

IIT Kanpur | Director's Gold Medal (2016), Women's Gold Medal (2016)
General Proficiency Medal (2016), Academic Excellence Awards (2014-15)
SN Bose Fellowship (2015) - US internship fund for top 1.5% applicants
[KVPY](#) (2012-16) - four-year undergraduate scholarship for top science majors

TEACHING AND SCIENCE COMMUNICATION

MITx Content Creator, Cell Biology and Genetics (2021-22)

- Developed assessment questions for two free-to-audit MIT Biology MOOCs.

Teaching Development Fellow, MIT Biology (2020-21)

- Organized a [Careers in Biology Education panel](#) featuring MIT Biology alumni.
- Developed and facilitated workshops on course design and effective feedback.

Teaching Assistant, Molecular Biology (2020) and Grad Biochemistry (2017), MIT

- Independently facilitated recitations and conducted assessments (rating 6.7/7.0).

Instructor, Cambridge Rindge and Latin School (2018)

- Designed and taught a six-week course on gene editing at a local high school.

CERTIFICATIONS AND TRAINING

- **Negotiation Analysis**, MIT (2019) • **Conflict Management Training**, MIT (2018)
- **Kaufman Teaching Certificate Program**, MIT Teaching and Learning Lab (2018)

OUTREACH AND LEADERSHIP

Outreach | Peer Mentor, MIT Summer Research Program (2018-21)
Judge, MJAS high school science symposium (2016-21)
MIT Biology Exhibitor and Judge, ABRCMS (2018)

MIT Biology | President, Biology Graduate Students Council ([BGSC](#)) (2018-19)
Events Chair, Biology Graduate Students Council (2017-18)

- Led organization of the 2019 biology graduate student retreat, department social hours and annual student-run seminars.
- Represented biology graduate students on a faculty committee.

MIT Grad Community | Member, Institute Resources for Easing Friction and Stress (2018-19)
Chair, Off-Campus Housing, Graduate Student Council (2018-19)
Member, Graduate Orientation Committee (2017-18)
Events Chair, Indian Graduate Student Association (2017-18)