

Arijit Mukherjee

Postdoctoral researcher

PI: Prof. Jeffery L. Dangl

Howard Hughes Medical Institute & Dept of Biology

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EDUCATION

Ph.D. Biological Sciences

National University of Singapore (NUS) | 2020–2024

Dissertation: Role of microbiomes in Plant Sulfur Nutrition

M.Sc. Biotechnology

Indian Institute of Technology Bombay (IIT Bombay), India | 2017–2019

Dissertation: Formalin-fixed Paraffin Embedded (FFPE) tissue-based Proteomics Workflow: A case study on Brain tumor

B.Sc. Agriculture

Banaras Hindu University (BHU), India | 2013–2017

EXPERIENCE & RESEARCH IMPACT

Research impact: 5 (co-) first author, 4 co-authored, & 4 Editorial publications | 1 granted patent | 67 citations | H-index: 5

Postdoctoral Researcher | Howard Hughes Medical Institute | UNC Chapel Hill | April 2025 – Present

Project: Deciphering the immune priming mechanisms of commensal bacteria against the downy mildew pathogen of Arabidopsis

Advisor: Prof. Jeffery L. Dangl

- Developed an *in vitro* method to screen for direct interaction between obligate biotroph pathogen and commensal bacterial strains
- Developed a high-throughput method for large-scale screening of commensal bacteria mediated immune priming against the downy mildew pathogen of Arabidopsis

Graduate Student Researcher | NUS, Singapore | January 2020 – December 2024

Advisor: Assoc. Prof. Sanjay Swarup

- Pioneered the concept of trans-kingdom fitness tradeoff in plant-microbiome systems while studying plant sulfur nutrition in presence of complex microbial communities (Cell Host & Microbe, 2025)
- Identified conserved sets of specialized metabolites produced by plant-associated microbial members (mSystems, 2025).
- Provided a systems level understanding of sulfur at the plant-atmosphere-microbe crossroads while providing insights onto its applications (Trends in Microbiology, 2025).

Junior Research Fellow | Indian Institute of Technology Bombay (IIT Bombay) | May 2019 – December 2019

Advisor: Prof. Sanjeeva Srivastava

- **Proteome Atlas of a widely cultivated fish:** Contributed to developing a comprehensive and in-depth Proteome Atlas of Rohu, a widely cultivated fish in India (Journal of Proteome Research, 2022).
- Label-free proteomics workflow from clinically relevant formalin-fixed and paraffin embedded (FFPE) tissues.

Master's Student Researcher | Indian Institute of Technology Bombay (IIT Bombay) | June 2018 – April 2019

Advisor: Prof. Sanjeeva Srivastava

- **Formalin-fixed and paraffin embedded (FFPE) tissue-based proteomics:** Developed a workflow for proteomic profiling of meningioma FFPE tissues (OMICS: A Journal of Integrative Biology, 2022).
- **Collaborative Leadership:** Worked with clinicians to accrue FFPE specimens from cancer hospitals.

PUBLICATIONS

(co) Lead author publications (*Equal contributions)

Mukherjee A, Mazumder M, Verma A, Tikariha H, Bhattacharya R, Ooi QE, Swarup S. A bacterial signal coordinates plant-microbe fitness trade-off to enhance sulfur deficiency tolerance in plants. *Cell Host Microbe*. 2025 Oct 8;33(10):1748-1764.e6. doi: 10.1016/j.chom.2025.09.007. Epub 2025 Sep 26. PMID: 41015044.

Mukherjee A, Han L, Mukhopadhyay S, Kopriva S, Swarup S. Sulfur traits in the plant microbiome: implications for sustainable agriculture. *Trends Microbiol*. 2025 Jun;33(6):635-649. doi: 10.1016/j.tim.2025.02.002. Epub 2025 Mar 11. PMID: 40074579. (Review article)

Mukherjee A*, Tikariha H*, Bandla A, Pavagadhi S, Swarup S. Global analyses of biosynthetic gene clusters in phytobiomes reveal strong phylogenetic conservation of terpenes and aryl polyenes. *mSystems*. 2023 Aug 31;8(4):e0038723. doi: 10.1128/msystems.00387-23. Epub 2023 Jul 6. PMID: 37409823; PMCID: PMC10469690.

Mukherjee A*, Ghosh S*, Biswas D, Rao A, Shetty P, Epari S, Moiyadi A, Srivastava S. Clinical Proteomics for Meningioma: An Integrated Workflow for Quantitative Proteomics and Biomarker Validation in Formalin-Fixed Paraffin-Embedded Tissue Samples. *OMICS*. 2022 Sep;26(9):512-520. doi: 10.1089/omi.2022.0082. Epub 2022 Aug 26. PMID: 36036964.

Mukherjee A, Tan BH, Swarup S. In Silico Prediction and In Vitro Validation of Bacterial Interactions in the Plant Rhizosphere Using a Synthetic Bacterial Community. *Bio Protoc*. 2025 Nov 5;15(21):e5496. doi: 10.21769/BioProtoc.5496. PMID: 41230548; PMCID: PMC12602168.

Co-authored publications

Nissa MU, Pinto N*, **Mukherjee A***, Reddy PJ, Ghosh B, Sun Z, Ghantasala S, Chetanya C, Shenoy SV, Moritz RL, Goswami M, Srivastava S. Organ-Based Proteome and Post-Translational Modification Profiling of a Widely Cultivated Tropical Water Fish, *Labeo rohita*. *J Proteome Res*. 2022 Feb 4;21(2):420-437. doi: 10.1021/acs.jproteome.1c00759. Epub 2021 Dec 28. PMID: 34962809.

Mukhopadhyay S, Ooi QE, **Mukherjee A**, Bhattacharya R, Sarkar P, Tan ZD, Phang B, Chey SL, Lupascu M, Bandla A, Swarup S. Xenobiotic dynamics in mangroves and peatlands: Microbial mechanisms for nature-based mitigation. *J Hazard Mater*. 2026 Jun 15;511:142149. doi: 10.1016/j.jhazmat.2026.142149. Epub 2026 Apr 21. PMID: 42033825. (Review article)

Mazumder M, Pavagadhi S, Bhattacharya R, **Mukherjee A**, Majedi SM, Hin ITC, Swarup S. Live-exudation assisted phytobiome culturomics system (LEAP-CS): a high-throughput culturomics system for studying plant-microbiome interactions through diffusible metabolites. *Plant Methods*. 2026 Apr 22. doi: 10.1186/s13007-026-01539-0. Epub ahead of print. PMID: 42021382.

Editorial publications

Mukherjee A. A plant-microbe treaty: coordinated action of plant and microbial proteins strengthens immunity in apple. *Plant Physiol*. 2026 Apr 2;200(4):kiag156. doi: 10.1093/plphys/kiag156. PMID: 41857792; PMCID: PMC13070392.

Mukherjee A, Sharma G. Beyond water transport: aquaporins mediate systemic ROS signalling to enhance stress resilience in rice roots. *Plant Physiol*. 2026 Jun 12:kiag362. doi: 10.1093/plphys/kiag362. Epub ahead of print. PMID: 42281269.

Mukherjee A, Distinct effects of Citric Acid on Primary and Anchor Roots, Plant Physiology, 2026;, kiag309, <https://doi.org/10.1093/plphys/kiag309>

GRANTED PATENT

Protein extraction methods and quantification assay for biologically important proteins in *Labeo rohita*
Indian Patent No: 596493 | Application No. 202021021988 | Date of grant: 22 Jul 2026

INVITED TALKS & PRESENTATIONS

Fitness tradeoffs between plants and their microbiome

National University of Singapore | July 2025 | Inviter: Dr. Yuchen Long

Presentations

2026.07	Poster	Plant Biology 2026
2023.07	Poster	Plant Biology 2023
2022.07	Poster	SCELSE retreat 2022

AWARDS AND FELLOWSHIPS

- 2026 | Travel award, American Society of Plant Biologists (ASPB)
- 2020 | Graduate Research Fellowship jointly awarded by Singapore center for Environmental Life Sciences Engineering (SCELSE) and National University of Singapore (NUS)
- 2019 | All India Rank 3 out of ~12,000 candidates in Junior Research Fellowship (JRF) examination conducted by Council of Scientific and Industrial Research (CSIR)
- 2019 | All India Rank 17 out of ~14,000 candidates in Graduate Aptitude Test for Engineers (GATE) in Life Sciences category
- 2017 | All India Rank 2 & 4 in Biological Science and Biotechnology, respectively out of ~7,000 candidates in Joint Admission Test for M.Sc (JAM) conducted by IITs

TEACHING, MENTORSHIP & OUTREACH

Teaching Experience

Graduate Student Instructor | Molecular Biology | NUS | 2022

- Taught Molecular Biology to sophomore undergraduate students and assessed their exam papers

Graduate Student Instructor | *Microbial ecology* | NUS | 2023/2024

- Supervised 70-80 Master's students on introductory microbiome data analysis

Graduate Student Instructor | Biological data analysis using R | NUS | 2022-2023

- Led the course for master's and undergraduate students to learn using R programming for statistical analysis of biological data

Mentorship

Undergraduate student | Xie Yuanchen (2026- present), UNC Chapel Hill

- Screening Arabidopsis mutants to identify conserved signaling pathways for rhizobacteria mediated immune priming

High school student | Ichiho Hige (July-Aug 2026), UNC Chapel Hill

- Identification of direct inhibition of candidate bacterial strains towards the obligate biotroph downy mildew pathogen in Arabidopsis

Undergraduate student | Sanya Arya (2025-26), UNC Chapel Hill

- Development of a high-throughput screening system to identify candidate bacterial strains that protect against *Hyaloperonospora arabidopsidis*.

Undergraduate Student | Li Han (2022–23)

- Diversity and distribution of sulfur metabolic genes in phytobiomes ([Published](#))

Undergraduate Student | Boon Hao Tan (2024–25), National University of Singapore

- Mapping bacterial interactions in a synthetic rhizosphere bacterial community ([Published](#))

Outreach

Instructor | *Proteomics Bootcamp* | IIT Bombay | July 2018

- Developed and taught hands-on modules on computational biology and plant immunity to ~50 high school and university students from underrepresented backgrounds.

Essay on personal development | **Mukherjee A**, Expanding my horizons.2024. Science 378 (6616), 218

- Worked with a *Science* editor to share how co-curricular activities can shape personal development and career outcomes

PROFESSIONAL SERVICES AND LEADERSHIP

Assistant Feature Editor in the journal *Plant Physiology*, 2026–2028

- Writing news and views articles for published research in the journal *Plant Physiology* (See News & views articles in Editorial publications)
- Collaborating with peer-researchers and communicating with editorial teams

Plantae Fellow: *American Society of Plant Biologists*, 2024–2025

- Writing summary of published articles broadly related to Plant Biology

Reviewer in the journal *Microbial Ecology*

- Reviewing submitted articles in the domain of microbial ecology

Coordinator for Gap Summit 2022: *University of Cambridge*, UK, 2022-2023

- Coordinating hundred leaders of tomorrow (LoT) for their Entrepreneurial pitching competition over a year
- Recruiting startup CEOs and staffs to mentor the LoTs
- Preparing topic themes for the entrepreneurial competition

Resident Assistant: *University Town residence, National University of Singapore*, 2022-2024

- Planning and organizing wellness events for ~450 student residents
- Peer support through counselling
- Working with a team of volunteers and manage expenses and purchases for improved housing experience of resident students

Placement coordinator: Graduate Students' society, NUS

- Contacting companies to participate in placement program in campus
- Managing a team of six volunteers to spearhead campus recruitment for students

President: DBS Graduate Students' Society, Department of Biological Sciences, NUS, 2022–2023

- Managing a team of eight volunteers to spearhead events for well-being of the graduate students in the department
- Arranging sponsorship for departmental events

Coordinator for Plant Forum in the Department of Biological Sciences, NUS, 2024–2025

- Conducting monthly seminar with plant science researchers (Graduate students and postdocs) within the department

REFERENCES

Jeffery L. Dangl

Postdoctoral Supervisor

John N. Couch Professor & HHMI Investigator

Sanjay Swarup

PhD Supervisor

Associate Professor, Dept. of Biological Sciences

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Sanjeeva Srivastava Master's Thesis Supervisor Professor Dept of Bioscience and Bioengineering Indian Institute of Technology Bombay, India Email: sanjeeva@iitb.ac.in https://www.bio.iitb.ac.in/people/faculty/srivastava-s/	Stanislav Kopriva Collaborator Professor Institute for Plant Sciences, Cluster of Excellence on Plant Sciences (CEPLAS) University of Cologne, Cologne, Germany Email: skopriva@uni-koeln.de http://www.ag-kopriva.botanik.uni-koeln.de/