Curriculum Vitae

HEMAL BHALLA

Prime Minister Research Fellow
Ph.D. Scholar
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Profile

A life science enthusiast and researcher with a curious mind and striking ideas to work and understand biological systems' complex yet logical workings. Currently working on plant systems to understand the complex pollination mechanism at the molecular level with enthusiasm to pour in some knowledge in the existing pool to help eradicate and fight global hunger.

Education

Ph.D. | Indian Institute of Technology, Gandhinagar, Gujarat, India | 2022 – Present
(Advisor: Prof. Subramanian Sankaranarayanan)
Currently working to understand the proteasomal regulation during the self-incompatibility response in Brassicaceae. The goal is to improve crop yield by better understanding self-incompatibility.
M.Sc. BOTANY | Kirori Mal College, University of Delhi, Delhi, India | 2019-2021
FIRST DIVISION AND GOLD MEDALIST (UNIVERSITY TOPPER), CGPA 8.94
B.Sc. (HONS.) BOTANY| Swami Shraddhanand College, University of Delhi, Delhi, India| 2016-2019,
FIRST DIVISION, CGPA 8.608
HSC | Bal Bharati Public School, Rohini, Delhi, India | 2016
CENTRAL BOARD OF SECONDARY EDUCATION, 84.8%
SSC | Bal Bharati Public School, Rohini, Delhi, India | 2014
CENTRAL BOARD OF SECONDARY EDUCATION, CGPA 8.8

Awards and Achievements

1. **Prime Minister Research Fellowship** | Aug 23 – present
2. **GATE EY** (Ecology and evolution) | 2023 | GATE score: 433, AIR: 195
3. **DST-INSPIRE fellowship** | Feb 23 – July 23
4. **MHRD Institute Fellowship** | Aug 22 - Jan 23
   For pursuing a Ph.D. from IIT Gandhinagar
5. **GATE BT** (biotechnology) | 2022 | GATE score: 398, AIR: 1522
6. **GATE XL** (life sciences) | 2022 | GATE score: 505, AIR: 1400
7. **Panchanan Maheshwari Memorial Prize** | University of Delhi | 2021
   For securing the highest percentage of marks in M.Sc. Botany and 1st division among 99 students.
8. **Academic Excellence Award** | Kirori Mal College, University of Delhi | 2021
   For securing the highest percentage of marks in M.Sc. Botany (across college).
9. **Prof. G.S. Paliwal Award** | Department of Botany, University of Delhi | 2021
   For securing the maximum marks in the Developmental Botany paper during M. Sc. (Previous) course.
10. **Prof. K.G. Mukerji Award** | Department of Botany, University of Delhi | 2021
    For securing the highest marks in the aggregate of core and optional papers on Plant-

Pathogen interactions during M. Sc. (Previous) course.

11. **Prof. Umakant Sinha Medal** | Department of Botany, University of Delhi | 2021
    For securing the highest marks in the Genetics core course during M. Sc. (Previous) course.
12. **Prof. S.S. Bhojwani Medal** | Department of Botany, University of Delhi | 2021
    For securing cumulative highest marks in M. Sc. (Previous) course.
13. **JOINT CSIR-UGC NET LS** | 2020 | lecturership/assistant professor, AIR: 38

Skills and tools

Hands-on experience and adequate knowledge of plant tissue culture techniques, protein isolation, purification and characterization, vector and primer designing, and RDT tools such as cloning and recombination, as well as hands-on experience in bioinformatic analysis of protein structure prediction, modeling, and docking.

Expertise in equipment:

- Mass spectrometry: MALDI-TOF (TA: August 2023 – present)
- Confocal microscopy (completed training for 2 months and user from August 2023)

Extra training and certification

- Certification in scientific writing; Nov 2023 (secured 2nd rank and distinction)
  Indian Institute of Technology, Gandhinagar

Soft skills

- Curious and proactive with drive and commitment towards the project.
- Ability to work independently as well as part of a team.
- Good communication skills.
- Hard working capacity, dedicated, and productive mindset.
- Motivated and solution-oriented thinking.

Teaching and mentoring experience

- Mentored an initiative on student well-being under the guidance of Prof. Subramanian Sankaranarayanan (2025)
- Assisted Prof. Sangram K. Lenka (Associate professor, Gujarat Biotechnology University) in delivering practical hands-on in the module- Challenge Practical (2024)
- Assisted Prof. Subramanian Sankaranarayanan in delivering lectures and practical hands-on in the course BE618-Molecular Biotechnology (2024)
- Assisted Prof. Sangram K. Lenka (Associate professor, Gujarat Biotechnology University) in delivering lectures and practical hands-on in the course PPMB002-Plant Molecular Biotechnology (2024)
- Assisted Prof. Sharad Gupta in delivering MALDI-TOF practical hands-on in the course BE691-I Analysis and Characterization of Biologicals (2024)
- Trained interns: Devika Miglani (IISER Mohali) | Jun-Jul 2023
- Assisted Prof. Subramanian Sankaranarayanan in delivering lectures in the course BE405 Introduction to Plant Biotechnology (2023)
- Assisted Prof. Subramanian Sankaranarayanan in delivering lectures in the course ES243 Biology for Engineers (2023)

Gene sequences submitted in NCBI, USA (World Gene Bank)

- 2942139 **Bhalla. H.,** Kumari,A. and Sankaranarayanan. S. 2025, *Brassica rapa* var Toria M locus protein kinase, mRNA, complete cds.
- PV022134 Kumari,A., **Bhalla,H.** and Sankaranarayanan,S. 2025, *Brassica rapa* var Toria Pollen Coat Protein-B gamma, mRNA, complete cds.

- 2868598 Kumari,A., **Bhalla,H.** and Sankaranarayanan,S. 2024, *Brassica rapa* var Toria Kunitz trypsin inhibitor 2, mRNA, complete cds.
- 2868588 Kumari,A., **Bhalla,H.** and Sankaranarayanan,S. 2024, *Brassica rapa* var Yellow Sarson Kunitz trypsin inhibitor 2, mRNA, complete cds.
- OR513091 **Bhalla. H.** and Sankaranarayanan. S. 2024, *Brassica rapa* var Yellow Sarson BTB-POZ Domain containing protein adaptor for Cullin-based E3 ligase, mRNA, complete cds.
- OR858821 **Bhalla. H.** and Sankaranarayanan. S. 2024, *Brassica rapa* var Toria BTB-POZ Domain containing protein adaptor for Cullin-based E3 ligase, mRNA, complete cds.
- OR887605 **Bhalla. H.** and Sankaranarayanan. S. 2024, *Brassica rapa* var Toria SRK gene for S-locus receptor kinase, mRNA, complete cds.

Workshops/seminars attended.

- FDP on Genome editing for sustainable Crop Improvement held on March 24-28, 2025, by Ganpat University, Mehsana, Gujarat, India
- Workshop on mass spectrometry held on February 6-8, 2024, by DBT-Sahej facility, Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram, Kerala
- CBT course series/workshop held on December 11-13, 2023, by Centre of Excellence and Biopharmaceutical Technology, Indian Institute of Technology, Delhi.
- National seminar on "Biological evolution: History and Processes" held on March 02, 2021, by the Department of Botany, Govt. Swami Vivekanand Degree College, Berasia, Bhopal (M.P.)
- International webinar on "Genome editing to enhance multiple disease resistance in crop plants" held on December 20, 2020, by Dr. Ajjamada Kushalappa, Professor of McGill University, Canada
- National webinar on "Machine learning and Data science for biologists" held on 4th September 2020 by the Department of Botany, Kirori Mal College, the University of Delhi, under the aegis of the DBT star college scheme
- Bilateral Indo-US Webinar on Covid Biology dated August 16-19, 2020, organized by Indian Institute of Science Education and Research, Kolkata, India, in collaboration with IISc Bangalore, University of Pennsylvania, and University of Colorado, USA
- National science series: Igniting Young Minds held on August 4-6, 2020, organized by Bhaskaracharya College of Applied Sciences, University of Delhi, under the aegis of the Star College scheme, Department of Biotechnology, Government of India and IQAC
- Symposium on "Intellectual property rights" held on 11 October 2018, organized by Swami Shraddhanand College, University of Delhi
- National conference on "Emerging Environmental Challenges and Sustainable Development" held on March 21-23, 2018, organized by Swami Shraddhanand College, University of Delhi and Society for Environment and Development, India

Conference publications

1. **Bhalla, H**., Sudarsanam, K., Srivastava, A., Sankaranarayanan, S. 2025. Structural insights into the recognition of RALF peptides by FERONIA receptor kinase during Brassicaceae pollination. International Conference on Developments in Plant Biology and Biotechnology. 2025. University of Hyderabad, Telangana, India
2. **Bhalla, H**., Srivastava, A., Sankaranarayanan, S. 2024. Structural Insights into Competitive Binding Dynamics between RALF23/33 and PCP-B in Brassicaceae Pollination. 27th International Congress On Sexual Plant Reproduction. 2024. Rhode Island School of Design, Providence, USA

Oral talks, invited lectures and contributions to meetings

1. 2025, 29th January. Oral talk "Structural insights into the recognition of RALF peptides by FERONIA receptor kinase during Brassicaceae pollination", International Conference on Developments in Plant Biology and Biotechnology. University of Hyderabad, Telangana, India

Publications and research experience

1. **Bhalla, H.,** Sudarsanam, K., Srivastava, A., & Sankaranarayanan, S. (2025). Structural insights into the recognition of RALF peptides by FERONIA receptor kinase during Brassicaceae pollination. ***Plant Mol Biol*** 115, 17 (2025). https://doi.org/10.1007/s11103-024-01548-4
2. **Bhalla, H.**, Ankita, K., Abhinandan, K., Sharma, T., & Sankaranarayanan, S. (2025). From lock and key to molecular diplomacy: Understanding pollen recognition and discrimination in brassicaceae. **Plant Reproduction**, 38(1), 2. https://doi.org/10.1007/s00497-024-00511-z
3. **Bhalla, H.**, Sudarsanam, K., Srivastava, A., & Sankaranarayanan, S. (2024). Structural Insights into Competitive Binding Dynamics between RALF23/33 and PCP-B in Brassicaceae Pollination.**bioRxiv** https://doi.org/10.1101/2024.12.03.626569
4. Gawande, N. D.*, **Bhalla, H.*,** Watts, A., Shelake, R. M., & Sankaranarayanan, S. (2024). Application of genome editing in plant reproductive biology: Recent advances and challenges. **Plant Reproduction**, 37(4), 441–462. https://doi.org/10.1007/s00497-024-00506-w (*equal contribution as first author)
5. Completed research work embodied as a **Dissertation thesis entitled *"Meta-Analysis of SARS-CoV-2 variants in Indian subcontinent vis a vis spike protein evolution and vaccination drive"*** | 2021 | (Advisor: Prof. Shailendra Goel)
6. Rajpal, V. R., Sharma, S., Sehgal, D., Singh, A., Kumar, A., Vaishnavi, S., Tiwari, M., **Bhalla, H**., Goel, S & Raina, S. N. (2022). A comprehensive account of SARS-CoV-2 genome structure, incurred mutations, lineages, and COVID-19 vaccination program. ***Future Virology***, *17*(9), 687-706. https://doi.org/10.2217/fvl-2021-0277

Professional services and outreach activities

- Ambassador for Pusa Krishi, Indian Centre for Agricultural Research (ICAR), Indian Agricultural Research Institute (IARI)