Parul Sharma

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Education

2018 – 2023	**Ph.D.** Genetics, Bioinformatics and Computational Biology *Virginia Tech* *Blacksburg, USA* Thesis: *Development of Bioinformatic pipelines to improve sequence-based pathogen classification and identification*
2015 – 2017	**M.Tech.** Computational Biology *Indraprastha Institute of Information Technology* *Delhi, India* Thesis: *Clinical Genomics and Personalized Medicine initiatives for Arabian Countries*
2011 – 2015	**B.Tech.** Biotechnology *Jaypee Institute of Information Technology* *Noida, India* Thesis: *Studying the effects of bacteriocin-like-inhibitory substances on bacterial biofilms*

Research Experience

Sept'22 – present	**Assistant Scientist, Bioinformatics** Emory University Atlanta, USA. Project - Detecting the spread of antimicrobial resistant strains in infectious diseases *Advisor: Dr Timothy Read*
May'22 – Aug'22	**Research Intern,** Vertex Pharmaceuticals Boston, USA. Project - Validating and benchmarking clinical pipeline for gene-editing-based disease therapies *Advisor: Dr Rebecca Fine*
2018 – present	**Graduate Research Assistant,** Virginia Tech Blacksburg, USA. Project - Improving pathogen identification and characterization using long- read sequencing methods *Advisor: Dr Boris Vinatzer*
Aug'17 – Dec'17	**Graduate Research Assistant,** Indraprastha Institute of Information Technology Delhi, India. Project - Post mitochondrial apoptotic pathway study using Monte Carlo Modelling *Advisor: Dr Subhadip Raychaudhuri*
May'16 – Dec'17	**Thesis Student,** Institute for Genomics and Integrative Biology Delhi, India. Project - Clinical Genomics and Personalized Medicine initiatives for Arabian Countries *Advisor: Dr Vinod Scaria*
May'14 – Aug'14	**Intern,** Centre for Genetic Manipulation of Crop Plants Delhi, India. Project - Analyzing the protein content in different *Brassica* species for improving the quality of mustard seeds *Advisor: Dr Yaspal Singh Sodhi*
Dec'13 – Jan'14	**Intern,** Rajiv Gandhi Cancer Hospital And Research Center Delhi, India. Learning to perform pathological testing in Biochemistry, Microbiology, and Hematology departments

Teaching Experience

Spring 2017 🔖 **Probability and Statistics** Undergraduate Level
Graduate Teaching Assistant, IIIT-Delhi
Responsibilities: Weekly tutorials, Grading assignments, Regular Office hours

Fall 2016 🔖 **Introduction to Mathematical Biology** Graduate Level
Graduate Teaching Assistant, IIIT-Delhi
Responsibilities: Designing homework assignments, Grading, Regular Office hours

Spring 2016 🔖 **Critical Thinking** Undergraduate Level
Graduate Teaching Assistant, IIIT-Delhi
Responsibilities: Preparing lecture material, Facilitating classroom discussions, Grading, Regular Office hours

Mentoring Experience

2019-present 🔖 **Peer-mentor** Vinatzer Lab, Virginia Tech
Give training sessions/workshops for new bioinformatic tools and pipelines
Provide support and advice on software/pipeline selection and installation
Assistance in troubleshooting computational problems through meetings

2016-2017 🔖 **Project manager** Institute for Genomics and Integrative Biology
Managed and mentored a team of 20+ student interns
Prepared teaching materials and organized training sessions
Assisted in timely progress of tasks

Awards and Honors

2023 🔖 **Outstanding PhD Student Award in Basic Research**, School of Plant and Environmental Sciences, Virginia Tech.

2022 🔖 **Travel Grant**, School of Plant and Environmental Sciences, Virginia Tech.
🔖 **Research Grant**, Pacbio Genomics Day, Atlanta.

2021 🔖 **Travel Grant**, Graduate Student Association Travel Fund Program, Virginia Tech.

2020 🔖 **Travel Grant**, Plant Health 2020.
🔖 **1st prize for Oral Presentation**, American Phytopathological Society Potomac Division Meeting.
🔖 **1st Prize for Flash Talk**, Graduate Student Association Research Symposium, Virginia Tech.

2019 🔖 **Best Poster**, School of Plant and Environmental Sciences, Graduate Student Poster Showcase.

2015 🔖 **Complete Tuition Waiver for Master's degree**, Department of Biotechnology, India.
🔖 **Scholarship for qualifying the Graduate Aptitute Test in Engineering**, Ministry of Human Resource Development, Government of India.

Publications

1 Abdelrazek, S., Bush, E., Oliver, C., Liu, H., **Sharma, P.**, Johnson, M. A., … Vinatzer, B. A. (2024). A survey of xylella fastidiosa in the us state of virginia reveals wide distribution of both subspecies fastidiosa and multiplex in grapevine. *Phytopathology®*, *114*(1), 35–46.
🔗 doi:`10.1094/PHYTO-06-23-0212-R`

2 Crosby, K. C., Rojas, M., **Sharma, P.**, Johnson, M. A., Mazloom, R., Kvitko, B. H., … Heath, L. S. et al. (2023). Genomic delineation and description of species and within-species lineages in the genus pantoea. *Frontiers in Microbiology*, *14*, 1254999. 🔗 doi:`10.3389/fmicb.2023.1254999`

3 Lowe-Power*, T., **Sharma, P.***, Alfenas-Zerbini, P., Álvarez, B., Arif, M., Baroukh, C., … Cellier, G. et al. (2023). The ralstonia research community rejects the proposal to classify phylotype i ralstonia into the new species ralstonia nicotianae. *PhytoFrontiers™*, *3*(4), 761–766.
🔗 doi:`10.1094/PHYTOFR-06-23-0071-LE`

4 Failor, K. C., Liu, H., Llontop, M. E., LeBlanc, S., Eckshtain-Levi, N., **Sharma, P.**, … Lefevre, C. et al. (2022). Ice nucleation in a gram-positive bacterium isolated from precipitation depends on a polyketide synthase and non-ribosomal peptide synthetase. *The ISME Journal*, 1–8.
🔗 doi:`10.1038/s41396-021-01140-4`

5 Johnson, M. A., Liu, H., Bush, E., **Sharma**, P., Yang, S., Mazloom, R., … Vinatzer, B. A. (2022). Investigating plant disease outbreaks with long-read metagenomics: Sensitive detection and highly resolved phylogenetic reconstruction applied to xylella fastidiosa. *Microbial Genomics*, *8*(5), 000822.
🔗 doi:`10.1099/mgen.0.000822`

6 **Sharma**, P., Johnson, M., Mazloom, R., Allen, C., Heath, L., Lowe-Power, T., & Vinatzer, B. (2022). Meta analysis of the ralstonia solanacearum species complex (rssc) based on comparative evolutionary genomics and reverse ecology. *Microbial Genomics*. 🔗 doi:`10.1099/mgen.0.000791`

7 Mechan Llontop, M. E., Tian, L., **Sharma**, P., Heflin, L., Bernal Galeano, V. A., Haak, D., … Vinatzer, B. (2021). Experimental evidence pointing to rain as a reservoir of tomato phyllosphere microbiota. *Phytobiomes Journal*, (ja). 🔗 doi:`10.1094/PBIOMES-04-21-0025-R`

8 **Sharma**, P., Jain, A., & Scaria, V. (2021). Genetic landscape of rare autoinflammatory disease variants in qatar and middle eastern populations through the integration of whole-genome and exome datasets. *Frontiers in Genetics-Applied Genetic Epidemiology*. 🔗 doi:`10.3389/fgene.2021.631340`

9 Vatsyayan*, A., **Sharma, P.***, Gupta, S., Sandhu, S., Venu, S. L., Sharma, V., … Rajab, A. et al. (2021). Dalia-a comprehensive resource of disease alleles in arab population. *PloS one*, *16*(1), e0244567.
🔗 doi:`10.1371/journal.pone.0244567`

10 Mechan Llontop*, M. E., **Sharma, P.***, Aguilera Flores*, M., Yang, S., Pollok, J., Tian, L., … Li, S. et al. (2020). Strain-level identification of bacterial tomato pathogens directly from metagenomic sequences. *Phytopathology*, *110*(4), 768–779. 🔗 doi:`10.1094/PHYTO-09-19-0351-R`

11 Roman-Reyna, V., Truchon, A., **Sharma, P.**, Hand, F. P., Mazloom, R., Vinatzer, B. A., … Allen, C. (2020). Genome resource: Ralstonia solanacearum phylotype ii sequevar 1 (race 3 biovar 2) strain uw848 from the 2020 us geranium introduction. *Plant disease*, PDIS06201269A. 🔗 doi:`10.1094/PDIS-06-20-1269-A`

12 Sharma, G., Sharma, S., **Sharma**, P., Chandola, D., Dang, S., Gupta, S., & Gabrani, R. (2016). Escherichia coli biofilm: Development and therapeutic strategies. *Journal of applied microbiology*, *121*(2), 309–319.
🔗 doi:`10.1111/jam.13078`

13 Sivadas, A., **Sharma**, P., & Scaria, V. (2016). Landscape of warfarin and clopidogrel pharmacogenetic variants in qatari population from whole exome datasets. *Pharmacogenomics*, *17*(17), 1891–1901.
🔗 doi:`10.2217/pgs-2016-0130`

14 Dangayach, S., **Sharma, P.**, Singhai, P., & Gupta, N. (2014). Microbial removal of arsenic: Mechanisms and applications. *As. J. Multidis. Stud*, *2*, 159–170. Retrieved from
🔗 `https://parul-sharma.github.io/parul-sharma.github.io/793-2281-1-PB.pdf`

Computational Skills

- Coding Languages : Python, R, Linux, HTML/CSS, LaTeX.
- Experience with High Performance and cloud computing platforms: Slurm, PBS, AWS, Google cloud.
- Familiarity with applications of machine learning and deep learning methods in genomics and survival data analysis.

Computational Skills (continued)

- Proficiency in data analysis of Next Generation Sequencing data including Illumina, Pacbio and Nanopore sequencing data.
- Experience with building custom bioinformatics tools and pipelines.
- Proficiency in using tools and pipelines for outbreak analysis, pathogen detection, SNP analysis, variant calling, phylogenetic analysis, recombination study, GWAS, and other comparative genomic methods.
- Experience with handling Metagenomics, RNA-seq, Multi-omics data for bacterial genomics and Whole genome and Exome sequencing data for clinical/population genomics studies.
- Experience with analysing gene editing data in clinical settings.

Oral Presentations

- Adapting a metagenomic classification tool to reach the resolution required for biosecurity-relevant identification of plant-associated bacteria, **International Phytobiomes Conference**, *2022, Denver-Colorado*.
- Rapid and precise metagenomics classification for pathogen detection using an exclusively genome-similarity-based approach, **International Conference on Plant Pathogenic Bacteria**, *2022, Assisi-Italy*.
- Rapid and precise metagenomics classification for pathogen detection using an exclusively genome-similarity-based approach, **American Phytopathological Society Potomac Division Meeting**, *2022, Online*.
- Genome-based circumscription of cool-virulent *Ralstonia solanacearum* strains in an attempt to improve their regulation, **Plant Health 2020**, *Online*.
- Genome-based circumscription of cool-virulent *Ralstonia solanacearum* strains in an attempt to improve their regulation, **American Phytopathological Society Potomac Division Meeting**, *2020, Online*.
- Strain-level identification of tomato pathogens from metagenomic sequences obtained with the ONT MinION **Graduate Student Association Research Symposium, Virginia Tech**, *2020, Online*.
- Strain-level identification of tomato pathogens from metagenomic sequences obtained with the ONT MinION **Translational Plant Science Symposium**, *2020, Virginia Tech*.
- Strain-level identification of tomato pathogens from metagenomic sequences obtained with the ONT MinION **Nanopore Community Meeting 2019**, *New York*.
- Hi Alexa! What's wrong with my tomato plant?**Nutshell Games 2019**, *Virginia Tech*.

Poster Presentations

- Adapting a metagenomic classification tool to reach the resolution required for biosecurity-relevant identification of plant-associated bacteria, **International Phytobiomes Conference**, *2022, Denver-Colorado*.
- Cool virulence: Catch me if you can, **School of Plant and Environmental Sciences Graduate Student Poster Showcase**, *2021, Virginia Tech, USA*.
- A comparative genomics investigation into cool-virulence in *Ralstonia solanacearum* to improve its phytosanitary regulation, **Plant Health 2021**, *Online*.
- Classification of the *Ralstonia solanacearum* species complex based on population and comparative genomics, **World Microbe Forum**, *2021, Online*.
- Strain-level identification of tomato pathogens from metagenomic sequences obtained with the ONT MinION, **School of Plant and Environmental Sciences Graduate Student Poster Showcase**, *2019, Virginia Tech, USA*.

Poster Presentations (continued)

- Strain-level identification of tomato pathogens from metagenomic sequences obtained with the ONT MinION **Nanopore Community Meeting 2019**, *New York, USA*.
- Pharmacogenetic variant analysis In Arab Populations from Exome Data, **Research Showcase**, *2017, Delhi-India*.
- Antimicrobial peptides as potential therapeutics against bacteria, **National Conference on "Recent Advances in Biological Sciences" organized by Society of young scientists**, *2014, Delhi-India*.

Workshops

- Hands-on workshop on "LINtax: A tool to identify biosecurity pathogens from metagenomic data. " at the **USDA-APHIS**, Laurel-Maryland, *2023*.
- Hands-on workshop on "Metagenomics and Microbial Sequencing for Diagnostics " at the **International Phytobiomes Conference**, Denver-Colorado, *2022*.
- Co-organized the Panel Discussion on "Plant Disease Pandemic Prevention" at the **Transnational Plant Science Symposium**, Virginia Tech, *2022*.
- Hands-on workshop on "Using metagenomic sequencing for Pathogen identification" at **Translational Plant Sciences Discussion Group meeting**, Virginia Tech, *2021*.

Volunteer and Outreach Activities

- Served as a Judge for Oral Presentations at DSAC Graduate Research Symposium at Emory University *March, 2024*.
- Served as a Judge for Poster Presentations at DSAC Graduate Research Symposium at Emory University *March, 2024*.
- Co-organized the Panel Discussion on "Plant Disease Pandemic Prevention" at the Transnational Plant Science Symposium *April, 2022*.
- Senator Representative for Genetics, Bioinformatics and Computational Biology Program in Graduate and Professional Student Services *2021-2023*.
- Committee Member of the Graduate Honor Society at Virginia Tech *2020-2023*.
- Served as a Judge for the Western Virginia Regional Science Fair 2020 at Hollins University *Mar 21, 2020*.
- Served as a Judge for the Roanoke County Science Fair 2020 at William Byrd Middle School *Feb 22, 2020*.
- Volunteer teacher for low-income schools in Delhi to encourage underprivileged kids towards STEM careers. Taught Math, Science and Computers to 7th Grade students through interactive learning to develop critical thinking *2015-2016*