LALIT MOHAN

PhD Candidate



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EDUCATION

Doctor of Philosophy (PhD) Candidate| A*STAR Infectious Diseases Lab / National University of Singapore, Yong Loo Lin School of Medicine

August 2022 – Expected completion 2026
(Aug 26 Thesis Submission, Jan-Feb 27 Defence TBC)

Funding: A*STAR Singapore International Graduate Award (SINGA) Scholarship — Full tuition + stipend (4-year award to top 2% of international applicants)

Dissertation: Therapeutic interventions for *Acinetobacter baumannii* using bacteriophage therapy

M.Sc. Biotechnology *Aug 2020 - May 2022*
Delhi Technological University, India
CGPA: 9.82/10.0 | **Department Rank:** 1st Position

Thesis: *Chlorella minutissima* as Functional Food and Bio-Nano-Factories for Silver Nanoparticle Synthesis

B.Sc. Honours, Microbiology *July 2017– Aug 2020*
Ram Lal Anand College, University of Delhi, India
CGPA: 9.095/10.0 | **Department Rank:** 2nd Position

PUBLICATIONS

Peer-Reviewed Research Articles (6)

1. Liew J H, Norman A, Illouz M, Teo T-H, Ponti R D, Hamela C, **Mohan L**, Lew R, Ron C, Low K E, Daher W, Chiam A, Maw J, Sun Y, Sorayah R, Oehlers S H, Jhun B W, Teo J W P, Goulet A, … Bifani P. (2026). Smooth-to-rough morphotype switching, a mechanism of phage resistance in Mycobacterium abscessus. *Proceedings of the National Academy of Sciences*, *123*(11), e2531197123. https://doi.org/10.1073/pnas.2531197123
2. Tan BSY, **Mohan L**, Watthanaworawit W, Ngamprasertchai T, Nosten FH, Ling C, Bifani P (2024). Detection of florfenicol resistance in opportunistic *Acinetobacter* spp. infections in rural Thailand. *Frontiers in Microbiology*, 15:1368813. https://doi.org/10.3389/FMICB.2024.1368813
3. **Mohan L**, Anand S, Mittal M, et al. (2023). Cross-sectional study: knowledge assessment of youth regarding the global public health threat of antibiotic resistance. *Journal of Public Health*, Online. https://doi.org/10.1007/s10389-023-02179-7
4. Kumar L, **Mohan L**, Anand R, Bharadvaja N. (2023). *Chlorella minutissima*-assisted silver nanoparticles synthesis and evaluation of its antibacterial activity. *Systematic Microbiology and Biomanufacturing*, 3:13. https://doi.org/10.1007/s43393-023-00173-4
5. Bahuguna M, Hooda S, **Mohan L**, Gupta RK, Diwan P. (2023). Identifying oral microbiome alterations in adult betel quid chewing population of Delhi, India. *PLoS ONE*, 18(1):e0278221. https://doi.org/10.1371/journal.pone.0278221
6. Snigdha S, Bajwa T, Anand S, **Mohan L**, Goyal K, Mittal M, Gupta KR, Wahlang J, Gupta RK, Diwan P. (2021). Cross-sectional Study on Prevalence of Betel Nut Chewing among Youth of Meghalaya, North East Region of India. *Asian Pacific Journal of Health Sciences*, 8(3):32. https://doi.org/10.21276/apjhs.2021.8.3.32

Peer-Reviewed Review Articles (6)

1. Anand R, Kumar L, **Mohan L**, Bharadvaja N. (2023). Nano-inspired smart medicines targeting brain cancer: diagnosis and treatment. *Journal of Biological Inorganic Chemistry*, 28:1–15. https://doi.org/10.1007/s00775-022-01981-0
2. Kumar L, **Mohan L**, Anand R, Joshi V, Chugh M, Bharadvaja N. (2022).

A review on unit operations, challenges, opportunities, and strategies to improve algal-based biodiesel and biorefinery. *Frontiers in Chemical Engineering*, 4:998289. https://doi.org/10.3389/fceng.2022.998289

3. Kumar L, **Mohan L**, Anand S, Bharadvaja N. (2022). Phyconanoremediation: a sustainable approach to deal with environmental pollutants, heavy metals, and dyes. *Vegetos*, 35:460–472. https://doi.org/10.1007/s42535-022-00399-y
4. Anand R, **Mohan L**, Bharadvaja N. (2022). Disease prevention and treatment using β-Carotene: the ultimate provitamin A. *Revista Brasileira de Farmacognosia*, 32:39–53. https://doi.org/10.1007/s43450-022-00262-w
5. Anand S, **Mohan L**, Bharadvaja N. (2022). A review on Ayurvedic non-carbohydrate prebiotics. *ECS Transactions*, 107:13505. https://doi.org/10.1149/10701.13505ecst
6. **Mohan L**, Anand S, Gupta R, Diwan P. (2021). Frugal science innovations: Promising tools for education and healthcare. *Journal of Advanced Scientific Research*, 12(3). https://doi.org/10.55218/JASR.202112303

Book Chapters (6)

1. **Mohan L**, Majeed S, Jain M, Sharma A, Hooda S, Chakraborty N. (2025). Algal-based nanoparticles as an alternative antimicrobial agent. In Ghosh D, Tiwari ON (Eds.), *Algal Biomass Technology and Research* (1st ed., pp. 225–255). Apple Academic Press. https://doi.org/10.1201/9781003613091-9
2. **Mohan L**, Gupta V. (2024). An overview of mycorrhizae: Nature's own biofertilizers. In Jain S, Gupta A, Verma N (Eds.), *Industrial Applications of Soil Microbes* (Vol. 4, pp. 1–16). BENTHAM SCIENCE PUBLISHERS. https://doi.org/10.2174/9789815124996124040004
3. Kumar L, **Mohan L**, Anand R, Tripathi A, Gangyan M, Garg M, Bharadvaja N. (2024). Biotechnological Approaches to Improve Algal Biofuel and Biochemical Production. 337–366. https://doi.org/10.1007/978-3-031-52319-9_15
4. **Mohan L**, Anand R, Kumar L, Bharadvaja N. (2024). Biogenic silver nanoparticles and their applications. In Shah MP, Bharadvaja N, Kumar L (Eds.), *Biogenic Nanomaterials for Environmental Sustainability: Principles, Practices, and Opportunities* (pp. 1–20). Springer. https://doi.org/10.1007/978-3-031-45956-6_2
5. Anand R, **Mohan L**, Bharadvaja N. (2023). Phyto- & Microbial- Remediation of Radioactive Waste. *Microbial Technologies in Industrial Wastewater Treatment*, 215–241. https://doi.org/10.1007/978-981-99-2435-6_12
6. **Mohan L**, Goyal K, Anand S, Mittal M, Snigdha S, Bajwa, Gupta K R, Gupta R K, Diwan P. (2020). Foldscope: A New Age Exploratory Educational Tool. In A. D. Sharma (Ed.). Foldscope and its Applications (pp. 188-193). New Delhi: National Press Associates. ISBN 978-93-85835-68-1

RESEARCH EXPERIENCE

Ph.D. Program| A*STAR Infectious Diseases Lab / National University of Singapore, Yong Loo Lin School of Medicine *Aug 2022 - Aug 2026*

Professor Pablo Bifani Lab: Therapeutic interventions for *Acinetobacter baumannii* using bacteriophage therapy

Research Objectives: Develop and characterize bacteriophage cocktails for treatment of multidrug-resistant (MDR) *A. baumannii* infections and elucidate phage resistance mechanisms.

Key Achievements:

• Isolated and characterized 70+ novel bacteriophages with lytic activity against predominant sequence types (ST1 and ST2) of *A. baumannii*, which are responsible for 70% of clinical infections in Southeast Asian hospitals

• Developed optimized phage cocktails demonstrating >95% bacterial clearance efficacy, cocktail formulations reduced phage resistance emergence compared to single-phage monotherapy

• Performed comprehensive genomic characterization of 44 therapeutic phage candidates using whole-genome sequencing, comparative genomics, and bioinformatic analysis (BVBRC, IQ-TREE)

• Identified and validated novel phage resistance mechanisms through mutational analysis and molecular characterization, revealing target genes for genetic engineering to overcome resistance

• Conducted host range testing against 500+ *Acinetobacter* clinical isolates across various sequence types, mapping therapeutic potential and cross-reactivity patterns

Master's Thesis | Delhi Technological University (Navneeta Bharadvaja Lab) *Aug 2021 - June 2022*

Chlorella minutissima as Functional Food and Bio-Nano-Factories for Silver Nanoparticle Synthesis

Key Achievements:

• Designed and executed comprehensive project evaluating microalgal cultivation, biogenic silver nanoparticle synthesis, characterization, and antimicrobial applications; completed thesis requirements with first-rank honors

• Synthesized silver nanoparticles using bioengineered *Chlorella minutissima* and characterized them using UV-Vis spectroscopy, Transmission Electron Microscopy (TEM), and X-ray Diffraction (XRD)

• Evaluated nanoparticle efficacy against multidrug-resistant bacterial strains, demonstrating superior antimicrobial activity

Research Internship | Oral Microbiome and Betel Nut-Induced Carcinogenesis *June 2021*

Research project under Prof Prerna Diwan, Department of Microbiology, Ram Lal Anand College, University of Delhi

Key Achievements:

• Conducted systematic sampling and DNA extraction from oral cavity of betel nut chewing populations in northeastern India; analyzed microbiome composition using 16S rRNA sequencing

• Identified significant microbiome alterations associated with betel quid chewing and established correlations with oral cancer prevalence; contributed to publication in *PLoS ONE* (2023)

• Gained practical expertise in experimental design, sampling protocols, metagenomic DNA extraction, data analysis, and interpretation of microbiome datasets

Research Internship | Communicating the science behind the phenomenon of antibiotic resistance to promote social awareness *September to December 2019*

Research project under Prof Prerna Diwan, Department of Microbiology, Ram Lal Anand College, University of Delhi

Key Achievements:

• Designed and conducted surveys to assess the understanding and awareness of the general public towards antimicrobial resistance

• Analyzed the survey data to conclude the association between different education levels and awareness about antimicrobial resistance; contributed to publication in Journal of Public Health (2023)

CSIR Summer Research Training Program (CSIR-SRTP) *June to August 2020*

Participated in an online training program demonstrating fundamental laboratory techniques; completed a literature review project on "Side effects of probiotics" with certification

Research Internship, Suraj Shree Chemical Ltd. *July-August 2021*

Conducted literature review and research on soil microbiota, plant-microbe interactions, and biofertilizer applications in agriculture

Department of Microbiology, University of Delhi, South Campus *May-June 2018*

Summer training covering standard microbiology laboratory techniques and equipment under the guidance of Prof. Rani Gupta

CONFERENCE & PRESENTATIONS

Viruses of Microbes VOM 2026 – Czech Republic, Prague *Jul 2026*

Poster Presentation: Phage cocktail development for the treatment of sequence type 2 (ST2) A. baumannii

Singapore Antimicrobial Resistance (AMR) Research Symposium 2025- Singapore *Nov 2025*

Flash talk: Phage cocktail development for the treatment of sequence type (ST) 2 Acinetobacter baumannii

AMR Symposium 2024: Challenges and Solutions to the AMR Crisis – Singapore *Sep 2024*

Poster Presentation: Effective phage cocktail for the treatment of ST 2 A. baumannii strains

Viruses of Microbes VOM 2024 – Australia, Cairns *Jul 2024*
Poster Presentation: Development of phage cocktails for the treatment of ST 1 and ST 2 A. baumannii strains

Oxford Bacteriophage Conference 2023 - United Kingdom, Oxford *Sept 2023*
Poster presentation: Screening and development of effective phage cocktail against Acinetobacter baumannii

International Conference on Technologies for Smart Green Connected Society (ICTSGS-1), Japan *Nov 2021*
Poster presentation: Ayurvedic non-carbohydrate prebiotics

TEACHING EXPERIENCE

Research Project Mentor | National University of Singapore *2022-2023*
Mentored 3 undergraduate researchers, 3 high school students and 1 research assistant on phage isolation, cultivation, and antimicrobial susceptibility testing

Teaching Assistant | National University of Singapore *Aug-Dec 2022*
Teaching assistant for LSM3232 Microbiology

AWARDS/ACHIEVEMENTS

Participant, SMART Venture Execution Program *2025-26*
Singapore-MIT Alliance for Research and Technology (SMART)
Project: "Novel Targets and First-in-class Compounds from Unveiling Innovative Platform"

Commendable Research Award for Excellence in Research (2023) — Delhi Technological University *2024*

Commendable Research Award for Excellence in Research (2022) — Delhi Technological University *2023*

Vice-Chancellor's Gold Medal and **Certificate of Merit** — 1st Position in M.Sc. Biotechnology (Order of Merit, 2020-2022) — Delhi Technological University *2022*

A*STAR Graduate Scholarship *2022*

Certificate of Appreciation — 2nd Position in B.Sc. Honours Microbiology (2017-2020) — Ram Lal Anand College, University of Delhi *2022*

Dr. D.K. Pabby Best Student Award (Sciences) — Awarded to one student in sciences for overall exemplary performance in academics and extracurricular activities — Ram Lal Anand College, University of Delhi *2021*

Excellence in Academics Award — 1st Position in B.Sc. Hons. Microbiology, II-Year (2018-2019) — Ram Lal Anand College, University of Delhi *2021*

Certificate of Appreciation — Most Active Participation in 30-hour Online Certificate Course on "Science Writing and Research Ethics" — Ram Lal Anand College *2020*

3rd Prize, Poster Presentation — "DNA-free Editing: Promises and Potential" — National Seminar on "Metagenomics and Genome Editing," Department of Microbiology, Ram Lal Anand College (DBT-sponsored) *2020*

Leadership Roles

PhD Student Representative, Infectious Diseases Lab, A*STAR *2024-26*
• Advocated for 10+ doctoral candidates on academic, research support, and professional development issues
• Organized monthly town halls with 30-40% student participation

President, Infectious Diseases Translational Research Programme (ID-TRP), Yong Loo Lin School of Medicine *2022-23*
• Elected President by peer vote; managed program activities and professional development
• Organized 12+ scientific work-in-progress seminars featuring various PhD and post-doctoral researchers
• Coordinated mentorship program pairing 25 junior members with senior researchers

Co-Head, Promotion and Publicity, BioSoc-DTU *2020-21*
• Led digital and physical promotion campaigns for biology student society
• Increased event attendance by 35% and social media following by 150%

Vice President, National Service Scheme (NSS) Unit, Ram Lal Anand College *2019-20*
Volunteer Hours: 120+ hours
• Coordinated volunteer activities and community outreach programs
• Managed team of 100+ student volunteers on educational initiatives

Treasurer, Society of Mikrobiologika, Department of Microbiology, Ram Lal Anand College *2017-18*
• Managed society budget and organized 6 professional development events
• Coordinated departmental seminars and student networking activities

Workshop Organization: "Foldscope: An Educational and Research Tool"
• Organized and facilitated workshop for 50+ participants on low-cost microscopy innovation
• Department of Microbiology, Ram Lal Anand College, in collaboration with Department of Biotechnology, Government of India (DBT-funded project)

SKILLS

Languages:
English – Full Professional Proficiency
Hindi – Native/Professional Working Proficiency

Laboratory skills:
Bacteriology and Microbiology
Molecular Biology and Molecular Cloning
Statistical Analysis and Data Processing
Animal Models

REFERENCES

Professor Pablo Bifani
Nanyang Technological University
A*STAR Infectious Diseases Lab
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Professor Paul A Macary
National University of Singapore
Microbiology and Immunology
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Professor Prerna Diwan
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