Deepali Luthra

Ph.D. Candidate
Microbiology and Molecular Genetics
Oklahoma State University, Stillwater, OK

☎ +1(636) 579-3450
✉ deepali.luthra@okstate.edu
deepali-luthra
deepali-luthra

SUMMARY

- Over 9 years of expertise in Biotechnology and Microbiology research (R&D) with interdisciplinary knowledge of Cell Biology, Bacteriology, Host-Pathogen interactions, Microbial Physiology, Genetics, Protein Science, and Diagnostics.
- Hands-on experience in Molecular Biology tools (DNA/RNA/Protein), mammalian Cell Culture, Fluorescent and Electron Microscopy, Transcription and Translation studies, Antimicrobial Resistance (AMR), Development of Diagnostic kits, and Bioinformatics.
- Experience working with cross-functional teams (Scientists, Microbiologists, Biochemists, Professors, and Students).

EDUCATION

Ph.D. Candidate, Microbiology and Molecular Genetics, Oklahoma State University — Aug 2017-Present
M.Sc., Microbiology, Punjab Agriculture University, India — 2013-2015
B.Sc., Microbiology, Panjab University, India — 2010-2013

RESEARCH EXPERIENCE

Research Assistant, **Oklahoma State University**, Stillwater, OK — Aug 2017-Present
Advisor: Tyrrell Conway
Project: **Host-pathogen interactions of *Pseudomonas aeruginosa* with lung epithelial cells.**

- Studied the role of Ca^{2+} and Ca^{2+}-binding proteins in host-pathogen interactions of *Pseudomonas aeruginosa* with lung epithelial cells (adenocarcinoma alveolar basal epithelial A549 cells and CuFi-5 bronchus lung epithelial cells CuFi-5, with homozygous F508 mutation as in CFTR protein in cystic fibrosis).
- Studied Ca^{2+} stimulated upregulation of adherence, invasion, intracellular survival and escape of *P. aeruginosa* strains and its clinical isolates during infection.
- Trancriptomics analysis conducted (RNA-seq and RT-qPCR) to study the expression of virulence genes during infection and its significance in Cystic Fibrosis.
- Studied the abundance of *P. aeruginosa* proteins and signaling molecules affected during adherence and invasion of epithelial cells.
- Screened Cystic Fibrosis clinical isolates for *P. aeruginosa*, followed by testing virulence (biofilm formation, antimicrobial resistance against antibiotics) and the effect of Ca^{2+} on virulence of *P. aeruginosa* (reactive oxygen species generation, cytotoxicity to epithelial cells, flagella of *P. aeruginosa*).
- Roles and responsibilities included but not limited to handling cell culture and blood-borne pathogens, planning and conducting experiments, documenting standard operating procedures (SOP) and material safety data sheets (MSDS) in compliance with EHS.

Senior Research Fellow, **Institute of Microbial Technology,** CSIR, India — May 2016 - Jun 2017
Advisor: Dr. Ramya T.N.C
Project: **Characterization of ST6GalNAc sialyltransferases from *E.coli* for possible use in the synthesis of the clinically relevant human milk oligosaccharide, Disialyllacto-N-tetraose (DSLNT).**

- Cloned and optimized expression of human sialyltransferase gene, ST6GalNAcI in multiple expression vectors, using several *E. coli* expression strains such as BL21(DE3), *E. coli* Shuffle T7 and *E. coli* Origami 2, followed by purification of the recombinant protein by various chromatography techniques.
- Biochemically characterized recombinant sialyltransferases using ELISA for further robust synthesis of medically relevant sialylated oligosaccharides.
- Roles and responsibilities included but not limited to standardizing protocols, spending long hours handling protein samples at 4°C, maintaining record of experiments and facilitating group discussions.

Graduate Student Researcher, **Punjab Agricultural University**, India Jul 2013 - Dec 2015
Advisor: Dr. Param Pal Sahota
Project: **Microbiological analysis of raw salad vegetables and development of Bacteriological Food Testing Kit (BFTK).**

- Developed a Bacteriological Food Testing Kit (BFTK) to detect the indicator/emerging food-borne pathogens in 1000+ food samples. BFTK validated by the Bureau of Indian Standards and Patent filed as per the guidelines of the Indian Patent Authority.
- Conducted epidemiological surveillance and molecular characterization of 9 recurrent and emerging foodborne pathogens (*Escherichia coli, Listeria monocytogenes, Staphylococcus aureus, Shigella spp., Salmonella spp., Aeromonas hydrophila, Yersinia enterocolitica, Campylobacter jejuni* and *Bacillus cereus*) in 1000+ food and vegetable samples.
- Evaluated recurrent indicators and emerging foodborne bacterial pathogens by biochemical characterization, virulence testing (multiplex PCR), and generation of antibiogram (multiple antibiotic resistance (MAR) indices).
- Standardized a separation and concentration method of food-borne pathogens to concentrate samples up to 25-fold for rapid detection and growth.
- Roles and responsibilities included conducting and troubleshooting experiments, handling bacterial pathogens in high-risk environments, critically analyzing sensitive data, and working with internal and external groups to validate diagnostic kit for patent purposes in a timely manner.

PUBLICATIONS/PATENTS

1. Sahota, PP, **Luthra, Deepali**, and Sood B. Bacteriological Food Testing Kit (BFTK) for rapid and efficient detection of the presence/absence of recurrent indicator and emerging pathogens in food samples. **Indian Patent 201711032209** (Filed: March 15th, 2019)
2. **Luthra, Deepali**, Patrauchan, M., and Lutter, E. Understanding Host-Pathogen Interactions of Pseudomonas aeruginosa with Lung Epithelial Cells Microscopy and Microanalysis, 28(S1), 1382-1383 (2022) (Abstract paper for Microscopy and Microanalysis conference).
3. Shaw, J, Shaw E, Holcomb C, **Luthra, Deepali**, and Lutter, E. Cytoskeletal Reorganization by Obligate Intracellular Pathogen in Obligate Intracellular Pathogens – Physiology, Virulence, and Interactions with the Human Host., Springer Nature (2022) (Under review).
4. **Luthra, Deepali**, Lutze T, Khanam S, Kubo A, Patrauchan M, and Lutter E. Calcium Stimulated Upregulation of Host Adherence of *Pseudomonas aeruginosa* during Infection (Manuscript to be submitted).
5. Zhang Y, **Luthra, Deepali**, Patrauchan M, and Lutter E. Effect of Calcium on Invasion, intracellular survival and escape of *Pseudomonas aeruginosa* (Manuscript under preparation).
6. Starr, W, King A, **Luthra, Deepali**, Elshy R, and Lutter E. Antibiotic resistance of *Pseudomonas aeruginosa* recovered from sputum of Cystic Fibrosis patients (Manuscript under preparation).

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SKILLS

Microbiology	Molecular biology techniques (DNA/RNA/Protein) | Cell Culture | Host-pathogen interactions | Microbial Pathogenesis | Cell based assays | Immunocytochemistry | Infection Studies | Microbial Genetics | Cell Biology | Bioinformatics analysis | Recombinant DNA technology | Cloning | qPCR | RT- qPCR | Polymerase Chain Reaction (PCR) | Gel electrophoresis | Antimicrobial Resistance (AMR) | Sequencing | Protein expression + purification | Affinity chromatography | SDS-PAGE | Western Blotting | Protein structure modeling.
Microscopy	Fluorescence Microscopy | Live cell imaging | Scanning Electron Microscopy (SEM) | Transmission Electron Microscopy (TEM) | Atomic Force Microscopy (AFM) |
Softwares/Tools	GraphPad Prism | DNAMAN | PyMOL | Leica LAS EZ | Leica LAS X | ImageJ | I-TASSER | Adobe Photoshop | ExPASy | TeXStudio | Microsoft Office | RStudio
Coding	R | LaTeX
Miscellaneous	Independent Experimental Design | Data analysis | Image processing | Critical Literature Review | Good Documentation Practices | Development of Diagnostic Kits

AWARDS AND HONORS

1. **Robberson Summer Dissertation Fellowship**, Graduate College, OSU, OK. 2022
2. **Travel award**, Microscopy and Microanalysis 2022, Portland, OR 2022
3. **Best Graduate Student Abstract and Oral Presentation**. 9^{th} Annual Oklahoma Centre for Respiratory and Infectious Disease (OCRID) Research Symposium (*Virtual*). 2022
4. **Third Place Graduate Student Medical Microbiology Presentation**, Meeting of the Missouri Valley Branch of the American Society of Microbiology (MV-ASM), Stillwater, OK. 2022
5. **ASM Student and Postdoctoral Travel Award** for World Microbe Forum, National Conference, American Society of Microbiology (ASM) and Federation of European Microbiological Societies (FEMS) collaboration. 2021
6. **Grula Distinguished Graduate Fellowship**, Microbiology and Molecular Genetics, OSU, OK. 2021
7. **Otto S. Cox Graduate Fellowship for Genetic Research**, Vice President of Research, OSU, OK. 2021
8. **Timpano Award for Best Student Oral Presentation**, Annual Spring Meeting, Oklahoma Microscopy Society, OK 2021
9. **Best Student Micrograph Award** Annual Spring Meeting, Oklahoma Microscopy Society, OK. 2021
10. **First Place, Best Graduate Oral Presentation**, Microbiology and Molecular Genetics, OSU, OK. 2021
11. **Kent Sampson Scholarship**, Leader-Scholar Scholarship Program, Residential Life, OSU, OK. 2019
12. **Outstanding Graduate Poster Presentation**, 108^{th} Technical Meeting of the Oklahoma Academy of Sciences, University of Central Oklahoma, OK. 2019
13. **First Place and People's Choice Award, 3-minute flash talk presentation**, 7^{th} Annual Symposium of Structural Biology. Oklahoma University, OK. 2019
14. **First Place, Graduate Poster Presentation**, Annual Symposium, Microbiology and Molecular Genetics, OSU, OK. 2019
15. **Second Place, Graduate Poster Presentation**, Meeting of the Missouri Valley Branch of the American Society of Microbiology (MV-ASM), Omaha, NE. 2019
16. **Merit Scholarship**, M.Sc., Punjab Agricultural University, Ludhiana, PB, India. 2014-2015

TEACHING EXPERIENCE

Teaching Assistant, MICR 4003, **Brewing Microbiology Grader** Spring 2022
Teaching Assistant, MICR 4053/5053, **Pathogenic Microbiology Grader** Spring 2021, 2022
Teaching Assistant, MICR 4052, **Pathogenic Microbiology Laboratory** Fall 2020, 2021
Teaching Assistant, MICR 2132, **Introduction to Microbiology** Fall 2017, 2018, Spring 2019

STUDENT ADVISING AND MENTORSHIP

Research Mentor, Oklahoma State University Dec 2018- Present
Individually supervised students over summer and semester-long research projects.
Co-designed experiments and mentored in research (★ indicates co-authorship in peer-reviewed papers).
Microbiology Undergraduate★, Oklahoma State University Jan 2021- Sept 2022
Nutrition Science Undergraduate★, Oklahoma State University Jan 2021- Jan 2022
Microbiology Undergraduate, Oklahoma State University Jan 2020- Dec 2020
Zoology and Biology Undergraduate, Oklahoma State University Fall, 2019

Teaching Mentor, Oklahoma State University Fall 2017-Fall 2020
Mentored 5 undergraduate students for teaching in Introduction to Microbiology and Pathogenic Microbiology lab courses.

SERVICE AND LEADERSHIP

Judge, (*Undergraduate Posters*) Microbiology Annual Research Symposium, OSU 2019, 2022
Judge, (*Undergraduate Posters*) Joint Meeting of the Missouri and Missouri Valley Branches of the American Society of Microbiology, OSU 2021, 2022
Judge, (*Veterinary research posters*), Summer Research Training Program, Veterinary Medicine, OSU 2021
Vice President, Graduate Student Association, Microbiology and Molecular Genetics, OSU 2018-2019
Judge,(*Undergraduate Posters*) Wentz Research Symposium, OSU. 2018, 2019
Proctored exams (*Undergraduate and graduate courses*) Microbiology, OSU. 2018- 2021
Volunteer, Indian Student Association, OSU 2018- 2022
Volunteer, National Agriculturist's Awareness Event '*Kisan Mela*', Punjab Agricultural University, Ludhiana, India. 2013-2015

SELECTED CONFERENCE PRESENTATIONS (7 out of 28)

International

- *i*Poster, World Microbe Forum, American Society of Microbiology (ASM), and Federation of European Microbiological Societies (FEMS) collaboration (Virtual). Jun 20-24, 2021.

National

- Invited Talk, Microscopy and Microanalysis (M&M 2022), Microscopy Society of America, Portland, OR, Aug 2022
- Poster, ASM Microbe 2022, American Society of Microbiologists, Washington, D.C. Jun 2022

Regional

- Contributed Talk, 9th Annual Oklahoma Centre for Respiratory and Infectious Disease, OCRID Research Symposium, Apr 5-6th, 2022
- Micrograph Competition, 2021 Oklahoma Microscopy Society Annual Spring Meeting, Oklahoma University. April 22-23, 2021.
- 3 Minute Thesis Competition, College Finals, College of Arts and Sciences, Oklahoma State University, Stillwater, OK. Nov 4, 2019.
- Poster, Joint meeting of Missouri and Missouri Valley Branches of American Society of Microbiologists (ASM), at Omaha, Nebraska. Mar 15-16th, 2019.

PROFESSIONAL MEMBERSHIPS

Microscopy Society of America (MSA)	2022-2023
American Society of Microbiology (ASM) National Membership	2021-2023
Oklahoma Microscopy Society (OMS)	2021-2023
American Society for Microbiology (ASM), Missouri Valley Branch	*2018-Present*
Microbiology and Molecular Genetics Graduate Student Association (MMG-GSA), OSU	2017-Present
Indian Student Association (ISA), Oklahoma State University	2017-2023
Indian Society of Microbiologists (ISM)	2013-2017

REFERENCES

Tyrrell Conway
Regents Professor
Oklahoma State University
Stillwater, OK
Email : tconway@okstate.edu
Tel: 405-744-6243

Matthew Cabeen,
Assistant Professor,
Oklahoma State University
Stillwater, OK
Email : matthew.cabeen@okstate.edu
Tel: 405-744-6652

Babu Fathepure
Professor
Oklahoma State University
Stillwater, OK
Email : babu.fathepure@okstate.edu
Tel: 405-744-7764