

Saroj Khadka

Graduate Student Researcher

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Summary

Biomedical Science PhD candidate with strong research experience in bacterial virulence mechanisms, host-pathogen interactions, and microbial gene regulation. Skilled in molecular biology and microbiological techniques, mentoring and science communication. Motivated to build an independent career in biomedical research.

Education

- PhD** **University of Pittsburgh**, PhD in Microbiology and Immunology – Pennsylvania, PA, USA Jan 2024 – Jan 2026
- Thesis: Mechanisms and Regulation of *Klebsiella pneumoniae* Capsular Polysaccharide Chain Length and Attachment.
 - Advisor: Dr. Laura A. Mike
- MSc** **Tribhuvan University**, MSc in Medical Microbiology – Kathmandu, Nepal Jan 2017 – Jan 2019
- Thesis: Susceptibility to Fluoroquinolones and gyrA ser83 Mutation in *Salmonella enterica* serovar Typhi at a Referral Hospital of Kathmandu Valley.
 - Advisor: Dr. Megharaj Banjara

Experience

- University of Pittsburgh**, Graduate Student Researcher – Pennsylvania, PA, USA Jan 2024 – Jan 2026
- Investigate molecular mechanisms regulating *Klebsiella pneumoniae* capsular polysaccharide attachment and chain length.
 - Develop and optimize experimental techniques for bacterial exopolysaccharide research.
 - Present research findings at departmental, regional, and national scientific conferences.
 - Mentor undergraduate researchers in laboratory techniques, experimental workflows, and project design.
- B-Sure Path Lab & Diagnostic Centre**, Molecular Biologist – Biratnagar, Nepal Jan 2020 – Jan 2021
- Performed routine qRT-PCR testing for COVID-19 diagnosis from clinical specimens.
 - Trained newly recruited laboratory technicians in molecular diagnostic techniques and workflows.
 - Managed patient records, diagnostic reporting, and laboratory quality control in compliance with National Public Health Laboratory (Nepal) guidelines.
 - Coordinated diagnostic reporting with the Ministry of Health COVID-19 Crisis Management Center.
- Newton Higher Secondary School**, Secondary School Teacher – Kathmandu, Nepal Jan 2018 – Jan 2019
- Taught Science and Mathematics to Grade 8 students.
 - Designed and administered tests, and prepared test score reports to track student progress.
 - Facilitated parent-teacher meetings to discuss student development and address concerns.
 - Proctored final examinations and National Education Board exams for Grade 8 and Grade 10 students.
- Kathmandu Model Hospital**, Intern Medical Microbiologist – Kathmandu, Nepal Jan 2018 – Jan 2019
- Conducted routine clinical microbiological tests for pathogen isolation and identification in clinical specimens.
 - Maintained culture collection and surveillance records of multidrug-resistant bacterial isolates for national reporting.
 - Performed monthly and quarterly quality assurance assays as required by National Public Health Laboratory.
 - Performed hospital environmental pathogen monitoring.

Awards

- MMI Research Fellowship Award** Jan 2024
Awarded by the Department of Medical Microbiology and Immunology, University of Toledo to graduate students who have received a pre-doctoral fellowship before thesis defense.
- MMI Research Scholar Award** Jan 2024
Awarded by the Department of Medical Microbiology and Immunology, University of Toledo to graduate students with a first-author research manuscript accepted or published before thesis defense.

AHA Predoctoral Fellowship

Jan 2023

Two-year fellowship awarded by the American Heart Association (AHA) in the form of stipend support to PhD students pursuing research aimed at advancing human health and well-being.

Graduate Research Award

Jan 2024

Awarded by the Department of Medical Microbiology and Immunology, University of Toledo to graduate students with a first-author research manuscript accepted or published before thesis defense.

Publications

Sugar-Import Suppresses *Klebsiella pneumoniae* mucoidy in cAMP-CRP-dependent Manner

This study demonstrates a new regulatory mechanism of *Klebsiella pneumoniae* mucoidy. Here, we show that sugars suppress mucoidy upon import which downregulates rmpADC expression and increases capsule chain length diversity, and as result suppresses mucoidy.

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Urine-mediated Suppression of Hypermucoviscosity is Counteracted by Wzc Mutations

In the second paper, he applied the quantum theory to light to explain the photoelectric effect. In particular, he used the idea of light quanta (photons) to explain experimental results, but stressed the importance of the experimental results. The importance of his work on the photoelectric effect earned him the Nobel Prize in Physics in 1921.

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Skills

Physics

Languages

Nepali

Native speaker

English

Fluent

Certificates

Machine Learning

Jan 2018

Projects

Systems controlling *Klebsiella pneumoniae* capsular polysaccharide chain length and attachment

Jan 2022 – Jan 2026

Currently investigating the mechanisms and regulatory pathways governing *Klebsiella pneumoniae* capsule attachment and chain length using various molecular biology and biochemical analytical tools. The ongoing projects aim to unravel the bacterial factors and signaling pathways involved in *K. pneumoniae* capsular polysaccharide attachment and chain length regulation and their impact on bacterial pathogenesis.

- Advisor: Dr. Laura A. Mike

Susceptibility to Fluoroquinolones and *gyrA* ser83 mutation in *Salmonella enterica* Serovar Typhi at a Referral Hospital of Kathmandu Valley

Jan 2018 – Jan 2019

Conducted a hospital-based study on the prevalence of *Salmonella* Typhi in febrile patients visiting the Kathmandu Model Hospital and evaluated resistance to fluoroquinolones associated with *gyrA* ser83 mutation in *Salmonella* Typhi and Paratyphi isolated from the patients.

- Advisor: Dr. Megharaj Banjara

References

Dr. Laura A. Mike

Assistant Professor, University of Pittsburgh, USA. Email laura.mike@pitt.edu

Dr. Megharaj Banjara