LIWEI FANG, Ph.D.

Department of Biological Sciences,
Western Kentucky University
Bowling Green, KY 42101
Email: liwei.fang@wku.edu

CURRENT POSITION

Western Kentucky University — Bowling Green, KY
Assistant Professor — August 2025-Present

EDUCATION

University of Wisconsin- Milwaukee — Milwaukee, WI
Ph.D. in Biological Sciences — August 2019
Dissertation: Mechanism of Anti-Virulence Compound 187R Inhibiting *Pseudomonas Aeruginosa* Type III Secretion System

Northeastern University — Boston, MA
M.S. in Regulatory Affairs for Drugs, Biologics and Medical Devices — May 2013

Zhejiang Chinese Medical University — Hangzhou, China
B.S. in Biotechnology — June 2009

AWARDS

Chancellor's Graduate Student Fellowship — 2013-2018

MENTORING AND TEACHING EXPERIENCE

Mentoring
University of Illinois Chicago
Loyola University Chicago
Mentor for Graduate student and rotation student.

- Mentored graduate student's thesis project focusing on determination of MroQ topology
- Instructed graduate students basic and advanced molecular microbiology techniques including bacterial culture, cloning, protein and peptide extraction, Western blot and testing production of autoinducer as well as experimental design and troubleshooting.

University of Wisconsin-Milwaukee
Served as mentor and supervisor for three technicians

- Instructed them in establishing fast screen system for antimicrobial compound against bacterial and fungal pathogen.
- Taught them how to screen for antimicrobial compound *in vivo* using a silkworm infection model.
- Assisted them in designing experiments and testing the efficacy and toxicity of new antimicrobial compound *in planta*.

Teaching
University of Wisconsin-Milwaukee
Lab Instructor, Elements of Biology — Spring 2019

- Instructed non-biology and biology majors in fundamental biology laboratory skills and research methods.
- Prepared and graded assessments to evaluate student understanding.

Teaching Assistant, Laboratory Techniques in Molecular Biology Fall 2018
- Assisted with lab exercises and reagent preparation for molecular biology techniques.

Teaching Assistant, Experimental Microbiology Spring 2017, 2018
- Designed and taught the introduction of bioinformatics session focusing on microbial communities.
- Taught advanced molecular microbiology general theory, experimental design, techniques, and demonstrated experimental procedures.
- Prepared reagents, equipment and other material required for the class.

Lab Instructor, General Survey of Microbiology Fall 2016-Spring 2018
- Instructed two lab sessions per semester of General Survey of Microbiology independently.
- Introduced the general theory and experimental principle of the experiments. Taught students entry level microbiology experimental skills. Prepared and graded quizzes and exams. Evaluated students' practical exams.

Lab Instructor, General Microbiology Fall 2017
- Instructed two lab sessions per semester General Microbiology independently.
- Delivered lectures and hands-on teaching in advanced microbiology labs.
- Prepared and graded assessments to evaluate student understanding.

Lab Instructor, Anatomy and Physiology I Fall 2013-Spring 2015
- Instructed two lab sessions per semester of Anatomy and Physiology I class for biology, anthropology, and nursing students.
- Delivered lectures, demonstrated experiments, and provided hands-on guidance for laboratory techniques.
- Prepared, administered, and graded quizzes and exams. Evaluated student performance in lab activities.

RESEARCH EXPERIENCE

Postdoctoral Research Associate
University of Illinois Chicago, Chicago, IL August 2022-July 2025
Loyola University Chicago, Maywood, IL August 2020-July 2022
Mentor: Dr. Francis Alonzo III

Mechanism of *Staphylococcus aureus* quorum sensing peptide maturation and transport.
- Analyzed the function of CAAX membrane protease, MroQ, and discovered its post-translational regulatory mechanism in *S. aureus* quorum sensing signal peptide processing and maturation using molecular biology and biochemical approaches.
- Explored the mechanism of quorum sensing autoinducing peptide release and identified key components of peptide export.
- Solved the topology of MroQ using substituted cysteine accessibility method.
- Uncovered the regulatory mechanism of MroQ and its role in other cellular processes beyond quorum sensing.

- Identified potential protein-protein interaction partners of MroQ by co-immunoprecipitation, mass spectrometry.

Regulation of the lipoic acid salvage pathway and its potential function(s) in *S. aureus* metabolism and pathogenesis.

- Examined host factors associated with the activation of the lipoic acid salvage pathway.
- Evaluated the role of lipoic acid biosynthesis genes during *S. aureus* pathogenicity.
- Characterized gene(s) involved in lipoic acid biosynthesis and metabolism.

Postdoctoral Research Associate
University of Wisconsin-Milwaukee, Milwaukee, WI October 2019-May 2020
Mentor: Dr. Ching-Hong Yang

Development of new antimicrobial agents against plant and human pathogens from natural compounds.

- Isolated previously unculturable bacteria from soil.
- Screened antimicrobial natural compounds from isolated soil bacteria against *S. aureus*, *P. aeruginosa* and *Erwinia amylovora*.
- Tested the toxicity and efficacy of screened antimicrobial compounds against methicillin-resistant *S. aureus* (MRSA) using silkworm infection models.
- Evaluated the impact of an anti-virulence compound against *E. amylovora* on plant microbial communities.
- Assessed toxicity and efficacy of antimicrobial compounds against multiple plant pathogens *in planta*.

Graduate Student
University of Wisconsin-Milwaukee, Milwaukee, WI August 2013-August 2019
Mentor: Dr. Ching-Hong Yang

Mechanisms of anti-virulence compounds inhibiting the Type III Secretion Systems of *Pseudomonas aeruginosa* and *Xanthomonas oryzae* pv. *oryzae*.

- Discovered potent novel anti-virulence compounds against *P. aeruginosa* by screening a synthetic compound library; examined compound efficacy and toxicity using HeLa cells.
- Determined the inhibitory mechanism of novel anti-virulence compounds using a combination of RNA-seq and molecular biology methods (e.g., mutagenesis, reporter plasmid construction, Western Blot, real time reverse transcription-PCR).
- Examined the effects of anti-virulence compounds on host-associated microbiota using Illumina sequencing and Biolog EcoPlate.

Mechanisms of negative plant-soil feedback.

- Analyzed the impacts of soil microbial community on the biodiversity of tropical forest ecosystem using next generation sequencing (i.e., bacterial 16S rRNA and fungal ITS region sequencing).

Undergraduate Research Assistant
Zhejiang Chinese Medical University, Hangzhou, China June 2007-September2008
Mentor: Dr. Zhishan Ding

Analyzed camptothecin production (an anti-cancer compound) in *Nothapodytes nimmoniana* tissue cultures using HPLC

LIST OF PUBLICATIONS

Acosta, IC., Albers, A., **Fang, L**., Serrato, G., Teoh, W.P., Glanville, D., Alonzo, F. III. *Staphylococcus aureus* exploits lipoic acid salvage to combat host oxidative stress. *Cell Reports.* Aug. 2025

Fang, L., Cosgriff, C., Alonzo, F. III. Determinants of maturation of the *Staphylococcus aureus* auto-inducing peptide. *Journal of Bacteriology.* Aug. 2024

Ding. X., Yan. Y., **Fang, L.**, Wang. S., Wu. Y. Trehalose 6-phosphate synthase gene rdtps1 contributes to thermal acclimation in *Rhyzopertha dominica. BMC Genomics.* Feb. 2024.

Fang, L., Banerjee, B., Yuan, X., Zeng, Q., Liang, C., Xin, C., Yang, CH. Genetic and Environmental Investigation of a Novel Phenylamino Acetamide Inhibitor of the *Pseudomonas aeruginosa* Type III Secretion System. *Applied and Environmental Microbiology.* Jan. 2023

Stock, M., **Fang, L**., Kaelie, J., Cosgriff, C., Teoh, W.P., Alonzo, F. III. Characterization of MroQ-Dependent Maturation and Export of the *Staphylococcus aureus* Accessory Gene Regulatory System Autoinducing Peptide. *Infection and Immunity,* Vol. 90, No. 10, Sept. 2022
Fan, S., Tian, F., **Fang, L**., Yang, CH., He, C. Transcriptional responses of *Xanthomonas oryzae* pv. *oryzae* to type III secretion system inhibitor *ortho*-coumaric acid. *BMC Microbiology,* No.163, July 2019

Shi,Y., Zhang, B., Lu, Y., Qian, C., Yan, F., **Fang, L**., Ding, Z., Chen, D. Antiviral activity of phenanthrenes from the medicinal plant *Bletilla striata* against influenza A virus. *BMC Complementary and Alternative Medicine.* Vol 17, No. 273, May. 2017

Gu, L., Wu, X., Yuan, X., **Fang, L.,** Zhang, C., Chen, X., Yang, CH. Regulation of type III secretion system inhibitors on virulence factors *of Pseudomonas aeruginosa* PAO1. *Microbiology China,* Dec. 2014

Shan, J., Wu, X., Yuan, X., **Fang, L.,** Liang, C., Chen, X., Yang, CH. The influence of cinnamic acid derivatives on the type III secretion system of *Pseudomonas aeruginosa* PAO1. *Microbiology China,* Dec. 2014

Fang, L. Study on Rapid Propagation and Effective Anticancer Constituents of *Nothapodytes nimmoniana*. *JOUR. OF ZHEJIANG FOR. SCI. & TECH*, pp. 27-29, Vol.28. No.6, Nov. 2008.

CONFERENCE PRESENTATIONS

Fang, L., Alonzo, F. III. "Study of MroQ-mediated post-translational modification of the quorum sensing peptide AgrD," International Conference on Gram-Positive Pathogens, Omaha, NE., Oct. 2022 (Poster)

Fang, L., Alonzo, F. III. "Study of MroQ-mediated post-translational modification of the quorum sensing pro-peptide AgrD," CSHL Microbial Pathogenesis and host response, Cold Spring Harbor, NY., Sept. 2023 (Poster)

Fang, L., Alonzo, F. III. “Study of MroQ-mediated post-translational modification of the quorum sensing pro-peptide AgrD,” Midwest Microbial Pathogenesis Conference, Chicago, IL., Oct. 2023 (Poster)

Fang, L., Alonzo, F. III. “Study of MroQ-mediated post-translational modification of the quorum sensing pro-peptide AgrD,” ASM microbes, Atlanta, GA., June. 2024 (Poster)