

Xuan FANG

Postdoctoral Researcher

in [linkedin.com/in/xuan-fang](https://www.linkedin.com/in/xuan-fang) @ xfang2@luc.edu

+1 312 972 7523 Chicago, IL

- > Biochemist and cell biologist with 9+ years of experience
- > 2+ years of experience in computational chemistry and programming (Python, Bash)
- > Experienced in developing, optimizing, and troubleshooting biochemistry and cell biology protocols including recombinant protein expression, FPLC, UV-vis spectroscopy, live cell imaging, and fluorescence microscopy
- > Extensive knowledge in enzymology, protein biochemistry, protein-ligand interaction, and protein-protein interaction
- > Goal-oriented team player who has established various collaborations with experts from different fields and mentored over 20 mentees from different levels
- > Capable of multi-tasking and managing multiple projects simultaneously

EDUCATION

Aug. 2014	Ph.D in Molecular Biochemistry and Biophysics, Illinois Institute of Technology (IIT), Chicago, IL, USA
Dec. 2019	
	> Advisor: Dr. Oscar Juarez, Co-advisor: Dr. David Minh
	> Thesis: Kinetic and structural characterization of the <i>Vibrio cholerae</i> flavin transferase ApbE
Sept. 2010	B.S in Biotechnology, Wuhan University of Technology (WHUT), Wuhan, Hubei, China
Jun. 2014	

PUBLICATIONS

1. Tuz, K., Li, C., **Fang, X.**, Raba, D. A., Liang, P., Minh, D. D. L., and Juarez, O. (2017) Identification of the catalytic ubiquinone-binding site of *Vibrio cholerae* sodium-dependent NADH dehydrogenase: a novel ubiquinone-binding motif. *J. Biol. Chem.* 292(7):3039-3048 doi: 10.1074/jbc.M116.770982
2. **Fang, X.**, Tuz, K., Liang, P., Raba, D., Rosa-Lemus, M., Chakravarthy, S., and Juarez, O. (2017) Kinetic characterization of *Vibrio cholerae* ApbE: substrate specificity and regulatory mechanisms. *PLoS One.* 12(10):e0186805
3. Liang, P., Rosas-Lemus, M., Patel, D., **Fang, X.**, Tuz, K., Juárez, O. (2018) Dynamic energy dependency of *Chlamydia trachomatis* on host cell metabolism during intracellular growth: Role of sodium-based energetics in chlamydial ATP generation. *J Biol Chem.* 293(2):510-522
4. Raba, D., Rosas-Lemus, M., Menzer, W., Li, C., **Fang, X.**, Liang, P, Tuz, K, Minh, D., Juárez, O. (2018) Characterization of the *Pseudomonas aeruginosa* NQR complex, a bacterial proton pump with roles in autopoisoning resistance. *J Biol Chem.* 293(40):15664-15677
5. **Fang, X.**, Osipiuk, J., Chakravarthy, S., Yuan, M., Menzer, W., Nissen, D., Liang, P., Raba, D. A., Tuz, K., Howard, A. J., Joachimiak, A., Minh, D. D. L. and Juarez, O. (2019) Conserved residue His-257 of *Vibrio cholerae* flavin transferase ApbE plays a critical role in substrate binding and catalysis. *J. Biol. Chem.* 294(37): 13800–13810
6. Raba, D. A., Yuan, M., **Fang, X.**, Menzer, W., Liang, P., Tuz, K., Minh, D. D. L. and Juarez, O. (2019) Role of subunit D in the ubiquinone binding site of *Vibrio cholerae* NQR: pocket flexibility and inhibitor resistance. *ACS Omega.* 4(21):19324-19331
7. Liang, P.* , **Fang, X.***, Hu, Y.* , Yuan, M., Raba, D. A., Ding, J., Bunn, D. C., Sanjana, K., Yang, J., Rosas-Lemus, M., Häse, C. C., Tuz, K., and Juárez, O. (2020) The aerobic respiratory chain of *Pseudomonas aeruginosa* cultured in artificial urine media: Role of NQR and terminal oxidases. *PLoS One.* 10.1371/journal.pone.0231965 *co-authors
8. Sun, B., **Fang, X.**, Johnson, C.N., Hauck, G., Kou, Y., Davis, J.P., Kekenos-Huskey, P.M. (2021) Non-canonical interaction between calmodulin and calcineurin contributes to the differential regulation of plant-derived calmodulins on calcineurin. *J. Chem. Inf. Model.* 61(10):5223-523
9. Seflova, J., Habibi, N.R., Yap, J.Q., Cleary, S.R., **Fang, X.**, Kekenos-Huskey P.M., Espinoza-Fonseca, L.M., Bossuyt, J.B., Robia, S.L. (2022) Fluorescence Lifetime Imaging Microscopy Reveals Sodium Pump Dimers in Live Cells. *J. Biol. Chem.* doi: 10.1016/j.jbc.2022.101865
10. Cleary, S.R., **Fang, X.**, Cho, E.E., Probadi, M.P., Seflova, J., Beach, J.R., Kekenos-Huskey, P.M., Robia, S.L. (2022) Inhibitory and stimulatory micropeptides preferentially bind to different conformations of the cardiac calcium pump. *bioRxiv* doi: <https://doi.org/10.1101/2021.06.15.448555> (submitted to J. Biol. Chem.)

11. Immadisetty, K., Fang, X., McCoy, T.P., Mirshahi, T., Delisle, B.P., Kekenus-Huskey, P.M. (2022) Prediction of hERG potassium channel PAS-domain variants trafficking via machine learning. *bioRxiv* doi: <https://doi.org/10.1101/2021.11.03.467212>

HONORS AND AWARDS

- 2017 **Starr/Fieldhouse Research Fellowship**
Awarded Project: Characterization and inhibition targeting a novel flavin transferase ApbE in pathogenic bacteria
* Highlighted research innovation and collaboration with the Argonne National Laboratory

CONFERENCES & TALKS

- 2022 **Chicago Regional Cardiovascular Research Symposium**, Chicago, IL, USA
Poster: Multiscale study of differential calcineurin activation by calmodulin isoforms
- 2021 **Department Seminar at Loyola University Chicago**, Chicago, IL, USA
Multi-Scale Investigation of Calmodulin Target Activation
- 2019 **Midwest Enzyme Chemistry Conference**, Chicago, IL, USA
Kinetic and Structural Characterization of the *Vibrio cholerae* Flavin Transferase ApbE
Biophysics Networking Symposium in Chicago, Chicago, IL, USA
Poster: Conserved residue His257 of *Vibrio cholerae* flavin transferase ApbE plays a critical role in substrate binding and catalysis
Undergraduate Course at IIT, Chicago, IL, USA
Introduction to Biology: Photosynthesis
Department Colloquium at IIT, Chicago, IL, USA
Kinetic and Structural Characterization of the *Vibrio cholerae* Flavin Transferase ApbE
- 2018 **Department Colloquium at IIT**, Chicago, IL, USA
Role of His257 of *Vibrio cholerae* Flavin Transferase ApbE
Midwest Enzyme Chemistry Conference, Chicago, IL, USA
Poster: Role of His257 of *Vibrio cholerae* Flavin Transferase ApbE
- 2017 **Department Colloquium at IIT**, Chicago, IL, USA
Characterization of the Novel Flavin Transferase Family ApbE
Midwest Enzyme Chemistry Conference, Chicago, IL, USA
Poster: Kinetic characterization of *Vibrio cholerae* ApbE: substrate specificity and regulatory mechanisms
- 2016 **Midwest Enzyme Chemistry Conference**, Chicago, IL, USA
Poster: Central role of His257 in the reaction mechanism of *Vibrio cholerae* ApbE flavin transferase

PROFESSIONAL EXPERIENCE

Jan. 2020
Present

Postdoctoral Researcher, Loyola University Chicago, Chicago, IL, USA

> Advisor: Dr. Peter Kekenos-Huskey

> Projects:

> Multiscale investigation of calmodulin-regulated pathways

- Study protein-protein interactions in the context of cell physiology using various computational tools including molecular docking, MD simulations, and systems modeling
- Characterize Ca²⁺ signaling proteins and their functional impacts *via* biochemical and cellular techniques including fluorescence spectroscopy, live-cell imaging, fluorescence microscopy, and single molecule FRET in multiple cell lines (HEK293T, BV2, RAW264.7, A7R5)
- Set up and manage wet lab that runs various biochemical and cellular experiments

> Automagik: a high-throughput automated data processing and fitting algorithm using Bayesian inference

- Develop and optimize an high-throughput automated cell detection algorithm (Python)
- Develop and optimize an high-throughput automated fitting algorithm (Python) applied to various microscopy data sets using Bayesian inference
- Bitbucket repository: <https://bitbucket.org/pkhlab/celldetection/src/master/>

> Prediction of hERG potassium channel PAS-domain variants trafficking *via* machine learning

- Extract protein features from MD simulations in an high-throughput automated manner (Bash)
- Evaluate machine learning algorithm performance using decision tree, random forest, and SVM models (Python)
- GitHub repository: <https://github.com/huskeypm/herg>

mammalian cell culture | transfection | fluorescence microscopy | single molecule FRET | enzyme kinetics | MD simulation | molecular docking | systems modeling | high-throughput cell detection | Bayesian inference | Python

May 2015
Dec. 2019

Graduate Researcher, Illinois Institute of Technology (IIT), Chicago, IL, USA

> Advisor: Dr. Oscar Juarez, Co-advisor: Dr. David Minh

> Projects:

> Kinetic and structural characterization of the *Vibrio cholerae* flavin transferase ApbE

- Construct, expressed and purified *Vibrio cholerae* membrane and soluble proteins using molecular cloning, *E. coli* recombinant expression system, FPLC affinity chromatography, FPLC gel filtration chromatography, SDS-PAGE, and western blotting
- Characterized enzyme functions *via* UV-vis spectroscopy, site-directed mutagenesis, gel filtration chromatography, BN-PAGE, and oximetry
- Obtained protein structural profiles through X-ray crystallography and SAXS (collaborative work with Argonne National Laboratory, PDB ID: 6NXI and 6NXJ)
- Studied protein-ligand binding using ITC (collaborative work with Horn lab at Northern Illinois University) and equilibrium dialysis
- Developed an innovative spectroscopy method to measure ApbE activity

> Identification and development of novel compounds inhibiting *Pseudomonas aeruginosa* SDH

- Expressed and purified *Pseudomonas aeruginosa* succinate dehydrogenase (SDH) using *E. coli* recombinant expression system, FPLC affinity chromatography, FPLC gel filtration chromatography, SDS-PAGE, and western blotting
- Built homology models of *Pseudomonas aeruginosa* and human SDH

pathogenic bacteria handling | protein expression & purification | site-directed mutagenesis | enzyme kinetics | UV-vis spectroscopy | X-ray crystallography | SAXS | ITC | homology modeling | molecular docking

Feb. 2016
Dec. 2018

Teaching Assistant, Illinois Institute of Technology (IIT), Chicago, IL, USA

> Courses: Human Biology, Metabolic Biochemistry, Biochemistry, Graduate Laboratory Techniques, Advanced Graduate Laboratory Techniques

> Responsibilities:

- Exam and assignment grading
- Lab class preparation and instruction

Feb. 2013 | **Undergraduate Researcher**, Wuhan Institute of Virology, Wuhan, Hubei, China
 May 2014

- > Advisor: Dr. Chaoyang Li
- > Project:
 - > Establishment and screening of galectin-3 knock-out M2 cell line
 - Construct plasmids that selectively knock out galectin-3 (gal-3) gene using the CRISPR/Cas system
 - Performed gal-3 knock-out and screening in M2 (RPM-MC) cell line

mammalian cell culture transfection molecular cloning CRISPR

SKILLS

Experiment	molecular cloning & site-directed mutagenesis, recombinant protein expression & purification, UV-vis spectroscopy, enzyme kinetics, SDS-PAGE & BN-PAGE & western blot, oximetry, pathogenic microorganism culture and handling, mammalian cell culture & transfection, live cell imaging, single molecule FRET
Computation	Python, Bash, homology modeling, MD simulation (packages used: AMBER, OpenMM, GROMACS), molecular docking, systems modeling, high-throughput automated cell detection, Bayesian inference, enzyme kinetics modeling and equation derivation, statistical analysis and data visualization
Interpersonal	multi-tasking, team player, fast learner, decision making, scientific writing, public speaking