Tong Wu, Ph.D.

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U.S. Permanent Resident

Education

Temple University, College of Science & Technology — Philadelphia, PA
Ph.D. in Physical Chemistry. GPA: 3.83/4.00 — September 2017-June 2022

Jilin University — China
Bachelor of Science with Outstanding Graduates Honors in Chemistry — September 2013-June 2017

Research Experience

Adjunct Research Assistant Professor — Philadelphia, PA
Temple University, Department of Chemistry — September 2017-June 2022

- Composed journal papers and grant applications
- Developed mathematical models and applied nonlinear least squares analysis to investigate the metabolism of antibiotic-resistant bacteria.
- Developed cancer diagnosis method based on membrane differences using nonlinear microscopy

Research Assistant (Ph.D. research) — Philadelphia, PA
Temple University, Department of Chemistry — September 2017-June 2022

- Utilized nonlinear optical spectroscopy and microscopy techniques to study interactions between molecules and cell membranes interface
- Developed mathematical models for drug metabolism
- Utilized nonlinear least squares analysis to fit model with up to 17 parameters
- Extracted valuable thermodynamic insights from the model
- Established protocols and mentored students in laboratory techniques, providing technical support to other labs as needed

Research Assistant — Jilin, China
Jilin University, State Key Laboratory of Supramolecular Structure and Materials — September 2015-May 2017

- Focused on rapid detection and analysis using surface-enhanced Raman Spectroscopy and microfluidic technologies for various applications
- Expertise in designing, fabricating, and testing microfluidic chips for efficient trace concentration detection

Publications

- **Wu, T.**, Wilhelm, M. J., Ma, J., Li, Y., Wu, Y., & Dai, H. L. (2022). Influence of Phase Transitions on Diffusive Molecular Transport Across Biological Membranes. *Angewandte Chemie - International Edition*, 61(e202205608).
- **Wu, T.**, Wilhelm, M. J., Li, Y., Ma, J., & Dai, H.-L. (2022). Indole Facilitates Antimicrobial Uptake in Bacteria. *ACS Infectious Diseases*, 8(6), 1124–1133 (Featured on Cover).
- Wilhelm, M. J., Sharifian Gh, M., **Wu, T.**, Li, Y., Chang, C. M., Ma, J., & Dai, H. L. (2021). Determination of bacterial surface charge density via saturation of adsorbed ions. *Biophysical journal*, 120(12), 2461–2470.
- Yang, L., **Wu, T.**, Fu, C., Chen, G., Xu, S., and Xu, W. (2016) SERS determination of protease through a particle-on-a-film configuration constructed by electrostatic assembly in an enzymatic hydrolysis reaction. *RSC Advances* 6: 90120–90125.

- Thesis: Influence of environmental factors on molecular transport through cell membrane
  Temple University, College of Science & Technology, 2022 (Advisor: Prof. Hai-Lung Dai)
- Thesis: Rapid detection of enzymatic hydrolysis reactions and pesticide residues using surface-enhanced Raman Spectroscopy and Microfluidics
  Jilin University, Department of Chemistry, 2017 (Advisor: Prof. Weiqing Xu)

Under Peer Review:

- **Wu, T.**, Wilhelm, M.J., Ma, J., Li, Y., and Dai, H.-L. Temperature effects on the permeability of living bacteria.
- **Wu, T.**, Wilhelm, M.J., Ma, J., Li, Y., Wu, Y., and Dai, H.-L. Asymmetry in the leaflets of the liposome membrane of E. coli lipid extract: structure, phase transition, and molecular adsorption
- **Wu, T.**, Chernikov, V., Lamb, G., Wang, Y., and Dai, H.-L. Auto-Mechanic Extruder for Liposome and Lipid-nanoparticle Preparation.
- **Wu, T.**, Wilhelm, M.J., Li, Y., and Dai, H.-L. Protocol for quantifying molecular interactions at the membrane surfaces of bacteria: Passive transport and saturated adsorption. STAR Protocols. (Invited Paper)

Talks & Posters

Talk: *Indole facilitates antimicrobial transport across the bacterial periplasm and cytoplasmic membrane.*
ACS meeting (Invited Talk), March 2022

Molecular adsorption and transport at living cell membranes by Second Harmonic Scattering.
Merck West Point Outreach Event, October 2021

Original Research Proposal: RNA-guided Cas9 Dynamics – A Study by Time-Resolved Second Harmonic Generation
Department of Chemistry, temple University, October 2021

Seminar:Identification of Transmembrane Asymmetry of Plasma Membrane Cholesterol by novel biosensors
Department of Chemistry, temple University, April 2019

Poster: *Extracellular Signaling Molecule Indole Increases Permeability of Bacterial Membranes* **(Best Poster)**
American Chemical Society (ACS) Younger Chemists Committee (YCC) Philadelphia section, 2020

SERS determination of protease through a particle-on-a-film configuration constructed by electrostatic assembly in enzymatic hydrolysis reaction
1st National Conference on Raman-based Biomedical Application at Wuhan University, China, 2016

Teaching & Mentoring Experience

Teaching Assistant Philadelphia, PA
Temple University, Department of Chemistry September 2017-August 2021

- General Chemistry II Recitation (1032)
- General Chemistry II Laboratory (1034)
- General Chemistry I Laboratory (1033)
- Introduction to chemical research techniques (3105)

Team Advisor/Supervisor Philadelphia, PA
Senior Design Project in College of Engineering August 2019-December 2020

- Invented and constructed an electronically controlled Extruder for liposome preparation
- Obtained FDA standard uni-lamellar nanoliposome and applied in research
- Mentored and guided students in research methodology and experimental techniques

Skills

- **Technical Skills:** Microfluidics, HPLC, Mass Spectroscopy (MS), Dynamic light scattering (DLS), Differential Scanning Calorimetry (DSC), Optical/Fluorescence/Nonlinear Optical Microscopy, Flow cytometry, UV-Vis, Bacteria/Human cell culture, Nano-lipid particle formation, Raman Spectroscopy
- **Software Skills:** Proficient in Python, Latex, Microsoft Package, Wolfram Mathematica, WaveMatrics Igor, ImageJ, ChemDraw; Experience with MATLAB, Origin, C, CUDA, Google Colab
- **Language Skills:** English – Full professional proficiency; Mandarin / Chinese – Native proficiency

Honors & Awards

Dissertation Grant Fellowship, Temple Dept. of Chemistry, 2022

2nd Place in Fall 2020 Top Senior Design Team Competition, Temple College of Engineering, 2021

Best Poster, ACS Philadelphia Section 2020 Expo Younger Chemists Committee Annual Meeting, 2020

Outstanding Graduates of Jilin University, 2017

Individual Scholarship of Jilin University, 2017

Excellent Psychological Counselor of Jilin University, 2016

The First Prize Scholarship of Jilin University, 2016 and 2015

Advanced Individual in College of Chemistry of Jilin University, 2015

Excellent Student Cadre Scholarship of Jilin University, 2014

The Second Prize Scholarship of Jilin University, 2014

Service

Part-time Counselor Jilin, China
Peer Mental Health Association, Jilin University May 2014-May 2015

- Organized seminars on mental health and stress management for students

Volunteer Teacher Longshan, Hunan Province
Supporting Education in Longshan County July 2014- August 2014

- Arranged emergency preparedness activities to respond to disasters
- Taught nature science class

Treasurer Jilin, China
Tedx in Jilin University December 2013-May 2015

- Responsible for seeking corporate sponsorship
- Handled the society's finances