

# Tong Wu, Ph.D.

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U.S. Permanent Resident

## Education

### Temple University, College of Science & Technology

*Ph.D. in Physical Chemistry. GPA: 3.83/4.00*

Philadelphia, PA  
September 2017-June 2022

### Jilin University

*Bachelor of Science with Outstanding Graduates Honors in Chemistry*

China  
September 2013-June 2017

## Research Experience

### Adjunct Research Assistant Professor

*Temple University, Department of Chemistry*

Philadelphia, PA  
June 2022-present

- 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)

*Temple University, Department of Chemistry*

Philadelphia, PA  
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 University, State Key Laboratory of Supramolecular Structure and Materials*

Jilin, China  
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

Temple University, Department of Chemistry

Philadelphia, PA  
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

Senior Design Project in College of Engineering

Philadelphia, PA  
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, WaveMetrics 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

*Peer Mental Health Association, Jilin University*

Jilin, China  
May 2014-May 2015

- Organized seminars on mental health and stress management for students

### Volunteer Teacher

*Supporting Education in Longshan County*

Longshan, Hunan Province  
July 2014- August 2014

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

### Treasurer

*Tedx in Jilin University*

Jilin, China  
December 2013-May 2015

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