

# PENGHSUAN (TIMO) HUANG

Madison, WI | (608) 977-3723 | penghsuan.huang@wisc.edu | [linkedin.com/in/penghsuanhuang](https://www.linkedin.com/in/penghsuanhuang)

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## PROFESSIONAL SUMMARY

Analytical chemist and PhD candidate with 7+ years of advanced mass spectrometry experience across LC-MS/MS, MALDI-MS, and ion mobility. Proven expertise in therapeutic protein characterization, biomarker discovery, and analytical method development in academic and industrial settings. Published researcher with 5 first/co-first and 10+ co-author papers in high-impact journals (Nature Methods, Nature Communications, ACS Central Science, Analytical Chemistry).

**\*\*US work authorization: No sponsorship required.\*\* Able to relocate. \*\***

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## TECHNICAL SKILLS

**MS Platforms:** Bruker TimsToF flex MALDI-2, MALDI-TOF/TOF, Thermo Orbitrap Fusion Lumos/Exploris/Eclipse, MALDI-MSI, DESI-MSI, ion mobility-mass spectrometry, SCIEX ZenoTOF 8600

**Chromatography & Sample Prep:** UHPLC-MS/MS, IEX chromatography, tissue cryosection, H&E staining, microscopy

**Quantitative Omics:** Bottom-up/middle-down/top-down proteomics, lipidomics, ADC/mAb/bsAb characterization, intact mass analysis, charge variant characterization, isobaric tag quantitation, DIA/DDA analysis (diaPASEF/ddaPASEF)

**Data Analysis:** MaxQuant, DIA-NN, Proteome Discoverer, Byonic, FragPipe, ProSight Native, Protein Metrics, Skyline, MS-DIAL, R, Python, MATLAB, GraphPad Prism

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## PROFESSIONAL EXPERIENCE

**Regeneron Pharmaceuticals, Inc. — Analytical Chemistry Group | Tarrytown, NY**

**PhD Internship** | May 2025 – Aug 2025 | Mentors: Tao Xing, Yuetian Yang, Shunhai Wang

- Developed and executed online electrochemical reduction method coupled with IEX separation for middle-down mAb analysis and mAb charge variant profiling.
  - Optimized MS/MS fragmentation methods (ET<sup>h</sup>CD and PT<sup>h</sup>CR) to increase sequence coverage and localize site-specific PTMs on CDR regions of mAbs, directly supporting candidate characterization workflows.
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## SELECTED PUBLICATIONS & PATENT

5 First/Co-First Author, 10+ co-author publications, 4 review papers | Full list: [Google Scholar](#) | [ORCID: Penghsuan Huang](#)

- Huang, P.;** Sardina, J.; Lu, H.; Currie, C.R.; Li, L. Proteome-wide analysis and surface protein isolation for secretome characterization: leaf-cutter ant *Acromyrmex echinatio*. *Analytical Chemistry* **2025**, 97 (51), 28281-28291. [Supp. Cover](#)
- Huang, P.;** Zhang, H.; Liu, Y.; Li, L. Rapid Characterization of Phospholipids using ITO-Coated Slide Assisted Enrichment MALDI Mass Spectrometry. *Analysis & Sensing* **2024**, 4 (3). [link](#)
- Huang, P.;** Huang, C. Y.; Lin, T. C.; Lin, L. E.; Yang, E.; Lee, C.; Hsu, C. C.; Chou, P. T. Toward the Rational Design of Universal Dual Polarity Matrix for MALDI Mass Spectrometry. *Analytical Chemistry* **2020**, 92 (10), 7139-7145. [link](#)

**Patent:** Hsu, C.-C.; Chou, P.-T.; Lee, C.; **Huang, P.;** et al. Use of Anthranilic Acid Derivative as Matrix for MALDI Mass Spectrometry. US20210066060A1 (2021). [link](#) | **Additional:** 4 oral & 8 poster conference presentations

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## EDUCATION

**University of Wisconsin–Madison** | PhD Candidate in Chemistry (Expected: May 2026) | Advisor: Prof. Lingjun Li

**National Taiwan University** | Bachelor of Science in Chemistry (June 2020) | Advisor: Prof. Cheng-Chih Richard Hsu

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## RESEARCH EXPERIENCE

**University of Wisconsin–Madison** | Jan 2022 – Present | Graduate Research Assistant

**ADC Characterization & Targeted Protein Degradation Analysis**

- Performed isobaric tagging-based quantitative proteomics to validate the efficacy of multiple RIPK1-targeting degraders across cell lines, contributing to a publication in [Journal of Medicinal Chemistry](#).

- Optimized MS methods for intact mass characterization of antibody-drug conjugates (ADC) incorporating DBCO-PEG<sub>3</sub>-NHS ester and azido-PEG linkers, supporting studies published in [Nature Communications](#) and [Angewandte Chemie](#).
- Developed and implemented top-down MS workflows for intact mass characterization and site-specific identification of NHS-PEG<sub>12</sub>-azide labeling on lysosome-targeting chimeras (LYTACs), contributing to a publication in [Advanced Science](#).

#### **MS Structural Elucidation (Metabolites, Lipids, and Glycans)**

- Established FFPE / fresh-frozen tissue extraction workflows for LC-MS-based structural elucidation of metabolites, lipids, and glycans; built an in-house spectral library supporting publications in [Nature Methods](#) and [Nature Communications](#).
- Adapted and applied the spectral library for on-tissue *in situ* MALDI-IM-MS/MS chemical structural elucidation.

#### **Proteome-Wide Analysis and Surface Protein Isolation for Secretome Characterization**

- Developed and validated advanced data-independent acquisition methods (diaPASEF/ddaPASEF) for comprehensive proteome profiling and quantification to understand developmental biology and biomineralization process.
- Established novel surface-bound protein isolation protocol enabling secretome characterization and biomarker identification for protein-protein interaction analysis and GO enrichment to translate MS data into mechanistic insights.

#### **Rapid Characterization of Phospholipids Using ITO-Coated Slide Enrichment**

- Designed and optimized high-throughput phospholipid enrichment method using ITO-coated slides, improving sample screening capacity for LC-MS/MS and MALDI-IM-MS.
- Developed and optimized MALDI-2 with ion mobility MS on Bruker TimsToF flex for accurate lipid identification and structural characterization.

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**National Taiwan University** | July 2018 – Feb 2021 | Undergrad Research Assistant & Full-time Scientist

#### **Toward the Rational Design of Universal Dual Polarity Matrix for MALDI MS**

- Designed and synthesized novel dual-polarity MALDI matrices enabling both positive and negative ion detection from single sample preparation with optimized matrix performance across multiple tissue sample types.
- Applied for and received US patent (US20210066060A1, 2021) based on novel matrix technology.

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### **SCIENTIFIC LEADERSHIP & MENTORSHIP**

**Instrument Manager & Scientific Leader** | Li Research Lab, UW-Madison | Mar 2022 – Present

- Managed Bruker TimsToF fleX: routine maintenance, user training, technical troubleshooting for 10+ lab members.
- Mentored 2 graduate students through research project completion: guided experimental design and supported manuscript preparation; wrote and maintained standard operating procedures (SOPs) for the MS instrument.

**Co-Organizer** | Wisconsin HUPO 2024 & IMSIS 2024 | Trainee Organizing Committee

- Co-led logistics/coordination for scientific conferences; engaged 100+ attendees and cross-institutional collaborators.

**Team Leader** | 2019 Winter Chemistry Camp, National Taiwan University | Sept 2018 – Feb 2019

- Organized educational programming for 100+ high school students; arranged hands-on chemistry experiments and visits to *Academia Sinica* (Taiwan) research facilities.

**Analytical/General Chemistry Course Teaching Assistant** | UW-Madison Department of Chemistry | Sept 2021 – June 2023

- Instructed and mentored 40–60 students per semester in lab practices, analytical techniques, and data analysis.
- Prepared and delivered weekly discussion sections on problem-solving and experimental design; Instructed and explained course materials and problem sets; Instructed group project lab; provided one-on-one consultation.

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### **FELLOWSHIPS & AWARDS**

Travel Grant, **GSFLC, UW–Madison** (Apr 2025); Educational Grant, **MSACL** (Mar 2024); Student Research Grant & Conference Funds, **UW–Madison** (Mar 2024); **LCY Group** College Student Research Award (Mar 2021); **Suu-Nien Fu Thesis Award**, 1st Place, **NTU** (Jun 2020); Outstanding Undergraduate Poster Award, **NTU** (Jun 2020); Travel Grants, **TSMS & NTU** (Feb, May 2020); Young Scientist Forum Best Presenter, **8th AOMSC** (Jan 2020).