Zhiwei Zhou, Ph. D.

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PROFESSIONAL EXPERIENCE

- Postdoctoral Scholar, Stanford University, Palo Alto, United States Jan. 2023 - Now
  Metabolomics; Microbiome; Bioinformatics
  Advisor: Prof. Dylan Dodd
- Research Scientist, Shanghai Institute of Organic Chemistry, Shanghai Apr. 2021 - Sep. 2022
  Interdisciplinary Research Center on Biology and Chemistry (IRCBC), SIOC, CAS
  Metabolomics; Metabolite annotation; Bioinformatics
  Advisor: Prof. Zheng-Jiang Zhu

EDUCATION

- Ph.D., Chinese Academy of Science, Shanghai, China Sep. 2015 - Jan. 2021
  Interdisciplinary Research Center on Biology and Chemistry (IRCBC), SIOC, CAS
  Dissertation: Ion Mobility-Mass Spectrometry based Metabolomics and Lipidomics
  Advisor: Prof. Zheng-Jiang Zhu
- B.S., Inner Mongolia University, Hohhot, China Sep. 2011 - Jun. 2015

FUNDING AND FELLOWSHIPS

- Postdoctoral and Early Career Support Award (No. 1245770-222-GHHEB), The Stanford Medicine Children's Health Center for Inflammatory Bowel Disease (IBD) and Celiac Disease, Stanford University, 01/2025 – 12/2026
- Dean's Postdoctoral Fellowship (No. 1044758-312-KARWY), School of Medicine, Stanford University, 01/2024 - 12/2024

TEACHING EXPERIENCES

- **Co-Instructor**: Microbiology and Immunology (M&I), Stanford University, April 2025
  - Served as a co-instructor in the class "Principles of Biological Techniques: Mass Spectrometry" for the PhD students in the M&I

AWARDS AND HONORS

- Basic Research Award, Stanford Pathology Research Retreat, Stanford University, Palo Alto, 2025
- Basic Research Award, Stanford Pathology Research Retreat, Stanford University, Palo Alto, 2024
- Basic Research Award, Stanford Pathology Research Retreat, Stanford University, Palo Alto, 2023
- Outstanding Poster Presentation Award, The 2nd Annual Conference for the Chinese Society of Metabolomics and International Symposium on Metabolomics, Shanghai, 2021

- Outstanding Graduate Student Award (Top 5%), University of Chinese Academy of Sciences, 2021
- China National Scholarship (Top 0.2%), China Government, 2019
- Outstanding Young Scientist Presentation Award, The 1st Annual Conference for the Chinese Society of Metabolomics and International Symposium on Metabolomics, Shanghai, 2019
- Chinese Academy of Sciences (CAS) President's Scholarship (Top 1%), University of Chinese Academy of Sciences, 2018
- Merit Student Award, University of Chinese Academy of Sciences, 2018
- Outstanding Young Scientist Presentation Award, The 3rd China Mass Spectrometry Conference, Xiamen, 2017
- Inner Mongolia Outstanding Undergraduate Award, Inner Mongolia Autonomous Region, 2015

PUBLICATIONS

First author publications:

1. **Z. Zhou**, Y. Liu, M. Wang, and D. Dodd*, IsoPairFinder: A tool for biochemical pathway discovery using stable isotope tracing metabolomics, ***Bioinformatics***, Under Review, 2025. bioRxiv [Preprint], DOI: 10.1101/2025.08.18.670916
2. **Z. Zhou**†, M. Luo†, H. Zhang, Y. Yin, Y. Cai, and Z.-J. Zhu*, Metabolite Annotation from Knowns to Unknowns through Knowledge-guided Multi-layer Metabolic Networking, **Nature Communications,** 2022, 13: 6656.
3. **Z. Zhou**, M. Luo, X. Chen, Y. Yin, X. Xiong, R. Wang, and Z.-J. Zhu*, Ion Mobility Collision Cross-Section Atlas for Known and Unknown Metabolite Annotation in Untargeted Metabolomics, **Nature Communications**, 2020, 11: 4334.
4. J. Tu, **Z. Zhou (Co-first author)**, T. Li, and Z-J. Zhu*, The Emerging Role of Ion Mobility-Mass Spectrometry in Lipidomics to Facilitate Lipid Separation and Identification, **Trends in Analytical Chemistry**, 2019, 116, 332-339.
5. **Z. Zhou**, X. Shen, X. Chen, J. Tu, X. Xiong, and Z.-J. Zhu*, LipidIMMS Analyzer: Integrating Multi-dimensional Information to Support Lipid Identification in Ion Mobility–Mass Spectrometry based Lipidomics, ***Bioinformatics***, 2019, 35, 698-700.
6. **Z. Zhou**, J. Tu, and Z.-J. Zhu*, Advancing the Large-Scale CCS Database for Metabolomics and Lipidomics at the Machine-Learning Era, ***Current Opinion in Chemical Biology***, 2018, 42, 34-41.
7. **Z. Zhou**, J. Tu, X. Xiong, X. Shen, and Z.-J. Zhu*, LipidCCS: Prediction of Collision Cross-Section Values for Lipids with High Precision to Support Ion Mobility-Mass Spectrometry based Lipidomics, ***Analytical Chemistry***, 2017, 89, 9559–9566.
8. **Z. Zhou**, X. Xiong, and Z.-J. Zhu*, MetCCS Predictor: a web server for predicting collision cross-section values of metabolites in ion mobility-mass spectrometry based metabolomics, ***Bioinformatics***, 2017, 33, 2235-2237.
9. **Z. Zhou**, X. Shen, J. Tu, and Z.-J. Zhu*, Large-Scale Prediction of Collision Cross-Section Values for Metabolites in Ion Mobility - Mass Spectrometry, ***Analytical Chemistry***, 2016, 88, 11084-11091.

Collaborative publications:

10. Y. Liu, **Z. Zhou**, J. Jarman, H. Chen, M. Miranda, R. Terkeltaub, and D. Dodd*, Gut bacteria degrade purines via the 2,8-dioxopurine pathway, ***Nature Microbiology*****,** 2025, DOI: 10.1038/s41564-025-02079-4
11. K. Sekiba, B. Hou, H. Chen, **Z. Zhou**, Y. Liu, A. Crawl-Bey, and D. Dodd*, High-throughput mass spectrometry reveals genetic determinants of nutrient acquisition in the gut bacterium Clostridium sporogenes, ***Nature Microbiology*****,** In Revision, 2025**.**
12. Y. Gao, M. Luo, H. Wang, **Z. Zhou**, Y. Yin, R. Wang, B. Xing, X. Yang, Y. Cai, Z.-J. Zhu, Charting unknown metabolic reactions by mass spectrometry-resolved stable-isotope tracing metabolomics, **Nature Communications**, 2025, 5059: 16.
13. Y. Liu, J. Jarman, Y.Low, H. Augustijn, S. Huang, H. Chen, M. DeFeo, K. Sekiba, B. Hou, X. Meng, A. Weakley, A. Cabrera, **Z. Zhou**, G. Wezel, M. Medema, C. Ganesan, A. Pao, S. Gombar, D. Dodd*, A widely distributed gene cluster compensates for uricase loss in hominids, **Cell**, 2023, 186: 16
14. M. Luo, Y. Yin, **Z. Zhou**, H. Zhang, X. Chen, H. Wang, and Z.-J. Zhu*, A Mass Spectrum-oriented Computational Method for Ion Mobility-resolved Untargeted Metabolomics, **Nature Communications**, 2023, 14: 1813.
15. Y. Cai, **Z. Zhou**, and Z.-J. Zhu*, Advanced Analytical and Informatic Strategies for Metabolite Annotation in Untargeted Metabolomics, **Trends in Analytical Chemistry**, 2023, 158: 116903.
16. W. Liu, W. Zhang*, T. Li, **Z. Zhou**, M. Luo, X. Chen, Y. Cai*, and Z.-J. Zhu*, Four-dimensional Untargeted Profiling of N-acylethanolamine Lipids in the Mouse Brain Using Ion Mobility-Mass Spectrometry, **Analytical Chemistry**, 2022, 94, 12472-12480.
17. R. Wang, Y. Yin, J. Li, H. Wang, W. Lv, Y. Gao, T. Wang, Y. Zhong, **Z. Zhou**, Y. Cai, X. Su, N. Liu*, and Z.-J. Zhu*, Global Stable-isotope Tracing Metabolomics Reveals System-wide Metabolic Alternations in Aging Drosophila, **Nature Communications**, 2022, 13: 3518.
18. X. Chen†, Y. Yin†, M. Luo, **Z. Zhou**, Y. Cai*, and Z.-J. Zhu*, Trapped Ion Mobility Spectrometry-Mass Spectrometry Improves the Coverage and Accuracy of Four-dimensional Untargeted Lipidomics, **Analytica Chimica Acta**, 2022, 1210: 339886.
19. T. Li, Y. Yin, **Z. Zhou**, J. Qiu, W. Liu, X. Zhang, K. He, Y. Cai, and Z.-J. Zhu*, Ion Mobility-based Sterolomics Reveals Spatially and Temporally Distinctive Sterol Lipids in the Mouse Brain, **Nature Communications**, 2021, 12: 4343.
20. H. Tsugawa , K. Ikeda, M. Takahashi , A. Satoh, Y. Mori, H. Uchino, N. Okahashi, Y. Yamada, I. Tada, P. Bonini, Y. Higashi, Y. Okazaki, **Z. Zhou**, Z.-J. Zhu, J. Koelmel, T. Cajka , O. Fiehn, K. Saito, M. Arita, and M. Arita*, A lipidome atlas in MS-DIAL 4, **Nature Biotechnology**, 2020, 38, 1159-1163.
21. X. Chen†, Y. Yin†, **Z. Zhou**, T. Li, and Z.-J. Zhu*, Development of A Combined Strategy for Accurate Lipid Structural Identification and Quantification in Ion-Mobility Mass Spectrometry based Untargeted Lipidomics, **Analytica Chimica Acta**, 2020, 1136, 115-124.
22. M. Luo, **Z. Zhou**, and Z.-J. Zhu*, The Application of Ion Mobility-Mass Spectrometry in Untargeted Metabolomics: from Separation to Identification, **Journal of Analysis and Testing**, 2020, 4, 163-174.
23. X. Chen, **Z. Zhou**, and Z.-J. Zhu*, The Use of LipidIMMS Analyzer for Lipid Identification in Ion Mobility-Mass Spectrometry-Based Untargeted Lipidomics, **Ion Mobility-Mass Spectrometry: Methods and Protocols**, 2020, 269-282

PATENTS

1. Z.-J. Zhu, **Z. Zhou**, A method for the identification of known and unknown metabolites, China, 2023. Patent No: CN114923992B
2. Z.-J. Zhu, **Z. Zhou**, A method for standardizing CCS data, database construction, and database management system, China, 2024. Patent No: CN111858570B

PRESENTATIONS

Oral presentations:

- **Z. Zhou**, Y. Liu, H. Chen, R. Colman, M. Rosen, M. Fischbach, D. Dodd*, Plasma metabolomics uncovers characteristic metabolic aberrancies and predictive biomarkers in pediatric Crohn's Disease, **The 73rd ASMS Conference on Mass Spectrometry and Allied Topics**, June 2025, Baltimore, US
- **Z. Zhou**, Plasma metabolomics uncovers characteristic metabolic aberrancies and predictive biomarkers in pediatric Crohn's Disease, **Wednesday Seminar - Department of Microbiology and Immunology, Stanford University,** Feb 2025, Stanford, US
- **Z. Zhou**, Z.-J. Zhu, Metabolic Reaction Network-based Metabolite Annotation for Untargeted Metabolomics: from Knowns to Unknowns, **Early-Career Members Network of Metabolomics Society**, March 29, 2022, Online
- **Z. Zhou,** Ion Mobility Collision Cross-Section Atlas for Known and Unknown Metabolite Annotation**, QM working group (QMWG) meeting,** October 12, 2021, Online
- **Z. Zhou,** Ion Mobility Collision Cross-Section Atlas for Known and Unknown Metabolite Annotation in Untargeted Metabolomics, **The 16th Annual Conference of the Metabolomics Society (Virtual conference),** October 28, 2020, Online
- **Z. Zhou**, Ion mobility – Mass Spectrometry based Multi-dimensional Metabolite Annotation, **The 15th Annual Conference of the Metabolomics Society**, June, 2019, Hague, Netherlands
- **Z. Zhou**, Ion mobility – Mass Spectrometry based Metabolomics, **The 1st Annual Conference for the Chinese Society of Metabolomics**, April, 2019, Shanghai, China
- **Z. Zhou**, LipidIMMS Analyzer: A Tutorial for Lipid Identification in Ion Mobility-Mass Spectrometry, **Agilent 6560 IM-MS Training Workshop**, October, 2018, Shanghai, China
- **Z. Zhou,** Z.-J. Zhu*, The Generation of Large-Scale CCS Database to Support Metabolomics and Lipidomics, **The 4th Annual ASMS Agilent Ion Mobility Reception**, June, 2018, San Diego, US
- **Z. Zhou,** Z.-J. Zhu*, Ion mobility – Mass Spectrometry for metabolomics and lipidomics, **World Federation of Chinese Medicine Societies**, June, 2018, Nanchang, China
- **Z. Zhou,** M. Xu, and Z.-J. Zhu*, Ion mobility–mass spectrometry based high-throughput metabolomics facilitates metabolite biomarker discovery in colorectal cancer. **The 13th International Conference of the Metabolomics Society**, June, 2017, Brisbane, Australia
- **Z. Zhou,** J. Tu and Z.-J. Zhu*, LipidIMMS: Ion Mobility – Mass Spectrometry based Multiple-dimensional Lipidomics. **The 3rd China Mass Spectrometry Conference**, December, 2017, Xiamen, China

Poster presentations:

- **Z. Zhou**, Y. Liu, H. Chen, R. Colman, M. Rosen, M. Fischbach, D. Dodd*, Plasma metabolomics uncovers characteristic metabolic aberrancies and predictive biomarkers in early-onset Crohn's Disease, **Stanford Pathology Research Retreat**, Oct 2025, Stanford, US
- **Z. Zhou**, Y. Liu, H. Chen, R. Colman, M. Rosen, M. Fischbach, D. Dodd*, Plasma metabolomics uncovers characteristic metabolic aberrancies and predictive biomarkers in early-onset Crohn's Disease, **The 3rd Stanford Annual IBD and Celiac Disease Research Symposium**, Oct 2024, Palo Alto, US
- **Z. Zhou**, Y. Liu, H. Chen, R. Colman, M. Rosen, M. Fischbach, D. Dodd*, Plasma metabolomics uncovers characteristic metabolic aberrancies and predictive biomarkers in early-onset Crohn's Disease, **Stanford Pathology Research Retreat**, Oct 2024, Stanford, US
- **Z. Zhou,** Y. Liu, H. Chen, R. Colman, M. Rosen, M. Fischbach, D. Dodd*, Plasma metabolomics uncovers characteristic metabolic aberrancies in early-onset Crohn's Disease, **The 72nd ASMS Conference on Mass Spectrometry and Allied Topics**, June 2024, Anaheim, US
- **Z. Zhou**, Y. Liu, H., R. Colman, M. Rosen, M. Fischbach, D. Dodd*, Plasma metabolomics uncovers characteristic metabolic aberrancies in early-onset Crohn's Disease, **Stanford Pathology Research Retreat**, Nov 2023, Palo Alto, US
- **Z. Zhou,** Z.-J. Zhu*, Ion Mobility Collision Cross-Section Atlas for Known and Unknown Metabolite Annotation in Untargeted Metabolomics, **The 2nd Annual Conference for the Chinese Society of Metabolomics and International Symposium on Metabolomics**, Sep 2021, Shanghai, China
- **Z. Zhou,** Z.-J. Zhu*, LipidIMMS Analyzer: Integration of Multi-Dimensional Information to Support Ambiguous Lipid Identification for Ion Mobility-Mass Spectrometry based Lipidomics. **The 66th ASMS Conference on Mass Spectrometry and Allied Topics**, June 2018, San Diego, US
- **Z. Zhou,** Z.-J. Zhu*, The Generation of Large-Scale CCS Database to Support Ion Mobility – Mass Spectrometry based Metabolomics and Lipidomics. **The 66th ASMS Conference on Mass Spectrometry and Allied Topics**, June 2018, San Diego, US
- **Z. Zhou,** Z.-J. Zhu*, Large-Scale Generation of CCS Values to Support Unambiguous Identification of Metabolites in Untargeted Metabolomics and Lipidomics. **The 13th International Conference of the Metabolomics Society,** June 2017, Brisbane, Australia

DEVELOPED ALGORITHMS AND TOOLS

- **IsoPairFinder**: A tool for biochemical pathway discovery using stable isotope tracing metabolomics (https://github.com/DoddLab/IsoPairFinder).
- **MetDNA2**: an algorithm integrates knowledge-guided multi-layer networks for known and unknown metabolite annotation (available at http://metdna.zhulab.cn/, completed ~25,000 projects).
- **AllCCS**: the largest CCS atlas covers >5000 experimental CCS and >13 million predicted CCS for >2 million small molecules (available at http://allccs.zhulab.cn/, 1212 users with ~3 million visits).
- **LipidIMMS Analyzer**: a novel tool to integrate multi-dimensional information for lipid identification in IM-MS based lipidomics (available at http://lipid4danalyzer.zhulab.cn/, completed >3400 projects).

- **LipidCCS**: an algorithm and user-friendly webserver to predict collision cross section (CCS) values for lipids (available at http://www.zhulab.cn/LipidCCS/)
- **MetCCS**: an algorithm and user-friendly webserver to predict collision cross section (CCS) values for metabolites (available at http://www.zhulab.cn/MetCCS/)

Journal Referee

Guest Editor:

- ***Metabolites***, Special Issue "Metabolomics and Bioinformatics Approaches to Studying Human Gut Microbiota-Derived Metabolites" (Link)

Peer Reviewer:

- Nature Communications
- Trends in Analytical Chemistry
- Food Chemistry
- Analytical Chemistry
- Communications Biology
- Journal of Chromatography A
- Journal of Chromatography B
- Metabolites
- Medical Science Monitor
- Frontiers in Genetics
- Frontiers in Psychiatry
- Chinese Journal of Analytical Chemistry