

Zhimin Huang, Ph.D.

Department of Neurological Surgery, University of Pittsburgh

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PROFESSIONAL APPOINTMENT

2025-Now **Assistant Professor, University of Pittsburgh, PA**

Department of Neurological Surgery

Principal Investigator of the Laboratory for NeuroControl and Monitoring, focused on developing noninvasive technologies and molecular tools to control and monitor endogenous processes in intact cells and tissues, with the goal of uncovering brain mysteries and advancing therapies for neurological disorders.

EDUCATION AND TRAINING

2020-2024 **Rice University, TX**

Postdoctoral research associate, Department of Bioengineering
Engineering site-specific brain therapeutics
Advisor: Jerzy Szablowski

2018-2020 **University of Washington, WA**

Senior fellow, Department of Biochemistry
Engineering red light-switchable protein dimerization systems
Advisor: Liangcai Gu

2015-2017 **Shanghai Jiao Tong University, Shanghai, China**

Postdoctoral fellow, School of Medicine
Identification of a cellularly active SIRT6 allosteric activator
Advisor: Jian Zhang

2009-2015 **Shanghai Jiao Tong University, Shanghai, China**

Ph.D. in Biochemistry and Molecular Biology, School of Medicine
Analysis of allosteric regulation in proteins and design of allosteric modulators for SIRT6
Advisors: Guoqiang Chen, Jian Zhang

2005-2009 **Tianjin Medical University, Tianjin, China**

B.Eng. in Biomedical Engineering

GRANT SUPPORT

PhRMA Foundation, Faculty Starter Grant in Drug Delivery

2025-2026

Role: Principal Investigator

In Vivo Protein Engineering for Prolonged Site-Specific Brain Therapeutics

HONORS AND AWARDS

2025 PhRMA Foundation Faculty Starter Grant in Drug Delivery

2023 Trainee Highlight Award Honorable Mention of 9th Annual BRAIN Initiative Meeting

2022 Poster Award of International Symposium on Biomolecular Ultrasound and Sonogenetics

2015 Excellent Graduates of Shanghai Colleges and Universities granted by Shanghai Municipal Education Commission

2012 Scholarship Award for Excellent Doctoral Student granted by Ministry of Education of China

2012 National Scholarship for Graduate Student granted by Ministry of Education of China

2012 Qiu Shi Graduate Student Scholarship granted by Qiu Shi Science and Technologies

- Foundation
- 2012 Excellent Oral Presentation Award, Second Session of Graduate Academic Forum in Shanghai Jiao-Tong University School of Medicine
- 2011 First-class Scholarship for Excellent Graduate Students in Shanghai Jiao Tong University, School of Medicine

PUBLICATIONS

#Represents equal contribution, my first authorship underlined: 10 first author contributions, 29 total

1. **Huang Z**, Mitrofan A, Nouraein S, Horak C, Seo JP, Harb M, Jin R, Szablowski JO. Engineering Site-Specific Drugs for Neuroscience. In revision. bioRxiv, doi: 10.1101/2023.10.12.562069.
2. Seo JP, Trippett JS, **Huang Z**, Lee S, Nouraein S, Wang RZ, Szablowski JO. Acoustically targeted measurement of transgene expression in the brain. *Science Advances*. 7 August 2024.
3. Lee S, Nouraein S, Kwon J. J, **Huang Z**, Wojick JA, Xia B, Corder G, Szablowski O. J. Engineered serum markers for non-invasive monitoring of gene expression in the brain. *Nature Biotechnology*. 2024 Jan 10.
4. Hao Q[#], **Huang Z**[#], Li Q[#], Liu D, Wang P, Wang K, Li J, Cao W, Deng W, Wu K, Su R, Liu Z[#], Vadgama J, Wu Y. A novel metabolic reprogramming strategy for the treatment of diabetes-associated breast cancer. *Advanced Science*. 2022, 9(6):e2102303.
5. Zhang Q[#], Chen Y[#], Ni D[#], **Huang Z**[#], Wei J, Feng L, Su J, Wei Y, Ning S, Yang X, Zhao M, Qiu Y, Song K, Yu Z, Xu J, Li X, Lin H, Lu S, Zhang J. Targeting a cryptic allosteric site of SIRT6 with small-molecule inhibitors that inhibit the migration of pancreatic cancer cells. *Acta Pharm Sin B*. 2022, 12(2):876-889.
6. **Huang Z**[#], Li Z[#], Zhang X[#], Dong R, Kang S, Sun L, Fu X, Vaisar D, Watanabe K, Gu L. Creating Red Light-Switchable Protein Dimerization Systems as Genetically Encoded Actuators with High Specificity. *ACS Synth Biol*. 2020, 9(12):3322-3333.
7. Wu K, Yu X, **Huang Z**, Zhu D, Yi X, Wu YL, Hao Q, Kemp KT, Elshimali Y, Iyer R, Nguyen KT, Zheng S, Chen G, Chen QH, Wang G, Vadgama JV, Wu Y. Targeting of PP2Cδ by a small molecule C23 inhibits high glucose-induced breast cancer progression in vivo. *Antioxid Redox Signal*. 2019, 30(17):1983- 1998.
8. **Huang Z**[#], Zhao J[#], Deng W[#], Chen Y[#], Shang J[#], Song K, Zhang L, Wang C, Lu S, Yang X, He B, Min J, Hu H, Tan M, Xu J, Zhang Q, Zhong J, Sun X, Mao Z, Lin H, Xiao M, Chin E, Jiang H, Xu Y, Chen G, Zhang J. Identification of a cellularly active SIRT6 allosteric activator. *Nature Chem Biol*. 2018, 14(12):1118-1126.
9. Wei W[#], Ma C[#], Cao Y[#], Yang L[#], **Huang Z**[#], Qin D, Chen Y, Liu C, Wang T, Lei H, Yu Y, Huang M, Tong Y, Xu H, Gao F, Zhang J, Wu Y. Identification of H7 as a novel peroxiredoxin I inhibitor to induce differentiation of leukemia cells. *Oncotarget*. 2016, 7(4):3873-3883.
10. Huang M, Chen Z, Zhang L, **Huang Z**, Chen Y, Xu J, Zhang J, Shu X. Screening and biological evaluation of a novel STAT3 signaling pathway inhibitor against cancer. *Bioorg Med Chem Lett*. 2016, 26(21):5172-5176.
11. Shen Q, Wang G, Li S, Liu X, Lu S, Chen Z, Song K, Yan J, Geng L, **Huang Z**, Huang W, Cheng G, Zhang J. ASD v3.0: unraveling allosteric regulation with structural mechanisms and biological networks. *Nucleic Acids Res*. 2016, 44(D1):D527-535.
12. Song F, Xia L, Ji P, Tang Y, **Huang Z**, Zhu L, Zhang J, Wang J, Zhao G, Ge H, Zhang Y, Wang Y. Human dCTP Pyrophosphatase 1 promotes breast cancer cell growth and stemness through modulation on 5-methyl-dCTP metabolism and global hypomethylation. *Oncogenesis*. 2015, 4:e159.
13. Huang W, Wang G, Shen Q, Liu X, Lu S, Geng L, **Huang Z**, Zhang J. ASBench: benchmarking sets for allosteric discovery. *Bioinformatics*. 2015, 31(15):2598-2600.
14. **Huang Z**[#], Mou L[#], Shen Q[#], Lu S[#], Li C[#], Liu X, Wang G, Li S, Geng L, Liu Y, Wu J, Chen G, Zhang J. ASD v2.0: updated content and novel features focusing on allosteric regulation. *Nucleic Acids Res*. 2014, 42(1):D510-516.

15. Huang W, Lu S, **Huang Z**, Liu X, Mou L, Luo Y, Zhao Y, Liu Y, Chen Z, Hou T, Zhang J. AlloSite: a method for predicting allosteric sites. *Bioinformatics*. 2013, 29(18):2357-2359.
16. Shi T, Han Y, Li W, Zhao Y, Liu Y, **Huang Z**, Lu S, Zhang J. Exploring the desumoylation process of SENP1: a study combined MD simulations with QM/MM calculations on SENP1-SUMO1-RanGAP1. *J Chem Inf Model*. 2013, 53(9):2360-2368.
17. Li X, Chen Y, Lu S, **Huang Z**, Liu X, Wang Q, Shi T, Zhang J. Toward an understanding of the sequence and structural basis of allosteric proteins. *J Mol Graph Model*. 2013, 40:30-39.
18. Huang M, Lu S, Shi T, Zhao Y, Chen Y, Li X, Liu X, **Huang Z**, Zhang J. Conformational transition pathway in the activation process of allosteric glucokinase. *PLoS One*. 2013, 8(2):e55857.
19. Lu S, **Huang Z**, Huang W, Liu X, Chen Y, Shi T, Zhang J. How calcium inhibits the magnesium-dependent kinase gsk3 β : a molecular simulation study. *Proteins*. 2013, 81(5):740-753.
20. **Huang Z**[#], Jiang H[#], Liu X[#], Chen Y, Wong J, Wang Q, Huang W, Shi T, Zhang J. HEMD: an integrated tool of human epigenetic enzymes and chemical modulators for therapeutics. *PLoS One*. 2012, 7(6):e39917.
21. Chen Y[#], Wen D[#], **Huang Z**[#], Huang M, Luo Y, Liu B, Lu H, Wu Y, Peng Y, Zhang J. 2-(4-chlorophenyl)-2-oxoethyl 4-benzamidobenzoate derivatives, a novel class of SENP1 Inhibitors: Virtual screening, synthesis and biological evaluation. *Bioorg Med Chem Lett*. 2012, 22(22):6867-6870.
22. Lu S, Huang W, Li X, **Huang Z**, Liu X, Chen Y, Shi T, Zhang J. Insights into the role of magnesium triad in myo-inositol monophosphatase: metal mechanism, substrate binding, and lithium therapy. *J Chem Inf Model*. 2012, 52(9):2398-2409.
23. Wang Q, Zheng M, **Huang Z**, Liu X, Zhou H, Chen Y, Shi T, Zhang J. Toward understanding the molecular basis for chemical allosteric modulator design. *J Mol Graph Model*. 2012, 38:324-333.
24. Tang J, **Huang Z**, Chen Y, Zhang Z, Liu G, Zhang J. A novel inhibitor of human La protein with anti-HBV activity discovered by structure-based virtual screening and in vitro evaluation. *PLoS One*. 2012, 7(4):e36363.
25. Duan X, Block E, Li Z, Connelly T, Zhang J, **Huang Z**, Su X, Pan Y, Wu L, Chi Q, Thomas S, Zhang S, Ma M, Matsunami H, Chen GQ, Zhuang H. Crucial role of copper in detection of metal-coordinating odorants. *Proc Natl Acad Sci U S A*. 2012, 109(9):3492-3497.
26. Liu X, Liu B, **Huang Z**, Shi T, Chen Y, Zhang J. SPSPS: a sequence-based method for predicting probability of protein-protein interaction partners. *PLoS One*. 2012, 7(1):e30938.
27. **Huang Z**[#], Zhu L[#], Cao Y[#], Wu G, Liu X, Chen Y, Wang Q, Shi T, Zhao Y, Wang Y, Li W, Li Y, Chen H, Chen G, Zhang J. ASD: a comprehensive database of allosteric proteins and modulators. *Nucleic Acids Res*. 2011, 39(Database issue):D663-669.
28. Liu X, Su X, Wang F, **Huang Z**, Wang Q, Li Z, Zhang R, Wu L, Pan Y, Chen Y, Zhuang H, Chen G, Shi T, Zhang J. ODORactor: a web server for deciphering olfactory coding. *Bioinformatics*. 2011, 27(16):2302-2303.
29. Zhao Y, Lu X, Yang CY, **Huang Z**, Fu W, Hou T, Zhang J. Computational Modeling Toward Understanding Agonist Binding on Dopamine 3. *J Chem Inf Model*. 2010, 50(9):1633-1643.

PATENTS

1. Szablowski JO, **Huang Z**. Site Specific Brain Therapeutics. Rice Tech ID 2023-066-PZ.
2. Gu L, **Huang Z**, Zhang X. Red light-controlled protein dimerization systems. US Patent, US20230167167A1. Publication date: Jun. 1, 2023.
3. Zhang J, Chen Y, Zhang Q, Zhao M, Wei J, **Huang Z**, Feng L. Compounds with inhibitory activity against SIRT6 deacetylation, SIRT6 inhibitors, and the uses thereof. Chinese patent, CN115043824A. Publication date: Sep. 13, 2022.
4. Wu Y, Vadgama J, **Huang Z**, Wu K. Novel MCT4 inhibitors and uses thereof. US Patent, US10919878B2. Publication date: Feb. 16, 2021. (**Licensed out**)
5. Zhang J, **Huang Z**, Chen Y. Small molecule activators of SIRT6 and the uses thereof. Chinese

- patent, CN109384694A. Publication date: Feb 26, 2019. **(Licensed out)**
- Zhang J, Chen Y, Huang M, **Huang Z**. Small molecule inhibitors of STAT3 and the uses thereof. Chinese patent, CN103880707A. Publication date: Jun. 25, 2014.
 - Zhang J, Cheng J, Huang M, Chen Y, **Huang Z**, Lu S, Shi T. Small molecule inhibitors of Snp2 and the uses thereof. Chinese patent, CN103877078A. Publication date: Jun. 25, 2014.

PRESENTATIONS

- Huang Z**. Invited talk for Synbio Supergroup Seminar Series at Rice University. Jan 2024, Houston, TX, USA. [**invited speaker**]
- Huang Z**. Invited talk for Basic Medical Sciences Seminar Series at the University of Arizona College of Medicine – Phoenix. Dec 2023, virtually via Zoom. [**invited speaker**]
- Huang Z**. Invited talk for Seminars for Postdocs Advancing Inclusion (SPAI) 2023 series at Baylor College of Medicine. Dec 2023, Houston, TX, USA. [**invited speaker**]
- Huang Z**. Meet the Faculty Candidate Forum at the BMES Annual Meeting. Oct 2023, Seattle, WA, USA. [**Poster**]
- Huang Z**, Mitrofan A, Nouraein S, Harb M, Szablowski JO. Site-specific Brain Therapeutics. Military Health System Research Symposium (SHSRs). Aug 2023, Kissimmee, FL, USA. [**Poster**]
- Huang Z**, Mitrofan A, Nouraein S, Harb M, Szablowski JO. Site-specific Brain Therapeutics. 9th Annual BRAIN Initiative Meeting. Jun 2023, Bethesda, MD, USA. [**online poster for Trainee Highlight Award Honorable Mention**]
- Huang Z**, Mitrofan A, Nouraein S, Harb M, Szablowski JO. Site-specific Brain Therapeutics. Synthetic Biology: Engineering, Evolution & Design (SEED). Jun 2023, Los Angeles, CA, USA. [**Poster**]
- Huang Z**, Mitrofan A, Nouraein S, Harb M, Szablowski JO. Site-specific Brain Therapeutics. InterfaceRice 2023. May 2023, Houston, TX, USA. [**Poster**]
- Huang Z**, Mitrofan A, Nouraein S, Harb M, Szablowski JO. Site-specific Therapeutics for Non-genetic Noninvasive Neuromodulation. International Symposium on Biomolecular Ultrasound and Sonogenetics. Dec 2022, Pasadena, CA, USA. [**Poster**]
- Huang Z**, Mitrofan A, Nouraein S, Harb M, Szablowski JO. Site-specific Therapeutics for Non-genetic Noninvasive Neuromodulation. BMES Annual Meeting. Oct 2022, San Antonio, TX, USA. [**Poster**]
- Huang Z**, Kang S, Watanabe K, Vaisar D, Moussa M, Dinh MN, Sun L, Kuang X, Sun D, Fu X, Gu L. Design of Near-Infrared Controlled Protein Dimerization Systems. The annual RosettaCon conference. Aug 2018, Seattle, WA, USA. [**Poster**]
- Huang Z**. HEMD: An Integrated Tool of Human Epigenetic Enzymes and Chemical Modulators for Therapeutics. *Second Session of Graduate Academic Forum in Shanghai Jiao-Tong University School of Medicine*. Oct 2012, Shanghai, China. [**invited speaker**]
- Huang Z**. ASD: a comprehensive database of allosteric proteins and modulators. *International Student Research Forum*. Aug 2012, Omaha, NE, USA. [**invited speaker**]
- Huang Z**. ASD: a comprehensive database of allosteric proteins and modulators. *11th Chinese Computational Chemistry Conference*. Aug 2011, Lanzhou, China. [**invited speaker**]
- Huang Z**. ASD: a comprehensive database of allosteric proteins and modulators. “Xin Yu” Cup Graduate Research Appreciation Day in Shanghai Jiao-Tong University School of Medicine. Jan 2011, Shanghai, China. [**invited speaker**]

PEER-REVIEW PARTICIPATION

Journals:

Advanced Drug Delivery Reviews, Journal of Nanobiotechnology, Bioengineering & Translational Medicine, Bioinformatics, Computers in Biology and Medicine, Journal of Chemical Information and Modeling, RSC Medicinal Chemistry

Conference: Abstract Reviewer for 2023 Biomedical Engineering Society (BMES) Annual Meeting

MENTORSHIP EXPERIENCE

Rice University: mentored 3 undergraduates, 2 graduate students

University of Washington: mentored 5 undergraduates

Shanghai Jiao Tong University: mentored 1 undergraduate, 3 graduate students

TEACHING EXPERIENCE

Teaching assistant for Basic Theory and Practice of Oncology (2009-2010) and Medical Functional Experiment (2010-2011) at Shanghai Jiao Tong University.

OUTREACH EXPERIENCE

- Proposed and participated in a special session on Diversity, Equity, and Inclusion (DEI) in Neuroscience and Engineering Education during InterfaceRice 2023 Conference
- Worked in a team to deliver a lecture on Brain Anatomy, employing a 'fruit salad' approach to engage teenage patients at MD Anderson Cancer Center