

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

Department of Bioengineering — Secondary Appointment

Affiliate Faculty — Joint Carnegie Mellon-University of Pittsburgh Ph.D. Program in Computational Biology

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

1. Programmable Ultrasound-Leveraged Site-Specific Exosomes

Sponsor: National Institute of Biomedical Imaging and Bioengineering, Trailblazer R21

Role: Principal Investigator

Project Period: August 2026 – July 2029

Status: Active

2. Noninvasive Ultrasound Control of Lysosomal Function: A Transdisciplinary Engineering–Biology Approach to Rare Disease and Brain Aging

Sponsor: Pitt Center for Industry Studies (CIS) Transdisciplinary Award

Role: Co-Principal Investigator, with Dr. Kirill Kiselyov and Dr. Nikhil Bajaj

Project Period: Sep 2026 – Aug 2027

Status: Active

3. *In Vivo* Protein Engineering for Prolonged Site-Specific Brain Therapeutics

Sponsor: PhRMA Foundation Faculty Starter Grant in Drug Delivery

Role: Principal Investigator

Project Period: 2025 – 2026

Status: Completed

HONORS AND AWARDS

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| 2026 | NIH/NIBIB Trailblazer Award |
| 2026 | Co-Editor, forthcoming Elsevier eBook on Synthetic Binding Proteins |
| 2026 | Invited Grant Reviewer, Action Medical Research (a UK medical research charity) |
| 2026 | Member, American Society of Gene + Cell Therapy Member |
| 2025 | PhRMA Foundation Faculty Starter Grant in Drug Delivery |
| 2025 | Ad Hoc Reviewer, NIH BRAIN Initiative U24 Program |
| 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

*Corresponding author; #Equal contribution; my first-author and corresponding-author publications are underlined.

1. Michael Edwards, Zheyue Zhang, Lilly Schultz, Junlin Li, Xianglong Dai, Ziyu Ding, Yutong Xing, **Zhimin Huang***. BrainFUS Atlas: A Comprehensive Database of Focused Ultrasound Applications in the Brain. *Submitted, 2026*. (*Corresponding author)
2. Bozhi Ye[#], Xin Zhong[#], **Zhimin Huang[#]**, Shanshan Dai[#], Ziyi Huang, Luo Li, Binbin Xia, Ruiyin Shao, Xiaoxi Fan, Zhouqing Huang, Changfa Guo, Hongbo Yang, Wenwen Tang, Lili Dong, Juying Qian, Junbo Ge, Jiatian Cao. Cardiomyocyte-derived KMO reprograms cardiac tryptophan metabolism to attenuate myocardial remodeling. Under review at *Nature Communications* (2026).
3. Wu K, Ge X, Duan X, Li J, Wang K, Chen Q, **Huang Z**, Zhang W, Wu Y, Li Q. Wip1 phosphatase activator QGC-8-52 specifically sensitizes p53-negative cancer cells to chemotherapy while protecting normal cells. *Drug Resist Updat*. 2025;79:101196.
4. **Zhimin Huang**, Zigang Wu, Andrei Mitrofan, Rongshu Jin, Honghao Li, Joon P. Seo, Shirin Nouraein, Chris Pennington, Clark Horak, Manwal Harb, Jerzy O. Szablowski. Site-Specific Brain Therapeutics. Revised and resubmitted; currently under review. bioRxiv, doi: 10.1101/2023.10.12.562069.
5. 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*. 2024 Aug 9;10(32):eadj7686.
6. 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 Nov;42(11):1717-1725.
7. 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.
8. 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.
 9. **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.
 10. 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 PP2C δ by a small molecule C23 inhibits high glucose-induced breast cancer progression in vivo. *Antioxid Redox Signal*. 2019, 30(17):1983-1998.
 11. **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.
 12. 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.
 13. 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.
 14. 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.
 15. 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.
 16. 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.
 17. **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.
 18. 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.
 19. 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.
 20. 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.
 21. 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.
 22. 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.
 23. **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.
 24. 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.
25. 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.
 26. 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.
 27. 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.
 28. 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.
 29. Liu X, Liu B, **Huang Z**, Shi T, Chen Y, Zhang J. SPPS: a sequence-based method for predicting probability of protein-protein interaction partners. *PLoS One*. 2012, 7(1):e30938.
 30. **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.
 31. 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.
 32. 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. US Patent, US20250195629A1. Publication date: Jun. 19, 2025.
2. Gu L, **Huang Z**, Zhang X. Red light-controlled protein dimerization systems. US Patent, US20230167167A1. Publication date: Jun. 1, 2023. (**Licensed out**)
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**)
6. 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.
7. Zhang J, Cheng J, Huang M, Chen Y, **Huang Z**, Lu S, Shi T. Small molecule inhibitors of Senp2 and the uses thereof. Chinese patent, CN103877078A. Publication date: Jun. 25, 2014.

SELECTED PRESENTATIONS

1. **Huang Z**. Invited flash talk (virtually) at the 2025 NIH Transporter Elucidation Network Meeting. April 16, 2025. [**invited speaker**]
2. **Huang Z**. Invited talk for the 'Advances in Ultrasound Neuromodulation' session at the Society for Brain Mapping and Therapeutics (SBMT) 2025 Annual Meeting. March 2, 2025. [**invited speaker**]
3. **Huang Z**. Invited talk for Synbio Supergroup Seminar Series at Rice University. Jan 2024, Houston, TX, USA. [**invited speaker**]
4. **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**]

5. **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**]
6. **Huang Z.** Meet the Faculty Candidate Forum at the BMES Annual Meeting. Oct 2023, Seattle, WA, USA. [**Poster**]
7. **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**]
8. **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**]
9. **Huang Z.** ASD: a comprehensive database of allosteric proteins and modulators. *International Student Research Forum*. Aug 2012, Omaha, NE, USA. [**invited speaker**]
10. **Huang Z.** ASD: a comprehensive database of allosteric proteins and modulators. *11th Chinese Computational Chemistry Conference*. Aug 2011, Lanzhou, China. [**invited speaker**]
11. **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**]

PROFESSIONAL SERVICE:

Peer review for 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, IEEE Transactions on Neural Systems and Rehabilitation Engineering*

Grant review: NIH BRAIN Initiative (U24), Action Medical Research Project Grant (a UK medical research charity)

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

Other scholarly activities: **Invited Co-Editor and Contributing Author** for the forthcoming Elsevier eBook, *Synthetic Binding Proteins: Biophysical Principles, Engineering Strategies, and Programmable Molecular Systems*.

MENTORSHIP EXPERIENCE

University of Pittsburgh: mentoring 1 postdoctoral fellow, 3 graduate students, 10 undergraduate students, and 3 academic visitors

Rice University: mentored 2 graduate students and 3 undergraduate students

University of Washington: mentored 5 undergraduate students

Shanghai Jiao Tong University: mentored 3 graduate students and 1 undergraduate student

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

- Participating in the UPMC Peer Coach Training Program, Spring 2025.
- Invited to give a popular science talk on the potential of noninvasive treatments at Rice University's Virtual Parkinson's Awareness Conference, March 2, 2024.
- 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, 2023.

