Hao Zheng

University of Louisiana at Lafayette
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Website | Scholar
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Research Interests

Computer Vision • Machine Learning • AI for Health • Biomedical Image Analysis • Visualization

Work Experience

Assistant Professor — Aug 2024 – Present
University of Louisiana at Lafayette — *Lafayette, LA, USA*
School of Computing and Informatics

Postdoctoral Researcher — Feb 2022 – Aug 2024
University of Pennsylvania — *Philadelphia, PA, USA*
Center for Biomedical Image Computing & Analytics **(CBICA)**

Research Intern — May 2021 – Aug 2021
IBM Research Almaden — *San Jose, CA, USA*

Education

Ph.D. in Computer Science and Engineering — Aug 2016 – Dec 2021
University of Notre Dame — *Notre Dame, IN, USA*

M.S. in Computer Science and Engineering — Aug 2016 – Aug 2020
University of Notre Dame — *Notre Dame, IN, USA*

B.E. in Electronic Engineering and Information Science — Sept 2012 – Jun 2016
University of Science and Technology of China — *Hefei, Anhui, China*

Awards & Honors

Francis P. Clark Endowed Professor in Computer Science, Lafayette, USA	2024
IEEE TMI Distinguished Reviewer	2022 & 2023
MICCAI Student Travel Awards	2021
Outstanding Research Assistant Award, Notre Dame, USA	2021
CVPR Outstanding Reviewer Award	2021
1st Place in Poster Contest of CSE Dept. (Faculty Choice), Notre Dame, USA	2020
AAAI-20 Scholarship, New York, USA	2020
Graduate School Professional Development Awards, Notre Dame, USA	2020
AAAI-19 Scholarship, Honolulu, USA	2019
Outstanding Graduate of Anhui Province, China	2016
National Endeavor Scholarship, Ministry of Education, China	2015
Gold Award, Outstanding Student Scholarship, USTC	2013 & 2014

Grants

External funds: Total amount: $169,622; Total credit: **$169,622**

"Enhancing Computational Pathology through Automated Large-Scale Multi-Modal Learning"
June 1, 2025 – June 30, 2028
Funding Vehicle: *Louisiana Board of Regents*
Amount: **$169,622**
Role: Sole PI

Publications

* Equal contribution; § Supervised students; ‡ Corresponding author
According to Google Scholar, as of May 1st, 2025, citations: 962, h-index: 17, i10-index: 23

Manuscripts Under Review

[R6] C. Jiang*§, Z. Zhao*, P. Liang, T. Tabassum, J. Han, N. Tzeng, G. Xiao, D.Z. Chen, and **H. Zheng**‡. "Exploring Multi-Scale Local and Global Features in Whole Slide Images Using State Space Models." (Under review with ***MICCAI***, 2025)

[R5] **H. Zheng**, H. Li, and Y. Fan. "SurfNet: Coupled Cortical Surface Reconstruction via Diffeomorphic Deformation." (***TMI***, Minor Revision)

[R4] P. Liang, Y. Ding, Y. Zhang, J. Chen, **H. Zheng**, H. Wang, Y. Zhang, G. Meng, T. Weninger, M. Niemier, X.S. Hu, and D.Z. Chen. "Cell Instance Segmentation: The Devil Is in the Boundaries." (***TMI***, Major Revision)

[R3] J. Han, **H. Zheng**, and J. Tao. "A Study of Data Augmentation for Learning-Driven Scientific Visualization." (***TVCG***, Major Revision)

[R2] T. Chen, H. Li, **H. Zheng**, J. Chen, and Y. Fan. "fMRIExperts: Learning Dynamic Functional Connectivity Patterns with Modularity and State Experts." (***TMI***, Major Revision)

[R1] X. Chen, **H. Zheng**, Y. Xie, Y. Ma, Y. Li, P.T. Yap, and T. Li. "A Scalable and Classifier-Free Framework for Automated Medical Image Segmentation." (Under review with ***TMI***)

Journal Publications

[J11] J. Han, **H. Zheng**, and C. Bi. "KD-INR: Time-Varying Volumetric Data Compression via Knowledge Distillation-based Implicit Neural Representation." *IEEE Transactions on Visualization and Computer Graphics (**TVCG**)*, 2024.

[J10] Y. Zhang, N. Imirzian, C. Kurze, **H. Zheng**, D. Hughes, and D.Z. Chen. "Learning from Algorithm-Generated Pseudo-Annotations for Detecting Ants in Videos." ***Scientific Reports***, Jul., 2023.

[J9] Y. Peng§, **H. Zheng**, P. Liang, L. Zhang, F. Zaman, X. Wu, M. Sonka, and D.Z. Chen. "KCB-Net: A 3D Knee Cartilage and Bone Segmentation Network via Sparse Annotation." *Medical Image Analysis (**MedIA**)*, Sept., 2022.

[J8] S.M. Motch Perrine*, M.K. Pitirri*, E.L. Durham, M. Kawasaki, **H. Zheng**, D.Z. Chen, K. Kawasaki, and J.T. Richtsmeier. "A Dysmorphic Mouse Model Reveals Developmental Interactions of Chondrocranium and Dermatocranium." ***eLife***, Jun., 2022.

[J7] M.K. Pitirri*, E.L. Durham*, N.A. Romano, J.I. Santos, A.P. Coupe, **H. Zheng**, D.Z. Chen, K. Kawasaki, E.W. Jabs, J.T. Richtsmeier, M. Wu, and S.M. Motch Perrine. "Meckel's Cartilage in Mandibular Development and Dysmorphogenesis." ***Frontiers in Genetics***, May, 2022.

[J6] Y, Peng§, **H. Zheng**, L, Zhang, M. Sonka, and D.Z. Chen. "CMC-Net: 3D Calf Muscle Compartment Segmentation with Sparse Annotation." *Medical Image Analysis (**MedIA**)*, Jul., 2022.

[J5] H. Wang§, **H. Zheng**, and D.Z. Chen. "TANGO: A GO-term Embedding Based Method for Protein Semantic Similarity Prediction." *IEEE/ACM Transactions on Computational Biology and Bioinformatics (**TCBB**)*, Jan., 2022.

[J4] J, Han, **H. Zheng**‡, D.Z. Chen, and C, Wang. "STNet: An End-to-End Generative Framework for Synthesizing Spatiotemporal Super-Resolution Volumes." *IEEE Transactions on Visualization and Computer Graphics (**TVCG**)*, 28(1), Jan., 2022. [IEEE Vis 2021]

[J3] J. Han, **H. Zheng**, Y. Xing§, D.Z. Chen, and C. Wang. "V2V: A Deep Learning Approach to Variable-to-Variable Selection and Translation for Multivariate Time-Varying Data." *IEEE Transactions on Visualization and Computer Graphics (**TVCG**)*, 27(2), Feb., 2021. [IEEE SciVis 2020]

[J2] T. Hu§, **H. Zheng**‡, C. Liang§, S. Zhu§, N. Imirzian, Y. Zhang, C. Wang, D.P. Hughes, and D.Z. Chen. "AntVis: A Web-Based Visual Analytics Tool for Exploring Ant Movement Data." ***Visual Informatics***, 4(1), 58–70, Mar., 2020.

[J1] J. Han, J. Tao, **H. Zheng**, H. Guo, D.Z. Chen, and C. Wang. "Flow Field Reduction via Reconstructing Vector Data from 3D Streamlines Using Deep Learning." *IEEE Computer Graphics and Applications (Special Issue on Visual Computing with Deep Learning) (**CG&A**)*, 39(2), Mar/Apr, 2019. [Presented at IEEE VIS 2020]

Conference Publications

[C27] **H. Zheng**, X. Chen, H. Li, T. Chen, P. Liang, and Y. Fan. "SegCSR: Weakly-Supervised Cortical Surfaces Reconstruction from Brain Ribbon Segmentations." *IEEE International Symposium on Biomedical Imaging (**ISBI**)*, 2025, Houston, USA. [Oral]

[C26] Y. Ma, Z. Zhou, X. Chen, **H. Zheng**, T. Neuberger, J. Zimmermann, G. Adriany, K. Ugurbil, and W .Chen. "Decoding Brain's Global Spatiotemporal Dynamics using a Scalable K-Means Clustering Method." *International Society for Magnetic Resonance in Medicine (**ISMRM**)*, 2025, Honolulu, USA.

[C25] P. Liang, **H. Zheng**, H. Li, Y. Gong, S. Bakas, and Y. Fan. "Enhancing Whole Slide Image Classification with Discriminative and Contrastive Learning." *International Conference on Medical Image Computing and Computer-Assisted Intervention (**MICCAI**)*, 2024, Marrakesh, Morocco. (***Early acceptance rate: 11%***)

[C24] X. Chen, **H. Zheng**, Y. Li, Y. Ma, L. Ma, H. Li, and Y. Fan. "Versatile Medical Image Segmentation Learned from Multi-Source Datasets via Model Self-Disambiguation." *IEEE/CVF Computer Vision and Pattern Recognition Conference (**CVPR**)*, 2024, Seattle, USA. (***Acceptance rate: 23.6%***)

[C23] **H. Zheng**, H. Li, and Y. Fan. "Coupled Reconstruction of Cortical Surfaces by Diffeomorphic Mesh Deformation." *Neural Information Processing Systems (**NeurIPS**)*, 2023, New Orleans, USA. (***Acceptance rate: 26.1%***)

[C22] Y.C. Zhang, P. Gu, N. Sapkota, **H. Zheng**, P. Liang, and D.Z. Chen. "A Point in the Right Direction: Vector Prediction for Spatially-Aware Self-Supervised Volumetric Representation Learning." *IEEE International Symposium on Biomedical Imaging (**ISBI**)*, 2023, Cartagena, Colombia. [Oral]

[C21] **H. Zheng**, H. Li, and Y. Fan. "*Surf*NN: Joint Reconstruction of Multiple Cortical Surfaces from Magnetic Resonance Images." *IEEE International Symposium on Biomedical Imaging (**ISBI**)*, 2023, Cartagena, Colombia.

[C20] B. Hou, H. Li, Z. Jiao, Z. Zhou, **H. Zheng**, and Y. Fan. "Deep Clustering Survival Machines with Interpretable Expert Distributions." *IEEE International Symposium on Biomedical Imaging (**ISBI**)*, 2023, Cartagena, Colombia.

[C19] Y.C. Zhang, P. Gu, N. Sapkota, Y. Peng, **H. Zheng**, and D.Z. Chen. "Keep Your Friends Close & Enemies Farther: Debiasing Contrastive Learning with Spatial Priors in 3D Radiology Images." *IEEE International Conference on Bioinformatics and Biomedicine (**BIBM**)*, 2022, Las Vegas, USA.

(***Acceptance rate: 19.8%***)

[C18] Y. Zhang, S. Mishra, P. Liang, **H. Zheng**, and D.Z. Chen. "Usable Region Estimate for Assessing Practical Usability of Medical Image Segmentation Models." *International Conference on Medical Image Computing and Computer-Assisted Intervention (**MICCAI**)*, 2022, Singapore. (***Acceptance rate: 31.5%***)

[C17] **H. Zheng**, J, Han, H. Wang, L. Yang, Z. Zhao, C. Wang, and D.Z. Chen. "Hierarchical Self-Supervised Learning for Medical Image Segmentation Based on Multi-Domain Data Aggregation." *International Conference on Medical Image Computing and Computer-Assisted Intervention (**MICCAI**)*, 2021, Strasbourg, France. (***Early acceptance rate: 13%***) [Student Travel Award]

[C16] P, Gu[§], **H. Zheng**, Y, Zhang, C. Wang, and D.Z. Chen. "kCBAC-Net: Deeply Supervised Complete Bipartite Networks with Asymmetric Convolutions for Medical Image Segmentation." *International Conference on Medical Image Computing and Computer-Assisted Intervention (**MICCAI**)*, 2021, Strasbourg, France. (***Acceptance rate: 32.7%***)

[C15] H. Wang[§], **H. Zheng**, J. Chen, L. Yang, Y. Zhang, and D.Z. Chen. "Unlabeled Data Guided Semi-supervised Histopathology Image Segmentation." *IEEE International Conference on Bioinformatics and Biomedicine (**BIBM**)*, 2020, Seoul, Korea. (***Acceptance rate: 19.4%***)

[C14] **H. Zheng**, S. Motch Perrine, M.K. Pitirri, K. Kawasaki, C. Wang, J.T. Richtsmeier, and D.Z. Chen. "Cartilage Segmentation in High-Resolution 3D Micro-CT Images via Uncertainty-Guided Self-Training with Very Sparse Annotation." *International Conference on Medical Image Computing and Computer-Assisted Intervention (**MICCAI**)*, 2020, Lima, Peru. (***Acceptance rate: 30%***)

[C13] Z. Zhao, H. Wang, Y. Zhang, **H. Zheng**, S. Zhang, and D.Z. Chen. "A Coarse-to-Fine Data Generation Method for 2D and 3D Cell Nucleus Segmentation." *International Symposium on Computer-Based Medical Systems (**CBMS**)*, 2020, Mayo Clinic, Rochester, MN, USA.

[C12] P. Liang, J. Chen, Y. Zhang, H. Wang, **H. Zheng**, P. Gu, and D.Z. Chen. "InTracker: An Integrated Detector-tracker Framework for Cell Detection and Tracking." *International Symposium on Computer-Based Medical Systems (**CBMS**)*, 2020, Mayo Clinic, Rochester, MN, USA.

[C11] L. Guo[§], S. Ye[§], J. Han, **H. Zheng**, H. Gao, D.Z. Chen, J. Wang, and C. Wang. "SSR-VFD: Spatial Super-Resolution for Vector Field Data Analysis and Visualization." *IEEE Pacific Visualization Symposium (**PacificVis**)*, 2020, Tianjin, China. (***Acceptance rate: 27.1%***)

[C10] **H. Zheng**, Y. Zhang, L. Yang, C. Wang, and D.Z. Chen. "An Annotation Sparsification Strategy for 3D Medical Image Segmentation via Representative Selection and Self-Training." *AAAI Conference on Artificial Intelligence (**AAAI**)*, 2020, New York, USA. (***Acceptance rate: 20.6%***) [Spotlight]

[C9] **H. Zheng**, L. Yang, J. Han, Y. Zhang, P. Liang, Z. Zhao, C. Wang, and D.Z. Chen. "HFA-Net: 3D Cardiovascular Image Segmentation with Asymmetrical Pooling and Content-Aware Fusion." *International Conference on Medical Image Computing and Computer-Assisted Intervention (**MICCAI**)*, 2019, Shenzhen, China. (***Acceptance rate: 31%***)

[C8] Y. Zhang, R. Zong, J. Han, **H. Zheng**, Q. Lou, D.Y. Zhang, and D. Wang. "TransLand: An Adversarial Transfer Learning Approach for Migratable Urban Land Usage Classification using Remote Sensing." *IEEE International Conference on Big Data (**IEEE BigData**)*, 2019. (***Acceptance rate: 19.3%***)

[C7] D.Y. Zhang, B. Ni, Q. Zhi, T. Plummer, Y. Zhang, Q. Li, **H. Zheng**, Q. Zeng, and D. Wang. "Through The Eyes of A Poet: Classical Poetry Recommendation with Visual Input on Social Media." *IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (**ASONAM**)*, 2019. (***Acceptance rate: 14.0%***)

[C6] Y. Zhang, L. Yang, **H. Zheng**, P. Liang, C. Mangold, D. Hughes, and D.Z. Chen. "SPDA: Superpixel-based Data Augmentation for Biomedical Image Segmentation." *International Con-*

*ference on Medical Imaging with Deep Learning (**MIDL**)*, 2019, London UK. [Oral]

[C5] P. Liang*, J. Chen*, **H. Zheng**, L. Yang, Y. Zhang, and D.Z. Chen. "Cascade Decoder: A Universal Decoding Method for Biomedical Image Segmentation." *IEEE International Symposium on Biomedical Imaging (**ISBI**)*, 2019, Venice Italy. [Oral]

[C4] **H. Zheng**, L. Yang, J. Chen, J. Han, Y. Zhang, P. Liang, Z. Zhao, C. Wang, and D.Z. Chen. "Biomedical Image Segmentation via Representative Annotation." *AAAI Conference on Artificial Intelligence (**AAAI**)*, 2019, Hawaii USA. (***Acceptance rate: 16.2%***) [Oral]

[C3] **H. Zheng***, Y. Zhang*, L. Yang*, P. Liang, Z. Zhao, C. Wang, and D.Z. Chen. "A New Ensemble Learning Framework for 3D Biomedical Image Segmentation." *AAAI Conference on Artificial Intelligence (**AAAI**)*, 2019, Hawaii USA. (***Acceptance rate: 16.2%***) [Oral]

[C2] Z. Zhao*, L. Yang*, **H. Zheng**, I.H. Guldner, S. Zhang, and D.Z. Chen. "Deep Learning Based Instance Segmentation in 3D Biomedical Images Using Weak Annotation." *International Conference on Medical Image Computing and Computer-Assisted Intervention (**MICCAI**)*, 352–360, 2018, Granada Spain. (***Early acceptance rate: 16.2%***)

[C1] D.Y. Zhang, D. Wang, **H. Zheng**, X. Mu, Q. Li, and Y. Zhang. "Large-Scale Point-of-Interest Category Prediction Using Natural Language Processing Models." *IEEE International Conference on Big Data (**IEEE BigData**)*, 1027–1032, 2017. (***Acceptance rate: 20.0%***)

Technical Reports

[T2] Z. Zhao, J. Chen, H. Wang, **H. Zheng**, Z. Liu, W.A. Barrios, I.H. Guldner, S. Zhang, and D.Z. Chen. "Synthetic Image Driven Fluorescence Image Restoration Through Deep Learning."

[T1] L. Yang, Y. Zhang, Z. Zhao, **H. Zheng**, P. Liang, M.T. Ying, A.T. Ahuja and D.Z. Chen. "BoxNet: Deep Learning Based Biomedical Image Segmentation Using Boxes Only Annotation." ArXiv, 2019.

Invited Talks

Talk at University of Louisiana at Lafayette, Lafayette, LA, March 2024
Talk at Rochester Institute of Technology, Rochester, NY, March 2023
Talk at University of Texas at Dallas, Richardson, TX, Feb 2023

Current Students Supervised

Fupei Guo, PhD student (co-advised with Dr. Songyang Zhang), UL Lafayette	Since Aug 2024
Tasnim Tabassum, PhD student , UL Lafayette	Since Aug 2024
Awaiz Noor, Master's student, University of Louisiana at Lafayette	Since Aug 2024
Chongcong Jiang, Intern student, MS@UESTC	Since Aug 2024
Jinfan Zhang, Intern student, BS@UCSB	Since Mar 2025

Past Students Supervised

Yuemeng Li, Ph.D. student, University of Pennsylvania	2022
Jean-Philippe Douailly-Backman, Master student, University of Notre Dame	Fall, 2020
Shaojie Ye, visiting undergraduate student at Notre Dame	summer, 2019
Yihong Ma, visiting undergraduate student at Notre Dame	summer, 2019
Li Guo, visiting undergraduate student at Notre Dame	summer, 2019
Yunhao Xing, visiting undergraduate student at Notre Dame	summer, 2019

Tianxiao Hu, visiting undergraduate student at Notre Dame — summer, 2018
Chen Liang, visiting undergraduate student at Notre Dame — summer, 2018
Sirou Zhu, visiting undergraduate student at Notre Dame — summer, 2018

Teaching Courses

CSCE 508 ***Image Processing*** — Spring 2025
University of Louisiana at Lafayette — *Lafayette, LA, USA*

CMPS 320 ***Introduction to Artificial Intelligence and Machine Learning*** — Fall 2024
University of Louisiana at Lafayette — *Lafayette, LA, USA*

Professional Activities

Conference Committee

Session Chair, IEEE International Symposium on Biomedical Imaging (ISBI'25)
Area Chair, Medical Image Computing and Computer Assisted Intervention (MICCAI'24)
Program Committee, Medical Imaging Meets NeurIPS Workshop (Med-NeurIPS'21-23)

Selected Journal Reviews

IEEE Transactions on Medical Imaging (TMI)
Medical Image Analysis (MIA)
IEEE Transactions on Biomedical Engineering (TBME)
IEEE Transactions on Visualization and Computer Graphics (TVCG)
IEEE Transactions on Image Processing (TIP)
Information Fusion (IF)
Pattern Recognition (PR)
IEEE Transactions on Artificial Intelligence (TAI)
Scientific Reports (SR)
Computers & Graphics (C&G)
Frontiers in Big Data (FBD)
IEEE Transactions on Emerging Topics in Computational Intelligence (TETCI)

Selected Conference Reviews

International Conference on Machine Learning (ICML'22&25)
International Conference on Learning Representations (ICLR'25)
Annual Conference on Neural Information Processing Systems (NeurIPS'24-25)
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR'21-24)
International Conference on Computer Vision (ICCV'21)
AAAI Conference on Artificial Intelligence (AAAI'21-24)
IEEE Visualization Conference (VIS'20-23)
International Joint Conference on Artificial Intelligence (IJCAI'21-25)
International Conf. on Medical Image Computing & Computer Assisted Intervention (MICCAI'20-25)
The European Conference on Computer Vision (ECCV'22&24)
The EG/VGTC Conference on Visualization (EuroVis'20&23)
Medical Imaging with Deep Learning (MIDL'22-24)
IEEE Pacific Visualization Symposium (PacificVis'20&23)