

Hui Zhu

Computer Vision & Trustworthy AI Researcher

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Computer Science Ph.D. researcher building **multimodal vision systems and trustworthy AI methods**. Published at CVPR, WACV, and ECAI, with hands-on experience in grounded vision-language models, 2D/3D segmentation, foundation-model adaptation, and LLM privacy evaluation. Skilled at taking research from data pipelines and experimental design through multi-GPU evaluation and publication.

Focus	Specialty	Methods	Practice
Computer Vision	Multimodal Learning	Foundation Models	Reproducible ML

EDUCATION

Ph.D. in Computer Science · Wayne State University
Expected Jul 2028
Detroit, Michigan · Advisor: Prof. Dongxiao Zhu

B.Eng. in Software Engineering · Dalian University of Technology
Jul 2023
Dalian, China

RESEARCH EXPERIENCE

Graduate Research Assistant · Trustworthy AI Lab, Wayne State University
Aug 2023—Present

- Co-developed **WalkGPT** (CVPR 2026), unifying conversational guidance, pixel-level segmentation, and relative depth estimation for accessible pedestrian navigation.
- Co-developed **BiPVL-Seg**, combining bidirectional progressive fusion with global-local contrastive alignment for end-to-end vision-language segmentation.
- Co-authored **MulModSeg** (WACV 2025), enabling one model to learn from unpaired modalities through text conditioning and alternating training without added inference cost.
- Build reproducible PyTorch/MONAI pipelines for preprocessing, augmentation, multi-GPU training, ablation studies, calibration, and model evaluation.
- Collaborate across computer science, engineering, and applied research teams; translate domain problems into measurable machine-learning objectives.

Undergraduate Researcher · Wang Laboratory, Dalian University of Technology
Sep 2022—Jul 2023

- Applied deep-learning methods to experimental signal data, covering preprocessing, feature extraction, algorithm replication, and parameter studies.
- Coordinated reruns and result analysis to improve experimental reliability and communicate progress to the research team.

PUBLICATIONS & PREPRINTS · NEWEST FIRST

1. **WalkGPT: Grounded Vision-Language Conversation with Depth-Aware Segmentation for Pedestrian Navigation.**
Rafi Ibn Sultan, **Hui Zhu**, Xiangyu Zhou, Chengyin Li, Prashant Khanduri, Marco Brocanelli, Dongxiao Zhu. [CVPR 2026, Mar 2026](#). [arXiv:2603.10703](#)
2. **Automatic Calibration for Membership Inference Attack on Large Language Models.**
Saleh Zare Zade, Yao Qiang, Xiangyu Zhou, **Hui Zhu**, Mohammad Amin Roshani, Prashant Khanduri, Dongxiao Zhu. [ECAI 2025](#). [arXiv:2505.03392](#)
3. **BiPVL-Seg: Bidirectional Progressive Vision-Language Fusion with Global-Local Alignment for Medical Image Segmentation.**
Rafi Ibn Sultan, **Hui Zhu**, Chengyin Li, Dongxiao Zhu. [arXiv preprint, Mar 2025](#). [arXiv:2503.23534](#)
4. **Mechanical Evolution of Metastatic Cancer Cells in 3D Microenvironment.**
Karlin Hilai, Daniil Grubich, Marcus Akrawi, **Hui Zhu**, Razanne Zaghloul, Chenjun Shi, Man Do, Dongxiao Zhu, et al. [Small, Mar 2025](#). [doi:10.1002/sml.202403242](#)
5. **Longitudinal Mechanical Imaging of Metastatic Tumor Spheroids Using Brillouin Microscopy.**
Karlin Hilai, Daniil Grubich, Marcus Akrawi, **Hui Zhu**, Razanne Zaghloul, Chenjun Shi, Man Do, Dongxiao Zhu, Jitao Zhang. [Optical Elastography and Tissue Biomechanics XII, Mar 2025](#). [doi:10.1117/12.3043385](#)
6. **MulModSeg: Enhancing Unpaired Multi-Modal Medical Image Segmentation with Modality-Conditioned Text Embedding and Alternating Training.**
Chengyin Li, **Hui Zhu**, Rafi Ibn Sultan, Hassan Bagher Ebadian, Prashant Khanduri, Chetty Indrin, Kundan Thind, Dongxiao Zhu. [WACV 2025, pp. 3581–3591, Feb 2025](#). [paper](#)
7. **GeoSAM: Fine-Tuning SAM with Multi-Modal Prompts for Mobility Infrastructure Segmentation.**
Rafi Ibn Sultan, Chengyin Li, **Hui Zhu**, Prashant Khanduri, Marco Brocanelli, Dongxiao Zhu. [arXiv preprint, Nov 2023](#). [arXiv:2311.11319](#)

TEACHING & MENTORSHIP

Teaching Assistant / Project Instructor · CSC 4996 Capstone Projects Jan 2024—Present

Wayne State University

- Guide student teams through problem definition, software architecture, implementation, milestone reviews, and final presentations.
- Supported projects spanning image analysis, compliance auditing, generative audio, voice interfaces, autonomous systems, and mobile applications.

TECHNICAL TOOLKIT

Programming & systems: Python, C/C++, Bash, SQL, LaTeX, Linux, Git/GitHub, Docker, CUDA, multi-GPU/HPC, Conda

ML stack: PyTorch, MONAI, Hugging Face Transformers, scikit-learn, NumPy/SciPy, pandas, reproducible experiment tracking

Vision & imaging: U-Net, CNN/ResNet, Vision Transformers, Swin-UNETR, SAM; 2D/3D CT/MR and microscopy; DICOM/NIfTI, OpenCV, scikit-image

Evaluation: Dice, IoU, boundary metrics, ROC/AUC, cross-validation, ablation design, calibration, uncertainty estimation