

RESEARCH INTERESTS	Deep learning for medical image analysis (e.g., image segmentation, classification, and detection, etc.): • Topology-driven image analysis, Self-supervised learning, Large foundation models/Large language models in medical imaging, Multi-modal data analysis, Data-efficient deep learning, Agentic Medical AI Deep learning for scientific visualization: • Scientific data generation, Scientific data compression
WORKING EXPERIENCE	Assistant Professor in Computer Science University of Texas Rio Grande Valley, Edinburg, TX, USA 2024.09 - Now
EDUCATION	Department of Computer Science and Engineering, University of Notre Dame Notre Dame, IN, USA <i>Ph.D. in Computer Science</i> 2018 - 2024 • Advisor: Drs. Danny Z. Chen and Chaoli Wang • Thesis: New Deep Methods for Medical Image Analysis and Scientific Data Generation and Compression Department of Computer Science, University of Texas Rio Grande Valley Edinburg, TX, USA <i>M.S. in Computer Science</i> 2016 - 2018 • Advisor: Dr. Bin Fu • Thesis: Approximate Set Union via Approximate Randomization School of Mathematical and Statistical Sciences , University of Texas Rio Grande Valley Edinburg, TX, USA <i>M.S. in Mathematics</i> 2014 - 2016 • Advisor: Dr. Zhaosheng Feng • Thesis: Lie Symmetry to Second-order Nonlinear Differential Equations and its First Integrals Department of Mathematics, Tianjin University of Technology and Education Tianjin, China <i>B.S. in Mathematics</i> 2010 - 2014
AWARDS	• IEEE CG&A 2021 Best Paper Award 2022 • Outstanding Student Award, University of Texas Rio Grande Valley 2018
GRANTS	1. Institutional Research Enhancement Award (AIREA): Immersive Surgical Planning: An AI-Integrated Virtual Reality Platform for Vascular Procedures (Co-PI, \$199,994), AHA-AIREA, 1/2026 – 12/2027 2. Collaborative Research: CISE Crosscutting Small: SCH: Towards Auto-Prompt Textual Annotations Generation with Domain Knowledge for Multimodal Medical Image Segmentation (Co-PI, \$600,000), NSF CISE MSI, 10/2025-9/2028 3. Cooperative Agreement: Advancing Automation in SIT Programs Using AI Tools: Pathogen Detection and Pupal Age Determination (Sole PI, \$152,501), USDA-APHIS, 9/2025 – 9/2027

PUBLICATIONS

(* INDICATES EQUAL CONTRIBUTION, # INDICATES A STUDENT I HAVE MENTORED, AND ◇ INDICATES CORRESPONDING AUTHOR)

1. Peixian Liang, Jianxu Chen, Yizhe Zhang, Hongxiao Wang, Hao Zheng, **Pengfei Gu**, and Danny Z. Chen, “InTracker: An Integrated Detector-tracker Framework for Cell Detection and Tracking”, in *IEEE 33rd International Symposium on Computer-Based Medical Systems (CBMS)*, 2020
2. Bin Fu, **Pengfei Gu**◇, and Yuming Zhao, “Polyhedral Circuits and Their Applications”, in *Algorithmic Aspects in Information and Management (AAIM)*, 2020
3. **Pengfei Gu**, Hao Zheng, Yizhe Zhang, Chaoli Wang, and Danny Z. Chen, “kCBAC-Net: Deeply Supervised Complete Bipartite Networks with Asymmetric Convolutions for Medical Image Segmentation”, in *International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*, 2021
4. **Pengfei Gu**, Jun Han, Danny Z. Chen, and Chaoli Wang, “Reconstructing Unsteady Flow Data from Representative Streamlines via Diffusion and Deep-learning-based Denoising”, *IEEE Computer Graphics and Applications (CG&A)*, 2021 (**IEEE CG&A 2021 Best Paper Award**)
5. Bin Fu, **Pengfei Gu**◇, and Yuming Zhao, “Approximate Set Union via Approximate Randomization”, *Theoretical Computer Science (TCS)*, 2021
6. **Pengfei Gu**, Jun Han, Danny Z. Chen, and Chaoli Wang, “Scalar2Vec: Translating Scalar Fields to Vector Fields via Deep Learning”, in *IEEE 15th Pacific Visualization Symposium (PacificVis)*, 2022
7. Yejia Zhang, Nishchal Sapkota, **Pengfei Gu**, Yaopeng Peng, Hao Zheng, and Danny Z. Chen, “Keep Your Friends Close & Enemies Farther: Debiasing Contrastive Learning with Spatial Priors in 3D Radiology Images”, in *IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, 2022
8. Yejia Zhang*, **Pengfei Gu***, Nishchal Sapkota, Hao Zheng, Peixian Liang, and Danny Z. Chen, “A Point in the Right Direction: Vector Prediction for Spatially-aware Self-supervised Volumetric Representation Learning”, in *IEEE 20th International Symposium on Biomedical Imaging (ISBI)*, 2023 (**Oral Presentation**)
9. **Pengfei Gu***, Yejia Zhang*, Chaoli Wang, and Danny Z. Chen, “ConvFormer: Combining CNN and Transformer for Medical Image Segmentation”, in *IEEE 20th International Symposium on Biomedical Imaging (ISBI)*, 2023 (**Oral Presentation**)
10. Yizhe Zhang*, **Pengfei Gu***, Yejia Zhang, Chaoli Wang, and Danny Z. Chen, “GrNT: Gate-regularized Network Training for Improving Multi-scale Fusion in Medical Image Segmentation”, in *IEEE 20th International Symposium on Biomedical Imaging (ISBI)*, 2023 (**Oral Presentation**)
11. Yejia Zhang, **Pengfei Gu**, Nishchal Sapkota, and Danny Z. Chen, “SwIPE: Efficient and Robust Medical Image Segmentation with Implicit Patch Embeddings”, in *International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*, 2023
12. Marinka Zitnik, Michelle M. Li, Aydin Wells, Kimberly Glass, Deisy Morselli Gysi, Arjun Krishnan, T. M. Murali, Predrag Radivojac, Sushmita Roy, Anaïs Baudot, Serdar Bozdog, Danny Z. Chen, Lenore Cowen, Kapil Devkota, Anthony Gitter, Sara Gosline, **Pengfei Gu**, Pietro H. Guzzi, Heng Huang, Meng Jiang, et al., “Current and Future Directions in Network Biology”, *Bioinformatics Advances*, 2024
13. **Pengfei Gu**, Danny Z. Chen, and Chaoli Wang, “NeRVI: Compressive Neural Representation of Visualization Images for Communicating Volume Visualization Results”, *Computers & Graphics (C&G)*, 2023
14. Yizhe Zhang, Tao Zhou, Yuhui Tao, Ye Wu, Benyuan Liu, **Pengfei Gu**, Qiang Chen, and Danny Z. Chen, “TestFit: A Plug-and-Play One-Pass Test Time Method for Medical Image Segmentation”, *Medical Image Analysis (MedIA)*, 2024

15. **Pengfei Gu**, Zihan Zhao, Hongxiao Wang, Yaopeng Peng, Yizhe Zhang, Nishchal Sapkota, Chaoli Wang, and Danny Z. Chen, “Boosting Medical Image Classification with Segmentation Foundation Model”, in *IEEE 21st International Symposium on Biomedical Imaging (ISBI)*, 2024 (Oral Presentation)
16. Hongxiao Wang, Yang Yang, Zhuo Zhao, **Pengfei Gu**, and Danny Z. Chen, “Path-GPTOmic: A Balanced Multi-modal Learning Framework for Survival Outcome Prediction”, in *IEEE 21st International Symposium on Biomedical Imaging (ISBI)*, 2024 (Oral Presentation)
17. Yunfei Lu, **Pengfei Gu**, and Chaoli Wang, “FCNR: Fast Compressive Neural Representation of Visualization Images”, in *IEEE VIS Conference (Short Papers)*, 2024
18. YeJia Zhang, Hanqing Chao, Zhongwei Qiu, Wenbin Liu, Yixuan Shen, Nishchal Sapkota, **Pengfei Gu**, Danny Z Chen, Le Lu, Ke Yan, Dakai Jin, Yun Bian, and Hui Jiang “IHCSurv: Effective Immunohistochemistry Priors for Cancer Survival Analysis in Gigapixel Multi-stain Whole Slide Images”, in *International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*, 2024
19. Yizhe Zhang, Tao Zhou, Shuo Wang, Ye Wu, **Pengfei Gu**, and Danny Z. Chen, “Combining Segment Anything Model with Domain-Specific Knowledge for Semi-Supervised Learning in Medical Image Segmentation”, in *Chinese Conference on Pattern Recognition and Computer Vision*, 2024
20. Delin An*, **Pengfei Gu***, Milan Sonka, Chaoli Wang, and Danny Z. Chen, “Sli2Vol+: Segmenting 3D Medical Images Based on an Object Estimation Guided Correspondence Flow Network”, in *IEEE/CVF Winter Conference on Applications of Computer (WACV)*, 2025
21. Fabian Vazquez[#], Jose Nunez, Xiaoyan Fu, **Pengfei Gu**, and Bin Fu, “Exploring Transfer Learning for Deep Learning Polyp Detection in Colonoscopy Images Using YOLOv8”, in *SPIE Medical Imaging*, 2025
22. Delin An, Pan Du, **Pengfei Gu**, Jian-xun Wang and Chaoli Wang, “Hierarchical LoG Bayesian Neural Network for Enhanced Aorta Segmentation”, in *IEEE 22nd International Symposium on Biomedical Imaging (ISBI)*, 2025 (Oral Presentation)
23. Jose Nunez[#], Fabian Vazquez, Diego Adame, Xiaoyan Fu, **Pengfei Gu**, and Bin Fu, “White Light Specular Reflection Data Augmentation for Deep Learning Polyp Detection”, in *IEEE 22nd International Symposium on Biomedical Imaging (ISBI)*, 2025
24. Diego Adame[#], Jose A Nunez, Fabian Vazquez, Nayeli Gurrola, Huimin Li, Haoteng Tang, Bin Fu, and **Pengfei Gu**, “Topo-VM-UNetV2: Encoding Topology into Vision Mamba UNet for Polyp Segmentation”, in *IEEE International Symposium on Computer-Based Medical Systems (CBMS)*, 2025 (Oral Presentation)
25. **Pengfei Gu**, Haoteng Tang, Islam A Ebeid, Jose A Nunez, Fabian Vazquez, Diego Adame, Marcus Zhan, Huimin Li, Bin Fu, and Danny Z Chen, “Adapting a Segmentation Foundation Model for Medical Image Classification”, in *IEEE International Symposium on Computer-Based Medical Systems (CBMS)*, 2025 (Oral Presentation)
26. Haoteng Tang, Siyuan Dai, Lei Guo, **Pengfei Gu**, Guodong Liu, Alex D Leow, Paul M Thompson, Heng Huang, and Liang Zhan, “Instantaneous Frequency: A New Functional Biomarker for Dynamic Brain Causal Networks”, *AI in Neuroscience*, 2025
27. **Pengfei Gu**, Hongxiao Wang, YeJia Zhang, Huimin Li, Chaoli Wang, and Danny Z Chen, “TopoImages: Incorporating Local Topology Encoding into Deep Learning Models for Medical Image Classification”, in *the 33rd ACM International Conference on Multimedia (ACM MM)*, 2025

28. Kun Zhao, Yang Du, Rhianna Zhang, Liang Zhan, Dongkuan Xu, **Pengfei Gu**, and Haoteng Tang, “Who Matters More in Radiology Report Generation: Vision Encoders or Language Models?”, in *IEEE International Conference on Data Mining Workshop (ICDM Workshop)*, 2025
29. **Pengfei Gu***, Huimin Li*, Yejia Zhang, Chaoli Wang, and Danny Z Chen, “Self Pre-training with Topology-and Spatiality-aware Masked Autoencoders for 3D Medical Image Segmentation”, in *IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, 2025
30. Islam Akef Ebeid, Haoteng Tang, and **Pengfei Gu**, “Inferred Global Dense Residue Transition Graphs from Primary Structure Sequences Enable Protein Interaction Prediction via Directed Graph Convolutional Neural Networks”, *Frontiers in Bioinformatics*, 2025
31. **Pengfei Gu***, Huimin Li*, Haoteng Tang, Dongkuan (DK) Xu, Erik Enriquez, DongChul Kim, Bin Fu, and Danny Z Chen, “Integrating Multi-scale and Multi-filtration Topological Features for Medical Image Classification”, in *IEEE/CVF Winter Conference on Applications of Computer (WACV)*, 2026
32. Nishchal Sapkota, Haoyan Shi, Yejia Zhang, Xianshi Ma, Bofang Zheng, Fabian Vazquez, **Pengfei Gu**, Danny Z Chen, “When Swin Transformer Meets KANs: An Improved Transformer Architecture for Medical Image Segmentation”, in *IEEE International Symposium on Biomedical Imaging (ISBI)*, 2026 (**Oral Presentation**)
33. Fabian Vazquez[#], Jose Nunez, Diego Adame, Alissen Moreno, Augustin Zhan, Huimin Li, Jinghao Yang, Haoteng Tang, Bin Fu, **Pengfei Gu**, “Learning with Geometric Priors in U-Net Variants for Polyp Segmentation”, in *IEEE International Symposium on Biomedical Imaging (ISBI)*, 2026 (**Oral Presentation**)
34. Guangyu Meng, **Pengfei Gu**[◇], Peixian Liang, John P. Lalor, Erin Wolf Chambers[◇], Danny Z Chen[◇], “TopoCL: Topological Contrastive Learning for Medical Imaging”, in *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2026
35. Guangyu Meng, **Pengfei Gu**[◇], Xueyang Li, Yiyu Shi, Erin Wolf Chambers[◇], Danny Z Chen[◇], “TopoAgent: An Agentic Framework for Automated Topology Learning in Medical Imaging”, in *European Conference on Computer Vision (ECCV)*, 2026
36. Diego Adame[#], Fabian Vazquez, Jose A. Nunez, Huimin Li, Jinghao Yang, Erik Enriquez, DongChul Kim, Haoteng Tang, Bin Fu, **Pengfei Gu**, “Patch-MoE Mamba: A Patch-Ordered Mixture-of-Experts State Space Architecture for Medical Image Segmentation”, in *IEEE/ACM International Conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE)*, 2026 (**Oral Presentation**)
37. Martha Asare, Jinman Zhang, Jingting Jiang, Jingyi Li, Hongkai Yu, **Pengfei Gu**, Qi Lu, and Jinghao Yang, “Stereo Vision-Based Point Cloud Reconstruction of Additive Manufacturing Productions”, in *ASME 2026 53rd Annual Review of Progress in Quantitative Nondestructive Evaluation (QNDE)*, 2026
38. Kun Zhao, Siyuan Dai, Yingying Zhang, Guodong Liu, **Pengfei Gu**, Chenghua Lin, Paul Matthew Thompson, Alex Leow, Heng Huang, Lifang He, Liang Zhan and Haoteng Tang, “Interpretable Multimodal Learning for Integrating Neuroimaging and Genetic Data in Alzheimer’s Disease”, *Frontiers in Radiology*, 2026
39. Chen Yuan Wang, Hector Lugo, Christian Narcia-Macias, Daniel Masamba, **Pengfei Gu**, Haoteng Tang, Erik Enriquez, and Dongchul Kim, “Vision–Language Guided Quadruped Navigation with Reinforcement Learning Control”, in *International Conference on Machine Learning and Applications (ICMLA)*, 2026

MENTORSHIP EXPERIENCE	Fabian Vazquez <i>Ph.D. in Computer Science, UTRGV</i>	Fall 2024 - Now
	Jose Nunez, (co-advisor: Dr. Bin Fu) <i>Ph.D. in Computer Science, UTRGV</i>	Fall 2024 - Now
	Abdul Basit Mohammed, (co-advisor: Dr. Haoteng Tang) <i>Ph.D. in Computer Science, UTRGV</i>	Spring 2026 - Now
	Diego Adame <i>M.S. in Computer Science, UTRGV</i>	Fall 2024 - Spring 2026
	Zihan Zhao <i>B.S. in Computer Science, Tianjin University</i>	Jul 2023 - Aug 2023
	Kaiyuan Tang <i>B.S. in Computer Science, Xidian University</i>	Jul 2021 - Aug 2021
	Shen Zheng <i>B.S. in Computer Science, Wenzhou Kean University</i>	Jul 2021 - Aug 2021
	Daniel Gutierrez <i>B.S. in Computer Science, UTRGV</i>	Jan 2025 - May 2025
	John Ross <i>B.S. in Computer Science, UTRGV</i>	Jan 2025 - May 2025
	Joe Reyna <i>B.S. in Computer Science, UTRGV</i>	Jan 2025 - May 2025
	Esteban Kott <i>B.S. in Computer Science, UTRGV</i>	Jan 2025 - May 2025
	Ana Sanchez <i>B.S. in Computer Science, UTRGV</i>	Jan 2025 - May 2025
TEACHING EXPERIENCE	CSCI-3310: Mathematical Foundation of CS, UTRGV	Fall 2024, Spring 2025, Fall 2025, Fall 2026
	CSCI-4341: Deep Learning Algorithms for Medical Imaging, UTRGV	Spring 2025, Spring 2026
	CSCI-4364: Deep Learning Algorithms for Medical Imaging, UTRGV	Fall 2026
	CSCI-8370: Deep Learning Algorithms for Medical Imaging, UTRGV	Fall 2025
UNIVERSITY SERVICES		
	• Faculty Search Committee, Department of Computer Science, UTRGV, 2024 - 2025	
	• Scientific Committee for STEM Research Conference 2025, UTRGV, 2025	
	• Scientific Committee for STEM Research Conference 2026, UTRGV, 2026	

Reviewers for Journals: *Engineering Applications of Artificial Intelligence,*
Computers & Graphics,
Biomedical Signal Processing and Control
Computers in Biology and Medicine
European Journal of Agronomy
Neural Networks
Scientific Reports
Neurocomputing
Medical Image Analysis
Information Fusion

Reviewers for Conferences: *ICDM Workshop 2025,*
MIDL 2026, 2025,
WACV 2026, 2025,
MICCAI 2025, 2024, 2023,
ISBI 2026, 2025, 2024
CVPR 2026
ECCV 2026
NeurIPS 2026
ACM MM 2026
IEEE/ACM CHASE 2026 Workshop
AAAI 2027