Pengfei Gu Ph.D.

pengfei.gu01@utrgv.edu
https://pgu-nd.github.io/

RESEARCH INTERESTS

Deep learning for medical image analysis (e.g., image segmentation, classification, and registration):

- Topology-driven image analysis, Self-supervised learning, Large foundation models/Large language models in medical imaging, Multi-modal data analysis, Data-efficient deep learning

Deep learning for scientific visualization:

- Scientific data generation, Scientific data compression

WORKING EXPERIENCE

Assistant Professor in Computer Science | University of Texas Rio Grande Valley, Edinburgh, TX, USA
2024.09 - Now

EDUCATION

Department of Computer Science and Engineering, University of Notre Dame Notre Dame, IN, USA

Ph.D. in Computer Science
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

M.S. in Computer Science
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

M.S. in Mathematics
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

B.S. in Mathematics
2010 - 2014

AWARDS

- **IEEE CG&A 2021 Best Paper Award** 2022
- **Outstanding Student Award**, University of Texas Rio Grande Valley 2018

PUBLICATIONS

1. **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

2. **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

3. **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)

4. **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

5. **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*)

6. **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

7. 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

8. 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)

9. 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)

10. Bin Fu, **Pengfei Gu (Corresponding Author)**, and Yuming Zhao, "Approximate Set Union via Approximate Randomization", *Theoretical Computer Science (TCS)*, 2021

11. Bin Fu, **Pengfei Gu (Corresponding Author)**, and Yuming Zhao, "Polyhedral Circuits and Their Applications", *in Algorithmic Aspects in Information and Management (AAIM)*, 2020

12. Yunfei Lu, **Pengfei Gu**, and Chaoli Wang, "FCNR: Fast Compressive Neural Representation of Visualization Images", *in IEEE VIS Conference (Short Papers)*, 2024

13. 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

14. 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

15. 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

16. 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

17. 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

18. 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

19. 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

20. Marinka Zitnik, Michelle M. Li, Aydin Wells, Kimberly Glass, Deisy Morselli Gysi, Arjun Krishnan, T. M. Murali, Predrag Radivojac, Sushmita Roy, Anaïs Baudot, Serdar Bozdag, 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

MENTORSHIP EXPERIENCE		
Fabian Vazquez		
Ph.D. in Computer Science, UTRGV		Fall 2024 - Now
Jose Nunez, (co-advisor: Dr. Bin Fu)		
Ph.D. in Computer Science, UTRGV		Fall 2024 - Now
Diego Adame		
M.S. in Computer Science, UTRGV		Fall 2024 - Now
Nayeli Gurrola		
M.S. in Computer Science, UTRGV		Fall 2024 - Now
Zihan Zhao		
B.S. in Computer Science, Tianjin University		Jul 2023 - Aug 2023
Kaiyuan Tang		
B.S. in Computer Science, Xidian University		Jul 2021 - Aug 2021
Shen Zheng		
B.S. in Computer Science, Wenzhou Kean University		Jul 2021 - Aug 2021

TEACHING EXPERIENCE		
CSCI-3310: Mathmatical Foundation of CS, UTRGV		Fall 2024

ACADEMIC
SERVICES

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

Reviewers for Conferences: *WACV 2025,*
MICCAI 2024, 2023,
ISBI 2025, 2024