Delin An

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EDUCATION

- **University of Notre Dame, (09/2022 - Present)**
  - Ph.D. Student in Computer Science and Engineering, GPA: 3.8/4.0
  - Research Interests: Advanced AI methodologies for interdisciplinary applications
  - Awards: Scientific Artificial Intelligence (SAI) Graduate Fellowship, Spring 2025; Zahm Professional Development Fund, Spring 2025
- **Xi'an Jiaotong University (XJTU), 09/2019-06/2022**
  - M.Eng. in Mechanical Engineering, GPA: 86.28/100
  - Honors: Special Scholarship, academic year 2019, 1st Class Scholarship, academic year 2020
  - Awards: 3rd Prize in National Graduate Robotics Contest, Grand Prize in Robot Creativity Contest
- **University of Electronic Science and Technology of China (UESTC), 09/2015-06/2019**
  - B.Eng. in Mechanical Engineering, GPA: 3.61/4.0, Ranking: 10%
  - Honors: Outstanding Graduates, academic year 2019, People's Second Scholarship, academic year 2017, People's Third Scholarship, academic year 2016

PUBLICATIONS

*Multiple first-author publications in **CVPR**, **IEEE TVCG** and **Science Advances**; recipient of the Notre Dame **SAI Fellowship** and **Zahm Award**.*

- **Delin An** and Chaoli Wang. Sketch2CT: Multimodal Diffusion for Structure-Aware 3D Medical Volume Generation. *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2026. (Accepted).*
- **Delin An**, Pan Du, Jian-Xun Wang, and Chaoli Wang. AortaDiff: Volume-Guided Conditional Diffusion Models for Multi-Branch Aortic Surface Generation. *IEEE Transactions on Visualization and Computer Graphics (IEEE VIS 2025), 32(1):922-932, Jan 2026.*
- Pan Du*, **Delin An***, Chaoli Wang, and Jian-Xun Wang. AI-Powered Automated Model Construction for Patient-Specific CFD Simulations of Aortic Flows. *Science Advances*, 2025. DOI: 10.1126/sciadv.adw2825. (*Co-first author)
- **Delin An** and Chaoli Wang. SurfPatch: Enabling Patch Matching for Exploratory Stream Surface Visualization. *IEEE Transactions on Visualization and Computer Graphics*, 2025. DOI: 10.1109/TVCG.2025.3567133.
- **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. *IEEE/CVF Winter Conference on Applications of Computer Vision*, 2025. DOI: 10.1109/WACV61041.2025.00357.
- **Delin An**, Pan Du, Pengfei Gu, Jian-Xun Wang, and Chaoli Wang. Hierarchical LoG Bayesian Neural Network for Enhanced Aorta Segmentation. *IEEE International Symposium on Biomedical Imaging*, 2025. DOI: 10.1109/ISBI60581.2025.10980947.
- **Delin An**, Aibin Zhu, Xian Yue, Diyang Dang, Yulin Zhang. Environmental obstacle detection and localization model for cable-driven exoskeleton, *International Conference on Ubiquitous Robots*, 2022. DOI: 10.1109/UR55393.2022.9826283.
- Xian Yue, Aibin Zhu, Peifeng Ma, **Delin An**, Diyang Dang, Yulin Zhang. Research on Lower Limb

Rehabilitation Exoskeleton Control based on Improved Dynamic Motion Primitives, *International Conference on Advanced Robotics and Mechatronics*, 2022. DOI: 10.1109/ICARM54641.2022.9959156.

- Xian Yue, Aibin Zhu, Jiyuan Song, Guangzhong Cao, **<u>Delin An</u>**, Zhifu Guo. The Design and Implementation of Human Motion Capture System Based on CAN Bus, *International Conference on Ubiquitous Robots*, 2020. DOI: 10.1109/UR49135.2020.9144858.

RESEARCH PROJECTS

- **3D Segmentation and Probabilistic Representation Learning**
  (Venue: WACV, ISBI)
- Developed correspondence-guided 3D segmentation frameworks that enforce cross-slice structural consistency and reduce manual annotation requirements through object-aware label propagation.
- Investigated probabilistic and hierarchical Bayesian neural architectures for uncertainty-aware segmentation, improving robustness, boundary precision, and reliability in volumetric representation learning.
- **Generative Modeling and Geometry-Aware Surface Reconstruction**
  (Venue: CVPR, VIS, and Science Advances)
- Designed multimodal structure-aware diffusion frameworks for controllable 3D volume synthesis with integrated geometric constraints.
- Proposed volume-guided conditional diffusion models for automatic centerline extraction and multi-branch surface reconstruction using NURBS fitting.
- Built end-to-end pipelines combining segmentation, geometric deformation (GNN + LDDMM), and mesh optimization to produce simulation-ready, CFD-compatible anatomical models.
- **Geometry Analysis and Scientific Visualization**
  (Venue: TVCG)
- Introduced hierarchical surface patch matching methods for multiscale geometric consistency analysis of complex 3D structures.
- Developed vertex-to-patch-to-surface comparison strategies and interactive visualization tools to support exploratory analysis of scientific flow data and geometric patterns.
- **Embodied Perception and Robotic Systems**
  (Venue: UR, ICARM)
- Developed CNN-based terrain perception integrated with finite-state gait control for adaptive locomotion in cable-driven wearable robots.
- Designed and validated embedded control pipelines bridging visual perception, mechanical actuation, and real-world robotic system deployment.

TECHNICAL SKILLS

- Machine Learning & AI: PyTorch-based deep learning for 3D diffusion models, transformer architectures, and distributed training on volumetric data.
- 3D Vision & Geometric Learning: Geometry-aware 3D segmentation, conditional generative modeling, correspondence learning across slices and volumes, probabilistic and Bayesian modeling for structurally consistent representation learning.
- Computational Modeling & Embedded Systems: Computational and engineering platforms (MATLAB, OpenFOAM, SolidWorks, Keil) for geometry processing, surface reconstruction, embedded control, and simulation-based validation.
- Robotics & Embedded Systems: Embedded programming (Keil), and mechanical system design.