Hongbo Chen

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EDUCATION

Joint-PhD Candidate in Electronic Science and Technology 2018-Present
University of Chinese Academy of Sciences, Beijing, China
ShanghaiTech University, Shanghai, China
School of Information Science and Technology (SIST)
- 3-D Reconstruction
- 3-D Ultrasound Imaging
- Medical Image Analysis

Visiting PhD Student/Research Assistant 2022-2023
University of Alberta/Alberta Health Services, Edmonton, Canada
Department of Radiology and Diagnostic Imaging
- 3-D Motion Processing
- Geometric Modeling
- 3-D Ultrasound Intraoral Imaging

Undergraduate in Electronic Information Engineering 2014-2018
Changchun University of Science and Technology, Changchun, China
- *Automatic Control*
- *Image Processing and Recognition*
- *Circuit Board and PCB Design*

SKILLS

- Development of 3-D reconstruction/detection algorithms with deep-learning frameworks
- Medical image processing and analysis based on Matlab/C#/Python
- C# windows application development based on Microsoft Visual Studio
- MCU C language development

AWARDS

- Best Paper Award of MICCAI Conference (Top 1st) 2024
- Merit student of ShanghaiTech University 2022
- Outstanding student in SIST of ShanghaiTech University 2021

- Honored Front Cover for ISSUE 10 VOLUME 68 in IEEE T-UFFC 2021.10
- National award for The "NXP Cup" Intelligent Car Competition 2017.8
- Third runner-up for The "NXP Cup" Intelligent Car Competition (Northeast China) 2017.7
- Provincial award for National Undergraduate Electronics Design Contest 2016.9
- National Training Program of Innovation and Entrepreneurship for Undergraduates 2015-2017
- Received the school-level scholarships and the honor of merit student 2014-2018

RESEARCH PROGRAMS

- Natural Science Foundation of China (NSFC) 2021-2024
  Participated, Grant No.12074258
- Alberta Innovates-Accelerating Innovations into CarE (AICE) program, Canada 2022-2024
  Participated, Grant No.RES0056222
- Natural Science Foundation of China (NSFC) 2021-2024
  Participated, Grant No.82071924
- Natural Science Foundation of Shanghai (NSFS) 2019-2021
  Participated, Grant No.19ZR1433800

PATENTS

- Rui Zheng (PhD Supervisor), **Hongbo Chen**. Unconstrained scanning and voxel-based three-dimensional real-time spine imaging method. Chinese invention patent. ShanghaiTech University.

  Valid No.CN110969694B. *Application No.201911132940.5.*

- Rui Zheng, **Hongbo Chen**. Handheld unconstrained scanning wireless three-dimensional ultrasound real-time voxel imaging system. Chinese invention patent. ShanghaiTech University.

  Valid No.CN111184535B. *Application No.202010165914.9*

- Rui Zheng, **Hongbo Chen**. A method and device for determining scoliosis angle. Chinese invention patent. ShanghaiTech University & United Imaging Intelligent Technology Co., Ltd. *Under Examination No. CN114299015A. Application No.202111630004.4*

- Rui Zheng, **Hongbo Chen**. A fixed rod bending method based on magnetic navigation positioning. Chinese invention patent. ShanghaiTech University & ZhongShan Hospital, Fudan University. *Application No.202210987837.4*

PUBLICATIONS

⇒ **† Equal Contribution.**

1. **Hongbo Chen**, Yuchong Gao, Shuhang Zhang, Jiangjie Wu, Yuexin Ma, and Rui Zheng. RoCoSDF: Row-Column Scanned Neural Signed Distance Fields for Freehand 3D Ultrasound Imaging Shape Reconstruction. Medical Image Computing and Computer Assisted Intervention – MICCAI 2024, October 2024a. doi: 10.48550/arXiv.2408.07325. ***Best Paper Award (Top 1st), ORAL Presentation.***

2. **Hongbo Chen**, Logiraj Kumaralingam, Shuhang Zhang, Sheng Song, Fayi Zhang, Haibin Zhang, Thanh-Tu Pham, Kumaradevan Punithakumar, Edmond H.M. Lou, Yuyao Zhang, Lawrence H. Le, and Rui Zheng. Neural implicit surface reconstruction of freehand 3D ultrasound volume with geometric constraints. *Medical Image Analysis*, 98:103305, December 2024b. ISSN 13618415. doi: 10.1016/j.media.2024.103305.

3. **Hongbo Chen**, Liyue Qian, Yuchong Gao, Jianhao Zhao, Yiwen Tang, Jiawen Li, Lawrence H. Le, Edmond Lou, and Rui Zheng. Development of Automatic Assessment Framework for Spine Deformity Using Freehand 3-D Ultrasound Imaging System. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 71(3):408–422, March 2024c. ISSN 1525-8955. doi: 10.1109/TUFFC.2024.3351223.

4. **Hongbo Chen**, Rui Zheng, Li-Yue Qian, Feng-Yu Liu, Sheng Song, and Hong-Ye Zeng. Improvement of 3-D Ultrasound Spine Imaging Technique Using Fast Reconstruction Algorithm. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 68(10):3104–3113, October 2021. ISSN 1525-8955. doi: 10.1109/TUFFC.2021.3087712. ***Honored Front Cover for Issue10 VOLUME 68 in OCTOBER 2021***

5. Daohuai Jiang†, **Hongbo Chen†**, Rui Zheng, and Fei Gao. Hand-held free-scan 3D photoacoustic tomography with global positioning system. *Journal of Applied Physics*, 132(7):074904, August 2022a. ISSN 0021-8979. doi: 10.1063/5.0095919

6. Hongye Zeng, Ke Zou, Zhihao Chen, Yuchong Gao, **Hongbo Chen**, Haibin Zhang, Kang Zhou, Meng Wang, Rick Siow Mong Goh, Yong Liu, Chang Jiang, Rui Zheng, and Huazhu Fu. Training-free image style alignment for self-adapting domain shift on handheld ultrasound devices. *preprint, submitted to IEEE Transactions on Medical Imaging*, (arXiv:2402.11211), February 2024. doi: 10.48550/arXiv.2402.11211. *Under Review*

7. **Hongbo Chen†**, Logiraj Kumaralingam†, Jiawen Li, Kumaradevan Punithakumar, Lawrence H Le, and Rui Zheng. Neural Implicit Representation for Three-dimensional Ultrasound Carotid Surface Reconstruction using Unsigned Distance Function. In *2023 IEEE International Ultrasonics Symposium (IUS)*, pages 1–3, September 2023. doi: 10.1109/IUS51837.2023.10307668

8. **Hongbo Chen**, Rui Zheng, Edmond Lou, and Lawrence H Le. Compact and Wireless Freehand 3D Ultrasound Real-time Spine Imaging System: A pilot study. In *2020 42nd Annual International Conference of the IEEE Engineering in Medicine Biology Society (EMBC)*, pages 2105–2108, July 2020. doi: 10.1109/EMBC44109.2020.9176614

9. **Hongbo Chen**, Rui Zheng, Edmond Lou, and Dean Ta. Imaging Spinal Curvatures of AIS Patients using 3D US Free-hand Fast Reconstruction Method. In *2019 IEEE International Ultrasonics Symposium (IUS)*, pages 1440–1443, October 2019. doi: 10.1109/ULTSYM.2019.8925758

10. Sheng Song, **Hongbo Chen**, Conger Li, Edmond Lou, Lawrence H. Le, and Rui Zheng. Assessing Bone Quality of the Spine in Children with Scoliosis Using the Ultrasound Reflection Frequency Amplitude Index Method: A Preliminary Study. *Ultrasound in Medicine & Biology*, February 2022. ISSN 0301-5629. doi: 10.1016/j.ultrasmedbio.2022.01.002

11. Jiawen Li, Yunqian Huang, Sheng Song, **Hongbo Chen**, Junni Shi, Duo Xu, Haibin Zhang, Man Chen, and Rui Zheng. Automatic Diagnosis of Carotid Atherosclerosis Using a Portable Freehand 3-D Ultrasound Imaging System. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 71(2):266–279, February 2024. ISSN 1525-8955. doi: 10.1109/TUFFC.2023.3345740

12. Javaneh Alavi, **Hongbo Chen**, Kim-Cuong T Nguyen, Thanh-Giang La, Logiraj Kumaralingam, Kumaradevan Punithakumar, Maria Alexiou, Edmond H.M. Lou, Michelle Noga, Paul W. Major, and Lawrence H Le. Three-dimensional Intraoral Imaging using a Portable 3D Freehand Ultrasound System: A Phantom Study. In *2023 IEEE International Ultrasonics Symposium (IUS)*, pages 1–4, Montreal, QC, Canada, September 2023. IEEE. ISBN 9798350346459. doi: 10.1109/IUS51837.2023.10308083

13. Daohuai Jiang†, **Hongbo Chen†**, Feng Gao, Rui Zheng, and Fei Gao. Hand-held 3D Photoacoustic Imaging System with GPS. In *2022 IEEE International Ultrasonics Symposium (IUS)*, pages 1–4, October 2022b. doi: 10.1109/IUS54386.2022.9957259

14. Yiwen Tang, **Hongbo Chen**, Liyue Qian, Songhan Ge, Mingbo Zhang, and Rui Zheng. Detection of Spine Curve and Vertebral Level on Ultrasound Images Using DETR. In *2022 IEEE International Ultrasonics Symposium (IUS)*, pages 1–4, October 2022. doi: 10.1109/IUS54386.2022.9958621

15. Honggen Li, **Hongbo Chen**, Wenke Jing, Yuwei Li, and Rui Zheng. 3D Ultrasound Spine Imaging with Application of Neural Radiance Field Method. In *2021 IEEE International Ultrasonics Symposium (IUS)*, pages 1–4, September 2021. doi: 10.1109/IUS52206.2021.9593917