Yaqian Chen

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Phd Student at Duke University
Google Scholar

About me

Researcher in machine learning with a primary emphasis on applying deep learning to medical image analysis. Current Ph.D. work focuses on developing techniques for medical image segmentation and registration, as well as adapting foundation models through self-supervised, semi-supervised, and fine-tuning approaches. Additional experience includes surgical and general robotics development, with emphasis on path planning and simultaneous localization and mapping (SLAM). Demonstrated ability to collaborate with clinicians to bridge real-world clinical needs with advanced AI methodologies.

Education

Duke University *Durham, NC*
Ph.D. student in Electrical and Computer Engineering *Sep. 2023 - now*

- Maciej Mazurowski's Lab
- GPA: 3.88/4.00

Johns Hopkins University *Baltimore, MD*
M.S. in Computer Science *Sep. 2021 - May. 2023*

- Laboratory of Biomechanical and Image Guided Surgical Systems
- GPA: 3.7/4.00

The Chinese University of Hong Kong, Shenzhen *Shenzhen, China*
B.E. in Computer Science and Engineering *Sep. 2017 - May. 2021*

- Shenzhen Institute of Artificial Intelligence and Robotics for Society
- GPA: 3.68/4.00

Research Experience

Mazurowski's Lab, Duke University *Durham, NC, US*
Doctoral Researcher at Mazurowski Lab, Duke AI Health Spark Initiative *Sep. 2023 - Now*

- Supervisor: Dr. Maciej A. Mazurowski
- Key Skills: Deep learning, Computer Vision, Foundation models, Image Registration, Image Segmentation

- **Image registration for medical imaging**:
  - Developed the first registration network for breast MRI FGT registration Link, outperforming existing deep learning-based registration models by over 13.01% in dense tissue Dice on both internal and external datasets.
  - Established five benchmarks for foundation model-based registration in breast MRI MICCAI workshop best paper award.

- **Image segmentation for medical imaging**:
  - Developed automatic CT abdominal muscle and fat segmentation, as well as end-to-end 2D and 3D body composition measurements MELBA.
  - Extended existing breast segmentation methods to include breast, vessel, and FGT, enabling breast density estimation on breast MRI and conducted demographic analysis and comparison with traditional breast density measurement on mammograms npj Breast Cancer.

- **Foundation models for medical imaging**:
  - Participated in multiple medical segmentation models development through foundation model finetuning MIA, Link.
  - Conducted a rapid, large-scale evaluation of SAM2 across 21 diverse medical imaging datasets within 72 hours of its release, establishing an early and impactful contribution to the field Link.

The Chinese University of Hong Kong, Shenzhen *Shenzhen, China*
Research assistant in Shenzhen Institute of Artificial Intelligence and Robotics for Society *Sep. 2017 - May. 2021*

- Supervisor: Dr. Ning Ding
- Key Skills: Simultaneous localization and mapping, Robot planning, Computer Vision

- **Simultaneous localization and mapping**: Proposed a monocular semantic SLAM system for outdoor UAV applications, addressing the issue of GNSS signal occlusion in urban areas IEEE RCAR.

Selected Publications (See full list on Google scholar)

- *Breast density in MRI: an AI-based quantification and relationship to assessment in mammography.*
  Chen, Y., Li, L., Gu, H., et al. *npj Breast Cancer, 2025*
- *GuidedMorph: Two-Stage Deformable Registration for Breast MRI.*
  Chen, Y., Gu, H., Dong, H., et al. *under review at IEEE J-BHI*
- *Automated muscle and fat segmentation in computed tomography for comprehensive body composition analysis.*
  Chen, Y., Gu, H., Dong, H., et al. *Machine Learning for Biomedical Imaging (MELBA) 2025*
- *Few-shot Learning for Interesting Scene Prediction.*
  Chen, Y., Wang, C., Qiu, Y., Scherer, S. *RISS Journal, 8, 45–50*
- *Pneumatic Soft Haptic Glove for Immersive Mixed-Reality Interactions.*
  Chen, Y., Jiang, S., Wang, W., et al. *IEEE World Haptics Conference*
- **[Co-first, best paper award]***Are Vision Foundation Models Ready for Out-of-the-Box Medical Image Registration?*
  Gu, H., **Chen, Y.**, Konz, N., et al. *MICCAI workshop 2025*
- *Realtime robust shape estimation of deformable linear object.*
  Zhang, J., Zhang, Z., Liu, Z., **Chen, Y.**, et al. *IEEE ICRA 2024*

Research in progress

Breast MRI Risk Stratification Study *Jun. 2025 - now*

- Develop multi-center breast MRI evaluation for risk stratification in women with dense breasts.
- Analyze correlations between MRI and mammographic density.
- Investigate MRI density as a predictor of 5-year cancer risk.
- Compare our risk prediction with clinical risk models including GAIL, Tyrer-Cuzick, and CanRisk.

Thoracic Trauma Risk Prediction Study *Jan. 2025 - now*

- Design a clinical decision support tool to predict respiratory failure risk in patients with rib fractures following blunt thoracic trauma.
- Develop an AI-based imaging pipeline integrating rib fracture detection, pulmonary contusion segmentation, and anatomical localization using deep learning models.
- Integrate imaging-based features (e.g., fracture severity, contusion volume, AIS/BPC18 scores) with physiological and demographic data to develop a multi-modal predictive model.

Intern Experience

UBTECH *Shenzhen, China*

Machine Learning (ML) Course Lecturer *May. 2021 - July. 2021*

- Prepared and gave a totally of 14 lectures for adult students about ML algorithms including classic ML algorithms (regression, dimension reduction, classification) and advanced ML applications including NLP, CV.
- Received positive feedback from more than 50 students, got a teaching evaluation score: 5.00/5.00, got a lecture evaluation score: 4.96/5.00.
- Prepared lecture materials about robot lectures including ROS use and inertial measurement unit (IMU) use in real-world scenarios include hotel welcome robots, museum guide robots, and hospital assist registration robots.

Awards and Scholarships

Summer Research Sponsorship Fund, AIRS, CUHKSZ *May 2020 - Aug. 2020*

Financial support provided by Institute of Artificial Intelligence and Robotics for Society (AIRS).

Academic Performance Scholarship, CUHKSZ *Sep. 2017 - Jun. 2018*

Top 30 out of totally 448 undergrads in the School of Science and Engineering.

Dean's List of the School of Science and Engineering, CUHKSZ *Sep. 2017 - Jun. 2021*

Top 20% undergrads in the School of Science and Engineering.

Skills

Technical Skills: ROS, TensorFlow, Matlab, PyTorch, C, C++, Python, Linux, NodeJS, NumPy, LaTex, Scikit-learn, Web Spider, CAPSTONE, Real Robot Experience.

Professional Skills: Demonstrated strong **leadership** by managing large-scale research projects with collaborators from Yale University, overseeing progress and task delegation. Proven **mentorship** skills through training over 10 interns in machine learning and delivering structured technical lessons. Excellent **communication** skills shown by organizing and leading interdisciplinary meetings with doctors, professors, and researchers. Extensive experience in **grant writing**, having contributed to more than three NIH R01 proposals and independently authored and submitted one complete NIH grant. Strong **project management** capabilities in coordinating multi-site imaging analysis pipelines and ensuring timely delivery. Experienced in **presenting** technical work to both clinical and technical audiences, bridging medical needs with AI solutions.