Qi Wang
Current role: Ph.D. Researcher

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EDUCATION

•**Max Planck Institute for Biological Cybernetics** *Germany, Oct 2019-now*
  Ph.D. researcher, Advisors: Prof. Dr. Klaus Scheffler, PD. Dr. Gabriele Lohmann

•**Eberhard Karl Universität Tübingen** *Germany, Oct 2019-now*
  Ph.D. Candidate, Graduate Training Center of Neuroscience

•**Hong Kong Polytechnique University** *Hong Kong, Sep 2017-Mar 2019*
  MSc., Mechanical Engineering in Aeronautical Engineering GPA: 3.0/4.0

•**Qing Hai University** *China, Sep 2013-June 2017*
  BSc., Mechanical Engineering GPA: 3.7/4.0

TECHNICAL SKILLS AND INTERESTS

Languages: Chinese(Native), Cantonese(Fluent), English(Fluent), German(Basic)
Developer Tools: C/C++, Python, Matlab, Rust, Julia, VIM, Git, LaTeX
Frameworks: PyTorch, JAX, Caffe, distributed training
Areas of Interest: Generative models, stability of GAN, Score-matching models, Computational fluid dynamics, Optimal transport, Graph neural networks

PROJECTS

•**Schrödinger bridge matching for high-dimensional generative model(Deep Learning)** *2023*
  Advance diffusion model by solving Schrödinger bridge problem, first time applied to the context of 2D and 3D models

•**Brain MRI surface rendering from volume using implicit neural representation (Deep Learning)** *2023*
  Render brain surface from MRI volumes without using ground truth mesh in training

  – Implicit representation used for rendering the surface of the brain MRI
  – Training without paired mesh ground truth, which is required in other works

•**Stable GAN training for super-resolution on volumetric MRI data (Deep Learning)** *2021*
  We use super-resolution strategy to generate high-resolution MRI volumes, with the most indistinguishable details

  – Stability in GAN dynamics, efficient convergence with small training sample size
  – Our GAN model achieved best perceptual quality in both spatial and frequency domain, with a frequency-informed discriminator
  – The best generalizability in OOD data than any other SR models for medical images

•**Flexible segmentation network for brain MRI on various resolutions (Deep Learning)** *2021*
  A neural network model, trained on 3T MRI data using domain adaption, to segment 9.4T MRI data

  – SOTA segmentation accuracy on 9.4T MRI data
  – Benchmarking existing ML based segmentation method as well as traditional segmentation tools for 9.4T MRI data

•**Inductively coupled wireless MR detector for improving focal SNR (Neuroscience)** *2020*
  A wireless MRI coil with enhanced SNR for animal experiments in 14.1T scanner

  – Developed wireless MR detector that allows flexible experiment design, e.g. concurrently optogenetic recording with MRI under ROI of the coil
  – Analysis of laminar BOLD fMRI signal functional activity in somatosensory cortex

•**Laminar-specific functional connectivity mapping with multi-slice fMRI (Neuroscience)** *2020*
  Multi-regional line-scanning fMRI paired with optical calcium signal recording, in 14.1T scanner

  – Multi-slice BOLD fMRI is recorded concurrently with local neuronal calcium signal, via an optical fiber
  – Neuro-vascular coupling studied in both task-evoked and spontaneous recording of brain states in rats

•**Automated vision-based micro-surgical task execution through a robotic multi-arm system (Robotics)** *2018*
  The vision system adopted a segmentation network trained on RGB-D images

•**Computational fluid analysis on indoor ventilation system (Thermodynamics)** *2017*
  Numerically simulate the temperature and flow stream of the air in a room with one source and one sink

Recent Publications (➔SEE ALL PUBLICATIONS)

Peer-reviewed Journal & Conference papers

1. DISGAN: Wavelet-informed discriminator guides GAN to MRI image Super-resolution with noise cleaning

ICCV Workshop on Computer Vision for Automated Medical Diagnosis 2023   *2023*

Wang, Q.; Mahler, L.; Steiglechner, J.; Birk, F.; Scheffler, K.; Lohmann, G.

2. A Three-Player GAN for Super-Resolution in Magnetic Resonance Imaging

MICCAI Workshop on Machine Learning for Clinial Neuroimaging 2023   *2023*

Wang, Q.; Mahler, L.; Steiglechner, J.; Birk, F.; Scheffler, K.; Lohmann, G.   <u>Oral</u>

3. Pretraining is All You Need: A Multi-Atlas Enhanced Transformer Framework for Autism Spectrum Disorder Classification

MICCAI Workshop on Machine Learning for Clinial Neuroimaging 2023   *2023*

Mahler, L.; **Wang, Q.**; Steiglechner, J.; Birk, F.; Heczko, S.; Scheffler, K.; Lohmann, G.

4. Super resolution for ultra-high fields MR images augmentation improving 9T MR image segmentation

Medical Imaging with Deep Learning(MIDL) 2022, Zürich   *2022*

Wang, Q.; Steiglechner, J.; Scheffler, K.; Lohmann, G.

5. Focal fMRI signal enhancement with implantable inductively coupled detectors

NeuroImage   *2022*

<u>Chen, Y.</u>, **Wang, Q.**; Choi, S.; Zeng, H.; Takahashi, K.; Qian, C.; Yu, X.   <u>Joint first author</u>

Conference contributions

1. JudgeMI: Towards Accurate Metrics for Assessing Deep Learning Based Structural MRI Motion Correction

29th Annual Meeting of the Organization for Human Brain Mapping (OHBM 2023), Montreal   *2023*

Mahler, L.; Steiglechner, J.; **Wang, Q.**; Scheffler, K.; Lohmann, G.

2. Super Resolution Improves Cortical Segmentation Accuracy in Ultra-high Resolution MRI

28th Annual Meeting of the Organization for Human Brain Mapping (OHBM 2022), Glasgow   *2022*

Wang, Q.; Steiglechner, J.; Scheffler, K.; Lohmann, G.

3. Sythetic 9T-like structural MRI using Generative Neural Network

22nd Conference of Junior Neuroscientists (NeNa 2021), Tübingen   *2021*

Wang, Q.; Steiglechner, J.; Lohmann, G.

4. Inductively coupled detectors for optogenetic-driven focal and multiregional fMRI signal enhancement

ISMRM & SMRT Annual Meeting & Exhibition (ISMRM 2021), Virtual   *2021*

<u>Chen, Y.</u>, **Wang, Q.**; Choi, S.; Zeng, H.; Takahashi, K.; Qian, C.; Yu, X.   <u>Oral, Summa cum laude award</u>

Talks

1. Deep learning for MRI super resolution and its applications

AI meets MRI seminar   *April, 2022*

Max Planck Institute for Intelligence System   <u>Tübingen, Germany</u>

2. Super Resolution Improves Cortical Segmentation Accuracy in Ultra-high Resolution MRI

28th Annual Meeting of the Organization for Human Brain Mapping   *June, 2022*

OHBM conference   <u>Glasgow, UK</u>

3. Sythetic 9T-like structural MRI using Generative Neural Network

22nd Conference of Junior Neuroscientists (NeNa 2021)   *September, 2021*

Eberhard Karl Universität Tübingen   <u>Tübingen, Germany</u>

Leaderships

- Reviewer for **NeuroImage** journal, 2022
- Supervising master students, and student assistants