Rex Tin Long Fung

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EDUCATION

University of Michigan, Ann Arbor, MI — Sep 2022 - Sep 2027
PhD Candidate specializing in MRI sequence programming and iterative reconstruction methods, with applications to accelerating functional MRI.

University of Michigan, Ann Arbor, MI — Sep 2022 - Aug 2024
Program: MS, Biomedical Engineering (Imaging and Ultrasonics) **GPA**: 3.65/4.00
Relevant Coursework: Linear Algebra, Optimization, Probability, Machine Learning, Image Processing, Medical Imaging Systems

University of Michigan, Ann Arbor, MI — Sep 2018 - May 2022
Program: BS, Neuroscience major, Electrical Engineering minor **GPA**: 3.78/4.00
Relevant Coursework: Digital Signal Processing, Electrical Biophysics, Embedded Control Systems, Sensing and ML for Neural Interfaces

RESEARCH EXPERIENCE

Functional MRI Lab, University of Michigan — Sep 2022 - Present
Graduate Student Research Assistant — *Advisors: Dr. Jon-Fredrik Nielsen, Dr. Douglas Noll*

- Accelerated fMRI data acquisition by 10× by developing a novel 3D-EPI sequence with Poisson-disc random sampling, increasing resolution for functional neuroimaging studies.
- Simultaneously reconstructed 100 GB+ fMRI datasets on HPCs using a custom 4D iterative optimization algorithm written in Julia and Python, which models low-rank signal structures on multiple scales to improve accuracy of functional activation maps.
- Standardized cross-vendor research for 7+ international institutions (e.g., Harvard, Freiburg) by developing open-source Pulseq sequences, facilitating seamless, hardware-agnostic protocol sharing.
- Authored 1 first-author manuscript (under revision) and co-authored 1 journal article and 4 conference presentations at top-tier venues (e.g. IEEE, ISMRM), translating complex sequence design and reconstruction findings for the global imaging community.

Bo Duan Lab, University of Michigan — Jul 2020 - May 2022
Undergraduate Research Assistant — *Advisor: Dr. Bo Duan*

- Reduced manual data processing time by 90% by using OpenCV to automate behavioral tracking in 30+ hours of footage and cell-counting for 200+ microscopy images.
- Co-authored 1 journal article in *Nature Communications*, characterizing a dedicated skin-to-brain neural circuit for cool sensation in mice.

TECHNICAL SKILLS

Math & Engineering: Signal Processing, Inverse Problems, Optimization, Machine Learning
Programming: Julia, Python, MATLAB, GPU programming, Jupyter Notebooks, LaTeX, Git/GitHub
Science: Experimental Design, Academic Writing and Presentations

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JOURNAL PUBLICATIONS

[1] R.A. Lobos, X. Wang, **R.T.L. Fung**, Y. He, D. Frey, D. Gupta, Z. Liu, J.A. Fessler, D.C. Noll. "Spatiotemporal Maps for Dynamic MRI Reconstruction.", *IEEE Transactions on Computational Imaging* (2026). DOI.

[2] H. Lee, C.C. Hor, L.R. Horwitz, A. Xiong, X.Y. Su, D.R. Soden, S. Yang, W. Cai, W. Zhang, C. Li, C. Radcliff, A. Dinh, **T.L.R. Fung**, I. Rovcanin, K.P. Pipe, X.Z.S. Xu, B. Duan. "A dedicated skin-to-brain circuit for cool sensation in mice.", *Nature Communications* (2025). DOI.

MANUSCRIPTS UNDER REVISION

[R1] **R.T.L. Fung**, R.A. Lobos, J.A. Fessler, D.C. Noll, J.-F. Nielsen. "ArbEPI: 3D-EPI sequences from arbitrary 2D sampling masks, with multiscale low-rank reconstruction for fMRI.", *Magnetic Resonance in Medicine*, under revision.

CONFERENCE POSTERS

[1] **R.T.L. Fung**, D.C. Noll, J.-F. Nielsen. "ArbEPI: A Framework for Generating 3D-EPI Sequences from Arbitrary Sampling Patterns" *In Vivo Magnetic Resonance, Gordon Research Conferences*, 2026. 20 minute talk and traditional poster.

[2] **R.T.L. Fung**, R.A. Lobos, J.A. Fessler, D.C. Noll, J.-F. Nielsen. "Sub 2 mm Resolution fMRI at 3T using Randomly Undersampled 3D-EPI with Locally Low-Rank + Temporally Sparse Reconstruction" *International Society for Magnetic Resonance in Medicine Annual Meeting*, 2025. Digital poster #3196.

[3] S. Peltier, M. Egan, **R. Fung**, Q. Chen, M. Zaitsev, J.-F. Nielsen. "Harmonization of an SMS-EPI fMRI protocol using Pulseq: Sequence implementation and ABCD QC metrics." *Organization for Human Brain Mapping Annual Meeting*, 2024. Digital poster #3804.

[4] Y. He, **R. Fung**, J.-F. Nielsen. "High-Accuracy Ultra-short Inner-Volume Saturation Pulse for 3D Steady-State Imaging." *International Society for Magnetic Resonance in Medicine Annual Meeting*, 2024. Digital poster #3249.

TEACHING EXPERIENCE

BME/ECE 516 Medical Imaging Systems, University of Michigan Sep 2024 - Dec 2024

- Mentored 20-30 students to learn Medical Imaging Systems e.g. MRI, ultrasound, by guiding them through homework problems during weekly office hours and via Piazza, an online Q&A forum.
- Streamlined course logistics for 15 weeks by releasing and grading homework assignments + final exam on Canvas, an online site for the class.

HONORS AND AWARDS

James B. Angell Scholar, University of Michigan Mar 2021
Students who achieve an "A" record (all grades of A+, A, or A-) for two or more consecutive terms

OTHER SKILLS

Digital Media Production: Adobe Premiere Pro/Rush, Audacity, Edits by Instagram
Languages: English, Cantonese, Mandarin Chinese, Japanese
Sports: Volleyball, Bouldering, Badminton, Pickleball, Table Tennis, Basketball, Triathlon