Tianle Cao

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Education

Ph.D. in Medical Imaging
Department of Bioengineering, UCLA, USA — Sep 2018 – Sep 2023

B.S. in Biomedical Engineering
Department of Biomedical Engineering, Tsinghua University, China — Aug 2014 - Jun 2018

Dissertation

Cao T. Improvements and Applications of Multiparametric Mapping with Magnetic Resonance Multitasking. University of California, Los Angeles; 2023.

Research interests

Quantitative Imaging *Image Acquisition* *Mathematic Modelling* *Artificial Intelligence* *Compact Signal Representations*

Honors and Awards

- Young Investigator Award, OCSMRM — 2023
- Editor's picks of October, MRM — 2022
- Early Career Award, SCMR — 2022
- Scholarship, Tsinghua University — 2014-2018

Journal Publications

[1] **Cao T**, Wang N, Kwan AC, Lee HL, Mao X, Xie Y, Nguyen KL, Colbert CM, Han F, Han P, Han H. Free-breathing, non-ECG, simultaneous myocardial T1, T2, T2*, and fat-fraction mapping with motion-resolved cardiovascular MR multitasking. Magnetic Resonance in Medicine. 2022 Oct;88(4):1748-63.

[2] **Cao T**, Ma S, Wang N, Gharabaghi S, Xie Y, Fan Z, Hogg E, Haacke EM, Tagliati M, Christodoulou AG, Li D. Three-dimensional Simultaneous Brain Mapping of T1, T2, T2*, and Magnetic Susceptibility with MR Multitasking. Magnetic Resonance in Medicine. 2022 Mar;87(3):1375-89

[3] **Cao T**, Hu Z, Mao X, Chen Z, Kwan AC, Xie Y, Berman DS, Li D, Christodoulou AG. Alternating low-rank tensor reconstruction for improved multiparametric mapping with cardiovascular MR multitasking. Magnetic Resonance in Medicine. 2024 Oct;92(4):1421-39.

[4] Sheagren C, **Cao T**, Patel J, Chen Z, Lee HL, Christodoulou AG, Wright G, Motion-Compensated T1 Mapping in Cardiovascular Magnetic Resonance Imaging: A Technical Review. Frontiers in Cardiovascular Medicine. 2023;10.

[5] Wang N, **Cao T**, Han F, Xie Y, Zhong X, Ma S, Kwan A, Fan Z, Han H, Bi X, Noureddin M. Free-breathing multitasking multi-echo MRI for whole-liver water-specific T1, proton density fat fraction, and R2* quantification. Magnetic Resonance in Medicine. 2022 Jan;87(1):120-37.

[6] Li X*, **Cao T***, Tong Y, Ma X, Niu Z, Guo H. Deep residual network for highly accelerated fMRI

reconstruction using variable density spiral trajectory. Neurocomputing. 2020 Jul 20;398:338-46. (* equal contribution)

[7] Mao X, Lee HL, Hu Z, **Cao T**, Han F, Ma S, Serry F, Fan Z, Xie Y, Christodoulou AG, Li D. Simultaneous Multi-slice Cardiac MR Multitasking for Motion-Resolved, Non-ECG, Free-Breathing T1-T2 Mapping. Frontiers in Cardiovascular Imaging. 2022 Mar 4;9:833257.

[8] Han P, Cheema K, Lee HL, Zhou Z, **Cao T**, Ma S, Wang N, Han H, Christodoulou AG, Li D. Whole-brain steady-state CEST at 3 T using MR Multitasking. Magnetic Resonance in Medicine. 2022 May;87(5):2363-71.

[9] Han P, Cheema K, **Cao T**, Lee HL, Han F, Wang N, Han H, Xie Y, Christodoulou AG, Li D. Free‐breathing 3D CEST MRI of human liver at 3.0 T. Magnetic Resonance in Medicine. 2023 Feb;89(2):738-45.

[10] Zhang B, Fan Y, Yang P, **Cao T**, Liao H. Worm-like soft robot for complicated tubular environments. Soft robotics. 2019 Jun 1;6(3):399-413.

Selected Conference Proceedings/Abstracts

[1] **Cao T**, Xie Y, Li D, Christodoulou AG. Alternating Low-Rank Tensor Reconstruction for Improved Multi-Dimensional MRI with MR Multitasking. In Proceedings of the Annual Meeting of ISMRM, Toronto, Canada, 2023. Abstract 5881.

[2] Mao X, Lee HL, Kwan AC, **Cao T,** Han F, Xie Y, Li D, Christodoulou AG, 3D Joint Reconstruction of Non-Contrast and Contrast-Enhanced CMR Multitasking. In Proceedings of the Annual Meeting of ISMRM, London, UK, 2022. Abstract 0274.

[3] **Cao T**, Wang N, Lee HL, Mao X, Xie Y, Han P, Christodoulou AG, Li D. Non-ECG, free-breathing T1/T2/T2*/fat-fraction mapping for comprehensive myocardial tissue characterization with MR Multitasking. In Proceedings of 25th Annual SCMR International Conference, Virtual meeting, 2022. Abstract 180.

[4] **Cao T**, Ma S, Wang N, Gharabaghi S, Xie Y, Fan Z, Hogg E, Haacke EM, Tagliati M, Christodoulou AG, Li D. Three-dimensional whole-brain simultaneous quantitative mapping of T1, T2, T2*, and susceptibility with MR Multitasking, In Proceedings of the Annual Meeting of ISMRM, An Online Experience, 2021. Abstract 1233.

[5] Chen Z, Chen Y, **Cao T**, Xie Y, Li D, Christodoulou AG. Data-consistent Non-Cartesian deep subspace learning for fast CMR multitasking reconstruction. In Proceedings of the 25th Annual SCMR International Conference, Virtual meeting, 2022.

[6] Ma S, **Cao T**, 10min Whole-Brain MRI Solution - Comprehensive Quantification of MR Relaxometry and Susceptibility Plus Synthetic Contrast-Weighted Images. In Proceedings of the Annual Meeting of ISMRM, An Online Experience, 2021. Abstract 0101.

[7] **Cao T**, Wang N, Ma S, Xie Y, Gharabaghi S, Haacke EM, Christodoulou AG, Li D. Simultaneous quantitative mapping of T1, R2* and susceptibility with magnetic resonance multitasking. In Proceedings of the Annual Meeting of ISMRM, Paris, France, 2020. Abstract 0881.

Research Experience

Postdoctoral Scholar
David Geffen Medical School, UCLA, USA — Oct 2023 – Dec 2023

Summer research intern
Department of Bioengineering, UCLA, USA — Jun 2017 – Sep 2017

Computer Skills

- Programming languages: C++, Python, MATLAB
- Packages: PyTorch, TensorFlow, OpenCV
- Various: git, Unix

Service

- Reviewer, IEEE Transactions on Medical Imaging
- Reviewer, Medical Physics
- Reviewer, Magnetic Resonance in Medicine
- Reviewer, Journal of Magnetic Resonance Imaging