

# Stanford

---



## Congyu Liao

Instructor, Radiology

### Bio

---

#### BIO

Congyu Liao is an Instructor in the Division of Radiological Sciences Laboratory (RSL). Dr. Liao received his PhD in Biomedical Engineering from Zhejiang University in China in 2018. Following the completion of his PhD, he was appointed Postdoctoral Research Fellow at Massachusetts General Hospital/Harvard University under Kavin Setsompop, PhD, where his research was focused on improving the efficiency of data acquisition/reconstruction in MRI. In 2021, he came to Stanford to join Dr. Setsompop's lab as a Postdoctoral Scholar in RSL where his research is focused on developing new technology for diffusion and quantitative MRI. Dr. Liao has received many awards including the Summa Cum Laude Merit Award from the International Society for Magnetic Resonance in Medicine and the Outstanding Research Award from the Overseas Chinese Society for Magnetic Resonance in Medicine.

#### ACADEMIC APPOINTMENTS

- Instructor, Radiology

#### HONORS AND AWARDS

- Junior Fellow, International Society for Magnetic Resonance in Medicine (2022)
- Editor's Monthly Pick, Magnetic Resonance in Medicine (2020, 2021)
- Summa Cum Laude Merit Awards, International Society for Magnetic Resonance in Medicine (2019, 2022)
- Young Investigator Award (Second Place), Overseas Chinese Society for Magnetic Resonance in Medicine (2019)
- Magna Cum Laude Merit Awards, International Society for Magnetic Resonance in Medicine (2018, 2020, 2021)
- Outstanding Research Award, Overseas Chinese Society for Magnetic Resonance in Medicine (2018)

#### PROFESSIONAL EDUCATION

- PostDoc, Stanford University , Radiology (2022)
- PostDoc, Massachusetts General Hospital, Harvard University , Radiology (2021)
- PhD, Zhejiang University , Biomedical Engineering (2018)
- BS, China University of Geosciences (2013)

#### LINKS

- My Google Scholar: <https://scholar.google.com/citations?user=MY87HSAAAAAJ&hl=en>

## Publications

---

### PUBLICATIONS

- **High-Fidelity Intravoxel Incoherent Motion Parameter Mapping Using Locally Low-Rank and Subspace Modeling.** *NeuroImage*  
Finkelstein, A. J., Liao, C., Cao, X., Mani, M., Schifitto, G., Zhong, J.  
2024: 120601
- **Reduced cross-scanner variability using vendor-agnostic sequences for single-shell diffusion MRI.** *Magnetic resonance in medicine*  
Liu, Q., Ning, L., Shaik, I. A., Liao, C., Gagoski, B., Bilgic, B., Grissom, W., Nielsen, J. F., Zaitsev, M., Rathi, Y.  
2024
- **Rapid and accurate navigators for motion and B0 tracking using QUEEN: Quantitatively enhanced parameter estimation from navigators.** *Magnetic resonance in medicine*  
Brackenier, Y., Wang, N., Liao, C., Cao, X., Schauman, S., Yurt, M., Cordero-Grande, L., Malik, S. J., Kerr, A., Hajnal, J. V., Setsompop, K.  
2024
- **Polynomial Preconditioners for Regularized Linear Inverse Problems.** *SIAM Journal on Imaging Sciences*  
Iyer, S. S., Ong, F., Cao, X., Liao, C., Daniel, L., Tamir, J. I., Setsompop, K.  
2024; 17:1 : 116-146
- **The Potential of Phase Constraints for Non-Fourier Radiofrequency-Encoded MRI** *IEEE Transactions on Computational Imaging*  
Liu, Y., Liao, C., Setsompop, K., Haldar, J. P.  
2024: 1-10
- **High-resolution myelin-water fraction and quantitative relaxation mapping using 3D ViSta-MR fingerprinting.** *Magnetic resonance in medicine*  
Liao, C., Cao, X., Iyer, S. S., Schauman, S., Zhou, Z., Yan, X., Chen, Q., Li, Z., Wang, N., Gong, T., Wu, Z., He, H., Zhong, et al  
2023
- **Next-generation MRI scanner designed for ultra-high-resolution human brain imaging at 7 Tesla.** *Nature methods*  
Feinberg, D. A., Beckett, A. J., Vu, A. T., Stockmann, J., Huber, L., Ma, S., Ahn, S., Setsompop, K., Cao, X., Park, S., Liu, C., Wald, L. L., Polimeni, et al  
2023
- **DTI-MR fingerprinting for rapid high-resolution whole-brain T1 , T2 , proton density, ADC, and fractional anisotropy mapping.** *Magnetic resonance in medicine*  
Cao, X., Liao, C., Zhou, Z., Zhong, Z., Li, Z., Dai, E., Iyer, S. S., Hannum, A. J., Yurt, M., Schauman, S., Chen, Q., Wang, N., Wei, et al  
2023
- **High-fidelity mesoscale in-vivo diffusion MRI through gSlider-BUDA and circular EPI with S-LORAKS reconstruction.** *NeuroImage*  
Liao, C., Yarach, U., Cao, X., Iyer, S. S., Wang, N., Kim, T. H., Tian, Q., Bilgic, B., Kerr, A. B., Setsompop, K.  
2023: 120168
- **Deep Learning Initialized Compressed Sensing (Deli-CS) in Volumetric Spatio-Temporal Subspace Reconstruction.** *bioRxiv : the preprint server for biology*  
Iyer, S. S., Schauman, S. S., Sandino, C. M., Yurt, M., Cao, X., Liao, C., Ruengchaijatuporn, N., Chatnuntawech, I., Tong, E., Setsompop, K.  
2023
- **3D-EPI blip-up/down acquisition (BUDA) with CAIPI and joint Hankel structured low-rank reconstruction for rapid distortion-free high-resolution T2 \* mapping.** *Magnetic resonance in medicine*  
Chen, Z., Liao, C., Cao, X., Poser, B. A., Xu, Z., Lo, W. C., Wen, M., Cho, J., Tian, Q., Wang, Y., Feng, Y., Xia, L., Chen, et al  
2023
- **Optimized three-dimensional ultrashort echo time: Magnetic resonance fingerprinting for myelin tissue fraction mapping.** *Human brain mapping*  
Zhou, Z., Li, Q., Liao, C., Cao, X., Liang, H., Chen, Q., Pu, R., Ye, H., Tong, Q., He, H., Zhong, J.  
2023
- **Synergistic Hankel Structured Low-Rank Approximation With Total Variation Regularization for Complex Magnetic Anomaly Detection** *IEEE Transactions on Instrumentation and Measurement*  
Liu, H., Zhang, X., Liao, C., Dong, H., Liu, Z., Hu, X.  
2023; 72

- **SLfRank: Shinnar-Le-Roux Pulse Design with Reduced Energy and Accurate Phase Profiles using Rank Factorization.** *IEEE transactions on medical imaging*  
Ong, F., Zhong, Z., Liao, C., Lustig, M., Vasawala, S. S., Pauly, J. M.  
2022; PP
- **Detecting Silent Acute Microinfarcts in Cerebral Small Vessel Disease Using Submillimeter Diffusion-Weighted Magnetic Resonance Imaging: Preliminary Results.** *Stroke*  
Misquitta, K., Daou, M., Conklin, J., Liao, C., Setsompop, K., Poulblanc, J., Shirzadi, Z., MacIntosh, B. J., Tomlinson, G., Cohn, M., Aviv, R. I., Silver, F. L., Mandell, et al  
2022: 101161STROKEAHA122039723
- **Highly accelerated EPI with wave encoding and multi-shot simultaneous multislice imaging.** *Magnetic resonance in medicine*  
Cho, J., Liao, C., Tian, Q., Zhang, Z., Xu, J., Lo, W. C., Poser, B. A., Stenger, V. A., Stockmann, J., Setsompop, K., Bilgic, B.  
2022
- **Blip up-down acquisition for spin- and gradient-echo imaging (BUDA-SAGE) with self-supervised denoising enables efficient T2, T2\*, para- and dia-magnetic susceptibility mapping.** *Magnetic resonance in medicine*  
Zhang, Z., Cho, J., Wang, L., Liao, C., Shin, H. G., Cao, X., Lee, J., Xu, J., Zhang, T., Ye, H., Setsompop, K., Liu, H., Bilgic, et al  
2022
- **Optimized multi-axis spiral projection MR fingerprinting with subspace reconstruction for rapid whole-brain high-isotropic-resolution quantitative imaging.** *Magnetic resonance in medicine*  
Cao, X., Liao, C., Iyer, S. S., Wang, Z., Zhou, Z., Dai, E., Liberman, G., Dong, Z., Gong, T., He, H., Zhong, J., Bilgic, B., Setsompop, et al  
2022
- **Rapid simultaneous acquisition of macromolecular tissue volume, susceptibility, and relaxometry maps.** *Magnetic resonance in medicine*  
Yu, F. F., Huang, S. Y., Kumar, A., Witzel, T., Liao, C., Duval, T., Cohen-Adad, J., Bilgic, B.  
2021
- **Quantitative T1 and T2 mapping by magnetic resonance fingerprinting (MRF) of the placenta before and after maternal hyperoxia.** *Placenta*  
Stout, J. N., Liao, C., Gagoski, B., Turk, E. A., Feldman, H. A., Bibbo, C., Barth, W. H., Shainker, S. A., Wald, L. L., Grant, P. E., Adalsteinsson, E.  
2021; 114: 124-132
- **Efficient T2 mapping with blip-up/down EPI and gSlider-SMS (T2 -BUDA-gSlider).** *Magnetic resonance in medicine*  
Cao, X., Wang, K., Liao, C., Zhang, Z., Srinivasan Iyer, S., Chen, Z., Lo, W., Liu, H., He, H., Setsompop, K., Zhong, J., Bilgic, B.  
2021
- **A multi-inversion multi-echo spin and gradient echo echo planar imaging sequence with low image distortion for rapid quantitative parameter mapping and synthetic image contrasts** *MAGNETIC RESONANCE IN MEDICINE*  
Manhard, M., Stockmann, J., Liao, C., Park, D., Han, S., Fair, M., van den Boomen, M., Polimeni, J., Bilgic, B., Setsompop, K.  
2021
- **SNR-enhanced diffusion MRI with structure-preserving low-rank denoising in reproducing kernel Hilbert spaces.** *Magnetic resonance in medicine*  
Ramos-Llordén, G. n., Vegas-Sánchez-Ferrero, G. n., Liao, C. n., Westin, C. F., Setsompop, K. n., Rathi, Y. n.  
2021
- **In vivo human whole-brain Connectom diffusion MRI dataset at 760 μm isotropic resolution.** *Scientific data*  
Wang, F. n., Dong, Z. n., Tian, Q. n., Liao, C. n., Fan, Q. n., Hoge, W. S., Keil, B. n., Polimeni, J. R., Wald, L. L., Huang, S. Y., Setsompop, K. n.  
2021; 8 (1): 122
- **Distortion-free, high-isotropic-resolution diffusion MRI with gSlider BUDA-EPI and multicoil dynamic B0 shimming.** *Magnetic resonance in medicine*  
Liao, C. n., Bilgic, B. n., Tian, Q. n., Stockmann, J. P., Cao, X. n., Fan, Q. n., Iyer, S. S., Wang, F. n., Ngamsombat, C. n., Lo, W. C., Manhard, M. K., Huang, S. Y., Wald, et al  
2021
- **Robust autocalibrated structured low-rank EPI ghost correction.** *Magnetic resonance in medicine*  
Lobos, R. A., Hoge, W. S., Javed, A., Liao, C., Setsompop, K., Nayak, K. S., Haldar, J. P.  
2020
- **Diffusion-PEPTIDE: Distortion- and blurring-free diffusion imaging with self-navigated motion-correction and relaxometry capabilities.** *Magnetic resonance in medicine*

- Fair, M. J., Liao, C., Manhard, M. K., Setsompop, K.  
2020
- **DeepDTI: High-fidelity six-direction diffusion tensor imaging using deep learning.** *NeuroImage*  
Tian, Q., Bilgic, B., Fan, Q., Liao, C., Ngamsombat, C., Hu, Y., Witzel, T., Setsompop, K., Polimeni, J. R., Huang, S. Y.  
2020: 117017
  - **High-fidelity, accelerated whole-brain submillimeter in vivo diffusion MRI using gSlider-spherical ridgelets (gSlider-SR)** *MAGNETIC RESONANCE IN MEDICINE*  
Ramos-Llorden, G., Ning, L., Liao, C., Mukhometzianov, R., Michailovich, O., Setsompop, K., Rathi, Y.  
2020; 84 (4): 1781–95
  - **Fast submillimeter diffusion MRI using gSlider-SMS and SNR-enhancing joint reconstruction** *MAGNETIC RESONANCE IN MEDICINE*  
Haldar, J. P., Liu, Y., Liao, C., Fan, Q., Setsompop, K.  
2020; 84 (2): 762–76
  - **High-fidelity, high-isotropic-resolution diffusion imaging through gSlider acquisition with B 1 + and T1 corrections and integrated #B0 /Rx shim array.** *Magnetic resonance in medicine*  
Liao, C. n., Stockmann, J. n., Tian, Q. n., Bilgic, B. n., Arango, N. S., Manhard, M. K., Huang, S. Y., Grissom, W. A., Wald, L. L., Setsompop, K. n.  
2020; 83 (1): 56–67
  - **AN EVALUATION OF REGULARIZATION STRATEGIES FOR SUBSAMPLED SINGLE-SHELL DIFFUSION MRI**  
Liu, Y., Liao, C., Setsompop, K., Haldar, J. P., IEEE  
IEEE.2020: 1437–40
  - **Accelerated spin-echo functional MRI using multisection excitation by simultaneous spin-echo interleaving (MESSI) with complex-encoded generalized slice dithered enhanced resolution (cgSlider) simultaneous multislice echo-planar imaging** *MAGNETIC RESONANCE IN MEDICINE*  
Han, S., Liao, C., Manhard, M., Park, D., Bilgic, B., Fair, M. J., Wang, F., Blazejewska, A., Grissom, W. A., Polimeni, J. R., Setsompop, K.  
2020; 84 (1): 206–20
  - **Highly accelerated multishot echo planar imaging through synergistic machine learning and joint reconstruction** *MAGNETIC RESONANCE IN MEDICINE*  
Bilgic, B., Chatnuntaweck, I., Manhard, M., Tian, Q., Liao, C., Iyer, S. S., Cauley, S. F., Huang, S. Y., Polimeni, J. R., Wald, L. L., Setsompop, K.  
2019; 82 (4): 1343–58
  - **Accelerated whole-brain perfusion imaging using a simultaneous multislice spin-echo and gradient-echo sequence with joint virtual coil reconstruction** *MAGNETIC RESONANCE IN MEDICINE*  
Manhard, M., Bilgic, B., Liao, C., Han, S., Witzel, T., Yen, Y., Setsompop, K.  
2019; 82 (3): 973–83
  - **Phase-matched virtual coil reconstruction for highly accelerated diffusion echo-planar imaging** *NEUROIMAGE*  
Liao, C., Manhard, M., Bilgic, B., Tian, Q., Fan, Q., Han, S., Wang, F., Park, D., Witzel, T., Zhong, J., Wang, H., Wald, L. L., Setsompop, et al  
2019; 194: 291–302
  - **Optimal Experiment Design for Magnetic Resonance Fingerprinting: Cramer-Rao Bound Meets Spin Dynamics** *IEEE TRANSACTIONS ON MEDICAL IMAGING*  
Zhao, B., Haldar, J. P., Liao, C., Ma, D., Jiang, Y., Griswold, M. A., Setsompop, K., Wald, L. L.  
2019; 38 (3): 844–61
  - **Fast 3D brain MR fingerprinting based on multi-axis spiral projection trajectory.** *Magnetic resonance in medicine*  
Cao, X. n., Ye, H. n., Liao, C. n., Li, Q. n., He, H. n., Zhong, J. n.  
2019; 82 (1): 289–301
  - **Highly efficient MRI through multi-shot echo planar imaging**  
Liao, C., Cao, X., Cho, J., Zhang, Z., Setsompop, K., Bilgic, B., VanDeVille, D., Papadakis, M., Lu, Y. M.  
SPIE-INT SOC OPTICAL ENGINEERING.2019
  - **Magnetic resonance fingerprinting of temporal lobe white matter in mesial temporal lobe epilepsy.** *Annals of clinical and translational neurology*  
Wang, K. n., Cao, X. n., Wu, D. n., Liao, C. n., Zhang, J. n., Ji, C. n., Zhong, J. n., He, H. n., Chen, Y. n.  
2019; 6 (9): 1639–46

- **Ultrashort echo time magnetic resonance fingerprinting (UTE-MRF) for simultaneous quantification of long and ultrashort T2 tissues.** *Magnetic resonance in medicine*  
Li, Q. n., Cao, X. n., Ye, H. n., Liao, C. n., He, H. n., Zhong, J. n.  
2019; 82 (4): 1359–72
- **Improving parallel imaging by jointly reconstructing multi-contrast data** *MAGNETIC RESONANCE IN MEDICINE*  
Bilgic, B., Kim, T., Liao, C., Manhard, M., Wald, L. L., Haldar, J. P., Setsompop, K.  
2018; 80 (2): 619–32
- **Detection of Lesions in Mesial Temporal Lobe Epilepsy by Using MR Fingerprinting.** *Radiology*  
Liao, C. n., Wang, K. n., Cao, X. n., Li, Y. n., Wu, D. n., Ye, H. n., Ding, Q. n., He, H. n., Zhong, J. n.  
2018; 288 (3): 804–12
- **Squeezed Trajectory Design for Peak RF and Integrated RF Power Reduction in Parallel Transmission MRI.** *IEEE transactions on medical imaging*  
Li, Q. n., Liao, C. n., Ye, H. n., Chen, Y. n., Cao, X. n., Yuan, L. n., He, H. n., Zhong, J. n.  
2018; 37 (8): 1809–21
- **3D MR fingerprinting with accelerated stack-of-spirals and hybrid sliding-window and GRAPPA reconstruction** *NEUROIMAGE*  
Liao, C., Bilgic, B., Manhard, M., Zhao, B., Cao, X., Zhong, J., Wald, L. L., Setsompop, K.  
2017; 162: 13–22
- **Efficient parallel reconstruction for high resolution multishot spiral diffusion data with low rank constraint.** *Magnetic resonance in medicine*  
Liao, C. n., Chen, Y. n., Cao, X. n., Chen, S. n., He, H. n., Mani, M. n., Jacob, M. n., Magnotta, V. n., Zhong, J. n.  
2017; 77 (3): 1359–66
- **Robust sliding-window reconstruction for Accelerating the acquisition of MR fingerprinting.** *Magnetic resonance in medicine*  
Cao, X. n., Liao, C. n., Wang, Z. n., Chen, Y. n., Ye, H. n., He, H. n., Zhong, J. n.  
2017; 78 (4): 1579–88
- **Uncertainty assessment of gamma-aminobutyric acid concentration of different brain regions in individual and group using residual bootstrap analysis.** *Medical & biological engineering & computing*  
Chen, M. n., Liao, C. n., Chen, S. n., Ding, Q. n., Zhu, D. n., Liu, H. n., Yan, X. n., Zhong, J. n.  
2017; 55 (6): 1051–59