

CURRICULUM VITAE

Xiaole (Zachary) Zhong
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Education

PhD, Medical Biophysics (Thesis: Neuronal and Vascular Contribution to rs-fMRI)

September 2021 - Present

University of Toronto, Toronto, ON

Bachelor of Engineering, Electrical and Biomedical (Summa Cum Laude)

Completed May 2020

McMaster University, Hamilton, ON

Awards

- MBP excellence UTF award in biomedical imaging (University of Toronto, 2025)
- ISMRM Trainee stipend (International Society for Magnetic Resonance in Medicine, 2025)
- Ydessa Hendeles Graduate Scholarship (Rotman Research Institute, 2024)
- MBP excellence UTF award in biomedical imaging (University of Toronto, 2024)
- ISMRM Trainee stipend (International Society for Magnetic Resonance in Medicine, 2024)
- MBP excellence UTF award in biomedical imaging (University of Toronto, 2023)
- Ydessa Hendeles Graduate Scholarship (Rotman Research Institute, 2023)
- ISMRM Trainee stipend (International Society for Magnetic Resonance in Medicine, 2023)
- Finkler Graduate Student Fellowship (Rotman Research Institute, 2022)
- MBP Lepock Memorial scholarship (University of Toronto, 2022)
- University Senate Scholarships (McMaster University, 2019)
- Dean's Honour list (McMaster University, 2016-2020)

Professional activities

- Review for Communication Biology, Human Brain Mapping, Frontiers in Neuroscience, PLoS Computational Biology
- Review for Annual meeting of International Society for Magnetic Resonance in Medicine

List of publications:

Pre-print manuscripts:

1. Rådman, G., **Zhong, X. Z.**, Kulkarni, M., Perosa, V., Matthews, J. J. L., Callaghan, M. F., Duzel, E., Hammerer, D., Femminella, G. D., Chen, J. J., & Olsen, R. (2026). Characterization and validation of compressed sensing for time-of-flight MRI angiography of the human brain at 3T and 7T. In *bioRxiv*. bioRxiv. <https://doi.org/10.64898/2026.04.22.720171> (co-first author)
2. Van Lankveld, H., Chen, J.X., **Zhong, X.**, Chen, J.J., 2026. Intranasal photobiomodulation: an energy efficient paradigm for cortical and subcortical stimulation. *bioRxiv*. <https://doi.org/10.64898/2026.03.03.709361>
3. Van Lankveld, H., Chen, J.X., **Zhong, X.Z.**, Chen, J.J., 2025. The fMRI response to transcranial photobiomodulation: the effect of wavelength, irradiance, frequency and skin tone on the BOLD and CBF response in healthy young adults. *bioRxiv*. <https://doi.org/10.1101/2025.11.20.689588>
4. Chen, J.X., Van Lankveld, H., **Zhong, X.**, Chen, J.J., 2025. Real-time spatial evolution of the fMRI response to photobiomodulation in the healthy human brain. *bioRxiv*. <https://doi.org/10.1101/2025.11.17.688884>

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5. Mathew, A., Van Lankveld, H., **Zhong, X.Z.**, Chen, J.X., Chen, J.J., 2025. Real-time EEG response to pulsed transcranial photobiomodulation in healthy young adults: Effects of stimulation parameters and skin tone. *bioRxiv*. <https://doi.org/10.1101/2025.05.26.656199>
6. **Zhong, X.**, Van Lankveld, H., Mathew, A., Chen, J.J., 2025. Linking electrophysiological metrics to oxidative metabolism: Implications for EEG-fMRI association. *bioRxiv*. <https://doi.org/10.1101/2025.11.04.686568>

Peer-reviewed journal publications:

1. **Zhong, X.**, Chang, C., Chen, J.J., 2026. Modulation of neurofluid fluctuation frequency by baseline carbon dioxide in awake humans: the role of the autonomic nervous system. *Front. Physiol.* 17, 1750101. <https://doi.org/10.3389/fphys.2026.1750101>
2. **Zhong, X.Z.**, Van Lankveld, H., Mathew, A., Chen, J.J., 2025. The link between steady-state EEG and rs-fMRI metrics in healthy young adults: the effect of macrovascular correction. *Imaging Neurosci. (Camb.)*. <https://doi.org/10.1162/IMAG..1092>
3. **Zhong, X.Z.**, Van Lankveld, H., Chen, J.J., 2025. The link to steady-state oxidative metabolism and hemodynamics varies across rs-fMRI metrics: A whole-brain assessment using macrovascular correction. *Imaging Neurosci. (Camb.)*. <https://doi.org/10.1162/imag.a.1060>
4. Motsenyat, A., **Zhong, X.Z.**, Van Lankveld, H., Chen, J.X., Mathew, A., Chen, J.J., 2025. Modulating cerebrospinal fluid dynamics using pulsed photobiomodulation. *Brain Stimul.* 102988. <https://doi.org/10.1016/j.brs.2025.102988>
5. **Zhong, X.Z.**, Polimeni, J.R., Chen, J.J., 2024. Predicting the macrovascular contribution to resting-state fMRI functional connectivity at 3 Tesla: A model-informed approach. *Imaging Neuroscience*. https://doi.org/10.1162/imag_a_00315
6. **Zhong, X.Z.**, Tong, Y., Chen, J.J., 2024. Assessment of the macrovascular contribution to resting-state fMRI functional connectivity at 3 Tesla. *Imaging Neuroscience* 2, 1–20. https://doi.org/10.1162/imag_a_00174
7. Agrawal, V., **Zhong, X. Z.**, Chen, J. J. (2023). Generating dynamic carbon-dioxide traces from respiration-belt recordings: Feasibility using neural networks and application in functional magnetic resonance imaging. In *Frontiers in Neuroimaging* (Vol. 2). <https://doi.org/10.3389/fnimg.2023.1119539>
8. **Zhong X**, Chen JJ (2022): Resting-state fMRI signal variations in aging: The role of neural activity. *Hum Brain Mapp* 10.1002/hbm.25823.

Peer-reviewed conference proceedings:

1. **Zhong X**, Chang C., Chen JJ. Modulation of neurofluid dynamics using carbon dioxide in awake humans. ISMRM 2025. **(Oral Presentation, Magna Cum Laude)**
2. **Zhong X**, Van Lankveld H., Chen JJ. Mapping the link between resting-state fMRI and cerebral oxidative metabolism. ISMRM Joint Workshop of the Ultra-High Field MR & Brain Function Study Groups 2025. **(Proffered Paper-Oral Presentation)**
3. **Zhong X**, Tong, Y., Chen JJ. Assessment of the macrovascular contribution to resting-state fMRI functional connectivity at 3 Tesla. ISMRM 2024. **(Oral Presentation)**
4. **Zhong X**, Chen JJ. Associations between Resting-state EEG and fMRI signals in Brain Aging. ISMRM 2021, Poster 0158. **(Oral Presentation)**
5. **Zhong, X.**, Van Lankveld, H., Mathew, A., Chen, J.J., 2026. The EEG-CMRO₂ association and its implications for resting-state fMRI. Presented at the Cape Town - 2026 ISMRM-ISMRT Annual Meeting and Exhibition, ISMRM.
6. **Zhong X**, Van Lankveld H., Chen JJ. Mapping the link between resting-state fMRI and cerebral oxidative metabolism. ISMRM 2025.
7. **Zhong X**, Polimeni, JR., Chen JJ. Modelling the macrovascular contribution to resting-state fMRI functional connectivity at 3 Tesla. ISMRM 2024.
8. **Zhong X**, Chen JJ. Variations in resting-state fMRI fluctuation frequency with basal carbon dioxide. OHBM 2023, Poster 1332.

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9. **Zhong X**, Chen JJ. Uncertainties in baseline cerebral oxidative metabolism mapping by gas-free and dual-calibrated fMRI: a simulation-based comparison. ISMRM 2023, Poster 4028.
10. **Zhong X**, Chen JJ. The dependence of the macrovascular transverse R2' relaxation and resultant BOLD fMRI signal on vascular position: A simulation study. ISMRM 2023, Poster 2705.
11. **Zhong X**, Chen JJ. The dependence of the resting-state macrovascular fMRI signal power on vascular volume and orientation: A simulation study. ISMRM 2022, Poster 3340.
12. **Zhong X**, Chen JJ. The frequency dependence of the resting-state fMRI signal on macrovascular volume and orientation. ISMRM 2022, Poster 3307.
13. **Zhong X**, Chen JJ. Characterizing Macrovascular Contributions to Resting-state fMRI. OHBM 2021, Poster 1574.
14. Motsenyat A., **Zhong X**, Van Lankveld H., Chen JX., Chen JJ. Modulating cerebrospinal fluid dynamics using pulsed photobiomodulation: the dose and skin-colour dependence. ISMRM 2025. (**Power Pitch**)

Mentorship

2024 Summer student: Ariel Motsenyat. Project: *'Modulating cerebrospinal fluid dynamics using pulsed photobiomodulation: the dose and skin-colour dependence'*.

Teaching/knowledge Dissemination

June 2023 Rotman Training Centre, Lighting Talks from Trainees, "fMRI acquisition and processing"