Qiliang He 615-999-8838 qiliang.he@utsa.edu

Research Interest

My research investigates how gene–environment interactions shape cognition, mental health, and broader health and wellness traits. I also examine how these interactions can be harnessed to enhance cognition and mental health. To address these questions, I use multimodal approaches, including virtual reality (VR), whole genome sequencing–based polygenic risk scores (PRS), neuroimaging, and computational modeling.

Academic Positions

- *Assistant Professor, Department of Psychology, University of Texas at San Antonio, 2024.1 - present*
- *Academic Professional in Neuroscience, School of Psychology, Georgia Institute of Technology, 2022.7 – 2023.12*
- *Postdoctoral Fellow, School of Psychology and Department of Biomedical Engineering, Georgia Institute of Technology, 2018.1 – 2022.6*

  Advisor: Dr. Thackery I. Brown and Dr. Annabelle C. Singer

Education

Department of Psychology, Vanderbilt University, 2012 – 2017

Doctor of Philosophy, Cognition and Cognitive Neuroscience, graduate minor in Quantitative Methods

Advisor: Dr. Timothy P. McNamara

Funding

Ongoing

- NIH All of Us Research Program Seed Grant by the University of Arizona-Banner Health (2025, total cost: $40,000)
  - Role: Principal Investigator
  - Title: Model Sleep Health as a Function of Genetic Susceptibility and Perceived Neighborhood Disorder leveraging All of Us Data

Completed

- The Warren Alpert Distinguished Scholar Fellowship (2021 – 2023, total cost: $400,000)
  - Role: Principal Investigator
  - Title: The neural and cognitive effects of sensory gamma stimulation on old adults (https://www.warrenalpertfoundation.org/awards/)

Publications *denotes mentees

25. Whitaker, K.*, Perkins, J.*, Bowlin, K.R.*, Fross, B.M.*, Garcia, K.*, Jaimes, J.*, Maknojia, S.*, Guerrero, D.D.*, Hunter, D.A.*, He, Q (2025). The Influence of Regional Landmarks (Color Zones) on Sex Differences in Spatial Navigation: The Moderating Role of Sense of Direction. *Journal of Environmental Psychology*. https://doi.org/10.1016/j.jenvp.2025.102688

24. Hill, T., He, Q., Zhang, J., Upenieks, L., & Ellison, C. (2025). A Socioecological Model of Neighborhood Disorder, Religious Attendance, and Sleep Efficiency. *Sleep Health*. https://doi.org/10.1016/j.sleh.2024.11.003

23. He, Q., Liu, J.L*., Eschapasse, L.*, & Brown, T.I. (2023). Neural mechanisms of memory integration in value-based decision-making during spatial navigation. *Neuropsychologia*, 193, 108758. https://doi.org/10.1016/j.neuropsychologia.2023.108758

22. Baumann, M. R., Kretz, D. R., & He, Q. (2024). A review of multiteam systems with an eye toward applications for collective spatial reasoning. *Collective spatial cognition*, 209-234.

21. Maxim, P., He, Q., & Brown, T. I. (2023). Stress and navigation. *In Reference Module in Neuroscience and Biobehavioral Psychology*. Elsevier. https://doi.org/10.1016/B978-0-12-820480-1.00027-9

20. He, Q., Beveridge, E.H.*, Vargas, V.,* Salen, A.N.*, & Brown, T.I. (2023). Effects of acute stress on rigid learning, flexible learning and value-based decision-making in spatial navigation. *Psychological Science*. https://doi.org/10.1177/09567976231155870

19. He, Q., Liu, J.L.*, Eschapasse, L.*, Beveridge, E.H.*, & Brown, T.I. (2022). A comparison of reinforcement learning models of human spatial navigation. *Scientific Reports*, 12(1), 13923. https://doi.org/10.1038/s41598-022-18245-1

18. He, Q., Starnes, J., & Brown, T.I. (2022). Environmental overlap influences goal-oriented hippocampal coding of spatial sequences. *Hippocampus,*1–17. https://doi.org/10.1002/hipo.23416

17. He, Q., Liu, J.L.,* Beveridge, E.H.*, Eschapasse, L.*, Vargas,V.*, & Brown, T.I. (2022). Episodic memory integration shapes value-based decision-making in spatial navigation. *Journal of Experimental Psychology: Learning, Memory, and Cognition.* http://dx.doi.org/10.1037/xlm0001133

16. Biju, K., Wei, E.X., Rebello, E., Matthews, J., He, Q., McNamara, T.P., Agrawal, Y. (2021). Performance in real world- and virtual reality-based spatial navigation tasks in patients with vestibular dysfunction. *Otology and Neurotology*. doi: 10.1097/MAO.0000000000003289

15. Brown, T.I., He, Q., Aselcioglu, I., Stern C.E. (2021). Evidence for a gradient within the medial temporal lobes for flexible retrieval under hierarchical task rules. *Hippocampus.*

https://doi.org/10.1002/hipo.23365

14. He, Q., Colon‐Motas, K. M., Pybus, A. F., Piendel, L., Seppa, J. K., Walker, M. L., ... & Singer, A. C. (2021). A feasibility trial of gamma sensory flicker for patients with prodromal Alzheimer's disease. *Alzheimer's & Dementia: Translational Research & Clinical Interventions*, *7*(1), e12178. https://doi.org/10.1002/trc2.12178

13. He, Q., Beveridge, E.H.*, Starnes, J.M., Goodroe, S.C. & Brown, T.I. (2021). Environmental overlap and individual encoding strategy modulate memory interference in spatial navigation. *Cognition*, 207, 104508. https://doi.org/10.1016/j.cognition.2020.104508

12. He, Q., Han, A.T.*, Churman, T.A.* & Brown, T.I. (2021). The role of working memory capacity in spatial learning depends on spatial information integration difficulty in the environment. *Journal of Experimental Psychology: General*, *150*(4), 666–685. https://doi.org/10.1037/xge0000972

11. He, Q., & Brown, T.I. (2020). Heterogeneous correlations between hippocampus volume and cognitive map accuracy among healthy young adults. *Cortex,* 124, 167–175. https://doi.org/10.1016/j.cortex.2019.11.011

10. He, Q., McNamara, T.P. & Brown, T.I. (2019). Manipulating the visibility of barriers to improve spatial navigation efficiency and cognitive mapping. *Scientific Reports*, *9*(1), 1–12. https://doi.org/10.1038/s41598-019-48098-0

9. He, Q., & Brown, T. I. (2019). Environmental Barriers Disrupt Grid-like Representations in Humans during Navigation. *Current Biology*, 29(16), 2718-2722.e3. https://doi.org/10.1016/j.cub.2019.06.072

8. He, Q., McNamara, T.P., Bodenheimer, B., & Klippel, A. (2019). Acquisition and transfer of spatial knowledge during wayfinding. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 45*(8), 1364–1386. https://doi.org/10.1037/xlm0000654

7. He, Q. & McNamara, T.P. (2018). Virtual Orientation Overrides Physical Orientation to Define a Reference Frame in Spatial Updating. *Front. Hum. Neurosci.* 12:269.

6. He, Q., McNamara, T.P. & Kelly, J.W. (2018). Reference frames in spatial updating when body-based cues are absent. *Memory & Cognition,* 46, 89-99.

5. He, Q. & McNamara, T.P. (2018). Spatial Updating Strategy Affects the Reference Frame in Path Integration. *Psychonomic Bulletin & Review*, 25, 1073-1079.

4. Paris, R., Joshi, M., He, Q., Narasimham, G., McNamara, T.P., & Bodenheimer, B. (2017). Acquisition of Survey Knowledge using Walking in Place and Resetting Methods in Immersive Virtual Environments. *In Proceedings of the ACM Symposium on Applied Perception* (p. 7:1–7:8). New York, NY, USA: ACM.

3. He, Q., McNamara, T.P. & Kelly, J.W. (2016). Environmental and Idiothetic Cues to Reference Frame Selection in Path Integration. In T. Barkowsky et al. (Eds.), *Spatial Cognition X*. Berlin Heidelberg: Springer.

2. C. Zancada-Menendez, Q. He, P. Sampedro-Piquero, L. Lopez & T. P. McNamara (2016): Influence of bidirectional perspective on learning routes and spatial layout. *Journal of Cognitive Psychology*, 28(4), 474-485. https://doi.org/10.1080/20445911.2016.1143476

1. Chen, X., He, Q., Kelly, J. W., Fiete, I. R., & McNamara, T. P. (2015). Bias in human path integration is predicted by properties of grid cells. *Current Biology*, 25(13), 1771-1776.

Teaching Experience

- **Cognitive Psychology** – University of Texas at San Antonio
- **Experimental Psychology** – University of Texas at San Antonio
- **Data analytics in Neuroscience** - Georgia Institute of Technology
- **Principle in Neuroscience** - Georgia Institute of Technology
- **Methods in Neuroscience** - Georgia Institute of Technology
- **Research Methods in Psychology** - Georgia Institute of Technology
- **General Psychology** - Georgia Institute of Technology
- **Data pre-processing, analysis and visualization in Python** (summer workshop instructor for lab undergraduate assistants, Georgia Institute of Technology)
- **Virtual Reality in Psychology and Neuroscience** (summer workshop instructor for lab undergraduate assistants, Georgia Institute of Technology)

Awards

- NIH All of Us Research Program Train-the-Trainer Bootcamp, 2025
- Georgia Tech Student Recognition of Excellence in Teaching, 2022 and 2023
- Best Poster of College of Sciences, Georgia Tech Postdoctoral Research Symposium, 2018
- Vanderbilt Graduate Student Travel Award, 2013, 2015, 2016
- International Spatial Cognition Summer Institute Travel Award, 2013

Conference Presentations

- The effects on memory organization, improvement and capacity on value-based decision-making in spatial navigation, *Dallas & Austin Area Memory Meeting*, 2024, talk
- Effects of acute stress on rigid learning, flexible learning and value-based decision-making in spatial navigation, *interdisciplinary Navigation Symposium* (iNAV), 2022, poster
- Reinforcement learning models provide unique insight in characterizing individual differences of navigation behaviors, *Psychonomic Society Annual Meeting*, 2021, poster
- Seeing through barriers to improve spatial navigation efficiency and cognitive mapping, *Cognitive Neuroscience Society*, 2019, poster
- Acquisition of spatial knowledge during wayfinding, *Psychonomic Society Annual Meeting*, 2016, poster
- Difficult spatial updating relies on the initial facing orientation as reference direction in path integration, *Spatial Cognition 2016,* poster
- Difficult spatial updating relies on a single static reference direction, *Psychonomic Society Annual Meeting*, 2015, poster
- Human Path Integration and Grid Cells, *International Spatial Cognition Summer Institute,* 2013, talk

Research Skills

- Experiment Implementation: Unity and Vizard (Virtual Reality), PsychoPy and Psychtoolbox (2D stimuli)
- 3D Model Construction: Sketchup
- Computer Programing (from most to least proficient): Python, Matlab, R, C# and C++
- Space Syntax Analysis: DepthMapX
- Neuroimaging Data Analysis (MRI and EEG): SPM, FSL, FreeSurfer, AFNI, and EEGLAB

Ad Hoc Journal Referee

■ Behavioural Brain Research ■ Behavior and Information Technology ■ Cell Reports ■ Cognition ■ Cognitive Neurodynamics ■ Cognitive Research: Principles and Implications ■ Frontiers in Human Neuroscience ■ IEEE International Symposium on Mixed and Virtual Reality ■ IEEE Transactions on Visualization and Computer Graphics ■ Journal of Experimental Psychology: General ■ Journal of Experimental Psychology: Human Perception and

Performance ■ Journal of Experimental Psychology: Learning, Memory and Cognition ■ Quarterly Journal of Experimental Psychology ■ Scientific Reports

Ad Hoc Grant Proposal Referee

■ Deutsche Forschungsgemeinschaft (DFG, German Research Foundation)
■ Florida Department of Health (FL DOH)

References

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