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

Dr. Thackery I. Brown

Assistant Professor of School of Psychology, Georgia Institute of Technology

Postdoctoral Advisor

129 J.S. Coon Building, Atlanta, GA 30313

thackery.brown@psych.gatech.edu

Dr. Timothy P. McNamara

Professor of Department of Psychology, Vanderbilt University

Ph.D. Advisor

517 Wilson Hall, 111 21st Avenue South, Nashville, TN 37240

t.mcnamara@vanderbilt.edu

Dr. Elisabeth Sandberg

Senior lecturer of Department of Psychology, Vanderbilt University

Teaching assistant instructor

528 Wilson Hall, 111 21st Avenue South, Nashville, TN 37240

elisabeth.h.sandberg@vanderbilt.edu