

JOHN McALISTER

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Education

- EXPECTED MAY 2026 **PhD. in Mathematics** — University of Tennessee - Knoxville
Mathematical Biology concentration
- MAY 2023 **M.S. in Mathematics** — University of Tennessee - Knoxville
Concurrent with PhD program
- MAY 2021 **B.S. in Zoology** — The Ohio State University
With Honors Research Distinction
- MAY 2021 **B.S. in Mathematics** — The Ohio State University
Math-Bio track

Research Interests

I study mathematical biology and game theoretic modeling. Using tools from PDEs, nonlocal equations and graph theory, my main focus is the interaction between relational structure and game theoretic dynamics.

Papers

- In review **McAlister J.S.**, Fefferman, N.H. Mengesha, T.A. (2025) *Nonlinear Nonlocal Diffusion Equation for the Analysis of Continuous Coordination and Anti-coordination Type Games*. submitted to Physical Reviews E.
<https://doi.org/10.48550/arXiv.2506.13929>
- Under Revision **McAlister J. S.**, Brunner, J.L., Galvin, D. J., Fefferman, N.H. (2025) *A Game Theoretic Treatment of Contagion in Trade Networks*. Submitted to PLOS computational Biology. <https://doi.org/10.48550/arXiv.2504.06905>
- April 2025 Kirkland, S., Li, C., **McAlister, J.S.**, and Zhang, X. (2025) *Edge Addition and the Change in Kemeny's Constant*. Discrete Applied Mathematics.
<https://doi.org/10.1016/j.dam.2025.04.031>
- January 2025 **McAlister, J.S.**, Fefferman N. H. (2025) *Insights into the coordination game with neutral options through simulation*. Dynamic Games and Applications <https://doi.org/10.1007/s13235-024-00612-4>
- January 2025 **McAlister, J.S.**, M.J. Blum, Y. Bromberg, N.H. Fefferman, Q. He, E. Lofgren, D.L. Miller, C. Schreiner, K. Selcuk Candan, H. Szabo-Rogers, and J. M. Reed (2025) *An Interdisciplinary Perspective of the Built-Environment Microbiome*. FEMS Microbiology Ecology <https://doi.org/10.1093/femsec/fiae166>
- December 2023 Fefferman, N.H., **McAlister, J.S.**, Akpa, B.S., Akwataghibe, K., Azad F.T., Barkley K., Bleichrodt, A., Blum M.J., Bourouiba, L., Bromberg, Y., Candan K.S., Chowell, G., Clancey, E., Cathroan, F.A., DeWitte, S.N., Fernandez, P., Finnoff, D., Flaherty, D.T., Gibson, N.L., Harris, N., He, Q., Lofgren, E.T., Miller, D.L., Moody, J., Muccio, K., Nunn, C.L., Papeş, M., Pachalidis, I.Ch., Pasquale, D.K., Reed, M.J., Rogers, M. B., Schreiner, C. L., Strand E.B., Swanson C.S., Szabo-Rodgers, H. L., and Ryan, S. J. (2023) *A New Paradigm for Pandemic Preparedness*. Current Epidemiological Reports. <https://doi.org/10.1007/s40471-023-00336-w>

April 2022 **McAlister, J.S.**, Hamilton, I. (2022) *An Adaptive Dynamic Model for the Vigilance Game in Group Foragers*. Journal of Theoretical Biology. 538:111033.
<https://doi.org/10.1016/j.jtbi.2022.111030>

Posters and Presentations

- September 2025 **McAlister J. S.**(2025) *Replicator Dynamics with Spatial Structure for Evolutionary Games*. at the Mathematical Biology Seminar at the University of Tennessee - Knoxville
- August 2025 **McAlister. J. S.**(2025)*Replicator Dynamics with Spatial Structure for Evolutionary Games*. **Invited Talk** at the NSF APPEX center Summer Research Symposium at the University of Tennessee - Knoxville
- September 2024 **McAlister. J. S.**(2024)*Structured Coordination in Continuous Spatial and Strategic Domains* Talk given at AMETHYST: Game Theory in Complex Systems during the Conference on Complex Systems 2024 at the University of Exeter
- March 2024 **McAlister J. S.**(2024)*The Structured Coordination Game with Neutral Options* Talk given at The Mathematical Association of America - South East Section Meeting at the University of Tennessee - Knoxville
- November 2023 **McAlister J. S.**(2023)*Spatially Structured Coordination Games and their Applications in Theoretical Ecology*. Talk given as part of the Oral Specialty Exam as a graduation requirement at the University of Tennessee - Knoxville.
- April 2023 **McAlister J. S.**(2023) *An Adaptive Dynamic Model for a Vigilance Game among Group Foragers*. Talk given at the SIAM Graduate Research Showcase at the University of Tennessee-Knoxville
- October 2020 **McAlister, J. S.**, Hamilton, I. (2020) *An Adaptive Dynamic Model for the Vigilance Game in Group Foragers*. Poster presented at the Undergraduate Research Conference at the National Institute of Mathematical and Biological Synthesis at the University of Tennessee - Knoxville.
- November 2019 Allen, R., Bains, A., Anderson, H., **McAlister, J. S.** (2019). *Parameter Estimation within an SIR Model of American Chestnut Blight*. Talk given at the Undergraduate Research Festival at The Ohio State University
- August 2019 Allen, R., Bains, A., Anderson, H., **McAlister, J. S.** (2019). *Parameter Estimation within an SIR Model of American Chestnut Blight*. poster presented at the Summer Research Expo at the University of Wisconsin - La Crosse

Funding

Proposals

- April 2024 **New Techniques for the Analysis of Coordination in General Discrete and Continuous Domains** Submitted to DARPA DSO Critical Orientation of Mathematics to Produce Advancements in Science and Security (COMPASS) (DARPA-EA-25-02-03) **Selected to give Oral Proposal Package (OPP)**

Support

- Spring 2025 GRA supported by NSF(DBI) #2312115 **PIPP Phase II: Analysis and Prediction of Pandemic Expansion (APPEX)**

- Fall 2024 GRA supported by NSF(DEB) #2207922 **Socioeconomic and Epidemiological Drivers of Pathogen Dynamics in Wildlife Trade Networks**
- Fall 2024 GRA supported by NSF(DRL) #2247074 **Developing and Early Understanding of Contagion in Preschool- and Kindergarten-Aged Children**
- Fall 2023 GRA supported by NSF(CCF) #2200140 **PIPP Phase I: Predicting Emergence in Multidisciplinary Pandemic Tipping-points(PREEMPT)**

Awards

- February 2024 **Eaves Teaching Award** - nominee
— Nominated for excellence in teaching among late career graduate students
- April 2023 **Eaves Teaching Award** - Finalist
— Awarded for excellence in teaching among early career graduate students
- April 2023 **Math GTA Teaching Excellence Fellowship** - Winner
— Nominated for commitment to further the teaching mission of the University.
- August 2021 **Academic Performance Assistantship** - Winner
— Awarded for meeting academic milestones in the PhD program early.

Workshops

- May 2022 **CBMS conference: Interface of Mathematical Biology and Linear Algebra**
University of Central Florida, Orlando, FL.

Mentorship and Teaching Experience

- July 2024 - Present **Applied Math Undergraduate Research Mentor**
University of Tennessee - Knoxville, Knoxville, TN.
- Aug 2022 - Dec. 2023 **Graduate Teaching Associate - Instructor of Record MATH 113**
University of Tennessee-Knoxville, Knoxville, TN.
- Aug 2021 - May 2022 **Graduate Teaching Assistant MATH 119, 125**
University of Tennessee-Knoxville, Knoxville, TN.
- Aug 2019- May 2021 **Undergraduate Teaching Assistant MATH 1075, 1149, 1150**
The Ohio State University, Columbus, OH.

Leadership and Volunteerism

- 2022-2024 **Member**—Graduate Teaching Assistantship Advisory Council
- 2023-2024 **Senator**—Graduate Student Senate
- 2022-2023 **President**—Math Graduate Student Council

Research Experience

- January 2022- Present **Graduate Research Assistant — Fefferman Lab**
University of Tennessee - Knoxville, Knoxville, TN.
Advisor: Prof. Nina Fefferman
- May 2018- May 2021 **Undergraduate Researcher — Hamilton Lab**
The Ohio State University, Columbus, OH.
Advisor: Prof. Ian Hamilton
- May-Aug. 2019 **REU Fellow — Ecological Modeling of the Mississippi River Basin**
University of Wisconsin - La Crosse, La Crosse WI.
Advisors: Prof. Robert Allen, Prof. Anita Baines, Prof. James Pierce, Prof. Greg Sandland

Software Experience

Proficient

- R
- Python
- MatLab
- L^AT_EX
- Mathematica

Experienced

- C#
- Java
- Maple
- JMP
- NetLogo