Austin Hinkel

Thomas More University, Department of Mathematics & Physics
XXXXX@XXXXXXXXX 859-XXX-XXXX ahinkel.github.io
www.orcid.org/0000-0002-9785-914X github.com/ahinkel
Research Interests: Galactic Archaeology, Applied Data Science, Physics & Astronomy Education/Outreach

Ph.D. Physics | Galactic Archaeology, Physics, Data Science

Appointments

2023 -	Assistant Professor	Thomas More University
2024 -	Director of the Observatory	Thomas More University
2024 -	Director of the Astronomy Public Lecture Series	Thomas More University
2021 - 2023	Visiting Assistant Professor	Colorado College
2016 - 2021	Teaching and Research Assistant	University of Kentucky

Education

2016 - 2021 Ph.D., M.S. in Physics — University of Kentucky
Dissertation: "Axial Symmetry Tests of Milky Way Disk Stars Probe the Galaxy's Matter Distribution", GPA: 3.94

2015 - 2015 — Danish Institute for Study Abroad
Summer study abroad program in geopolitics and history

2012 - 2016 B.S. in Physics, minor in Mathematics — University of Kentucky
Honors Program, summa cum laude, GPA: 4.00

Courses Taught

Thomas More University

Elements of Physics I 2023, 2024, 2025
Elements of Physics I Laboratory 2023(x2), 2024, 2025
Elements of Physics II 2024, 2026
Elements of Physics II Laboratory 2024, 2025
Astronomy Lab 2023
Introductory Astronomy Integrated Lecture/Lab 2025
General Physics I 2024
General Physics II 2025
General Physics II Laboratory 2026
Astrophysics 2025
Understanding and Communicating the Physics Behind Modern, International Issues 2024
Galactic Archaeology and Data Science with the Gaia Space Telescope 2024
Research Projects in Physics 2026
Advanced Research Proposal 2023
Advanced Research Projects in Physics 2024, 2025(x2), 2026

Colorado College

Introductory Physics for the Life Sciences I 2022
Introductory Physics for the Life Sciences I Lab 2021, 2023
Introductory Physics for the Life Sciences II 2021, 2022

Introductory Physics for the Physical Sciences I Lab 2021
Introductory Physics for the Physical Sciences II Lab 2022(x2)
Introductory Astronomy 2022
Introductory Astronomy Lab 2023
Astronomy and Data Analysis with the Gaia Space Telescope 2022

Publications

Peer-Reviewed Journal Articles

1. Yin, Ziyuan and **Austin Hinkel** (2024). "A Wave-Corrected Assessment of the Local Midplane". In: *The Astrophysical Journal* 963.2, p. 136. DOI: 10.3847/1538-4357/ad20ea.
2. **Hinkel, Austin**, Susan Gardner, and Brian Yanny (2023e). "Two-Point Correlation Function Studies for the Milky Way: Discovery of Spatial Clustering from Disk Excitations and Substructure". In: *The Astrophysical Journal* 942.1, p. 41. DOI: 10.3847/1538-4357/ac9ccc.
3. Gardner, Susan, **Austin Hinkel**, and Brian Yanny (2020). "Applying Noether's theorem to matter in the Milky Way: evidence for external perturbations and non-steady-state effects from Gaia Data Release 2". In: *The Astrophysical Journal* 890.2, p. 110. DOI: 10.3847/1538-4357/ab66c8.
4. **Hinkel, Austin**, Susan Gardner, and Brian Yanny (2020b). "Axial Asymmetry Studies in Gaia Data Release 2 Yield the Pattern Speed of the Galactic Bar". In: *The Astrophysical Journal Letters* 899.1, p. L14. DOI: 10.3847/2041-8213/aba905.
5. **Hinkel, Austin**, Susan Gardner, and Brian Yanny (2020c). "Probing Axial Symmetry Breaking in the Galaxy with Gaia Data Release 2". In: *The Astrophysical Journal* 893.2, p. 105. DOI: 10.3847/1538-4357/ab8235.

Other Professional Journal Articles

1. **Hinkel, Austin** (2026a). "Planetary Defense in the Introductory Astronomy Classroom: Visualizing Kepler's Laws". In: *AstroNotes. The Physics Teacher.* 64.2. DOI: 10.1119/5.0312991.

Theses

1. **Hinkel, Austin** (2021). "Axial Symmetry Tests of Milky Way Disk Stars Probe the Galaxy's Matter Distribution". In: *Theses & Dissertations*.
2. **Hinkel, Austin** (2016). "Modeling Extrasolar Trojan Asteroids in Gravitational Potentials of Migrating Jovian-like Planets to Inform Future Observations". In: *Theses & Dissertations*.

Conference Proceedings, Posters, & Outreach

Conference Proceedings

1. **Hinkel, Austin**, Susan Gardner, and Brian Yanny (2023f). "Two-Point Correlation Function Studies for the Milky Way: Discovery of Spatial Clustering from Disk Excitations and Substructure". In: 241st Meeting of the AAS.
2. **Hinkel, Austin**, Susan Gardner, and Brian Yanny (2021a). "Axial Symmetry Tests of Milky Way Disk Stars Probe the Galaxy's Matter Distribution". In: 237th Meeting of the AAS.
3. **Hinkel, Austin**, Susan Gardner, and Brian Yanny (2021b). "Axial Symmetry Tests of Milky Way Disk Stars Probe the Galaxy's Matter Distribution". In: APS April Meeting.

4. **Hinkel, Austin**, Susan Gardner, and Brian Yanny (2020a). "Applying Noether's Theorem to Matter in the Milky Way: Axisymmetry Tests with Gaia Data Release 2 Reveal External Perturbations and Non-Steady-State Effects". In: vol. 65. APS April Meeting.

Invited Talks and Other Colloquia

1. **Hinkel, Austin** (2025f). "The Gaia Space Telescope". In: Invited talk at the Cincinnati Observatory's Friend of the Observatory Lecture Series.
2. **Hinkel, Austin** (2024b). "Eclectic Explorations: Data Science and Machine Learning Across Diverse Domains". In: Thomas More University Faculty CRAFT Talk Series.
3. **Hinkel, Austin**, Susan Gardner, and Brian Yanny (2023a). "Galactic Archaeology with the Gaia Space Telescope: Digging for Galactic Structure with the Two-Point Correlation Function". In: Invited talk at Kalamazoo College.
4. **Hinkel, Austin**, Susan Gardner, and Brian Yanny (2023b). "Galactic Archaeology with the Gaia Space Telescope: Digging for Galactic Structure with the Two-Point Correlation Function". In: Invited talk at Centenary College of Louisiana.
5. **Hinkel, Austin**, Susan Gardner, and Brian Yanny (2023c). "Galactic Archaeology with the Gaia Space Telescope: Digging for Galactic Structure with the Two-Point Correlation Function". In: Invited talk at Eastern Kentucky University.
6. **Hinkel, Austin**, Susan Gardner, and Brian Yanny (2023d). "Galactic Archaeology with the Gaia Space Telescope: Digging for Galactic Structure with the Two-Point Correlation Function". In: Invited talk at Thomas More University.
7. **Hinkel, Austin**, Susan Gardner, and Brian Yanny (2021c). "Galactic Archaeology with Gaia: Digging for Structure in the Milky Way". In: Invited talk at Colorado College.
8. **Hinkel, Austin**, Susan Gardner, and Brian Yanny (2021d). "Two-Point Correlation Function Studies in the Milky Way: Spatial Clustering from Disk Excitations and Substructure". In: Ohio State University Little Galaxies Journal Club.

Poster Talks (Presenter)

1. **Hinkel, Austin** (2025c). "Solar Photovoltaics on College Campuses Outperform Traditional Endowed Funds: A Geospatial Analysis of the Potential Impact of the Inflation Reduction Act". In: Midwest Region Sustainability Summit.
2. **Hinkel, Austin** (2024a). "Designing an Open Source, Skills-Based, Introductory Astronomy Course: Teaching Data Science and Python with Gaia Space Telescope Data". In: 243rd Meeting of the AAS.

Conference Proceedings (Non-Presenting Coauthor)

1. Roach, Josephine and **Austin Hinkel** (2025a). "Linking Dark and Stellar Substructure in the Illustris TNG50 Simulation". In: 2025 Kentucky Area Astronomical Society Meeting.
2. Krishnarao, Dhanesh, Catherine Witherspoon, Adam Light, and **Austin Hinkel** (2024). "Towards an Antiracist Introductory Astronomy Curriculum". In: 243rd Meeting of the AAS.
3. Gardner, Susan, **Austin Hinkel**, and Brian Yanny (2023). "Two-Point Correlation Function Studies for the Milky Way: Discovery of Spatial Clustering from Disk Excitations and Substructure". In: APS April Meeting.

Poster Talks (Non-Presenting Coauthor)

1. Bursk, Emmy and **Austin Hinkel** (2025a). “Linking Dark and Stellar Substructure in the Illustris TNG50 Simulation”. In: 245th Meeting of the AAS.
2. Bursk, Emmy and **Austin Hinkel** (2025b). “Linking Dark and Stellar Substructure in the Illustris TNG50 Simulation”. In: 2025 Kentucky Area Astronomical Society Meeting.
3. Roach, Josephine and **Austin Hinkel** (2025b). “Visualizing Disequilibrium: Exploring the Vertical Structure of the Milky Way at Various Length Scales”. In: Thomas More University 2025 Student Research Forum.
4. Roach, Josephine and **Austin Hinkel** (2025c). “Visualizing Disequilibrium: Exploring the Vertical Structure of the Milky Way at Various Length Scales”. In: 245th Meeting of the AAS.
5. Roach, Josephine and **Austin Hinkel** (2024a). “Visualizing Disequilibrium: Exploring the Vertical Structure of the Milky Way”. In: Conference for Undergraduate Women in Physics.
6. Roach, Josephine and **Austin Hinkel** (2024b). “Visualizing Disequilibrium: Exploring the Vertical Structure of the Milky Way”. In: Thomas More University 2024 Student Research Forum.
7. Hancock, Hart, Eryn Murphy, Ben Blackmore, and **Austin Hinkel** (2023). “Center Of Pressure Metrics During The Five-time Sit-to-stand Are Associated With Falls-history In Older Adults”. In: vol. 55. 9S. LWW, p. 742. DOI: 10.1249/01.mss.0000986812.49924.0f.
8. Yin, Ziyuan and **Austin Hinkel** (2022). “A Wave-Corrected Assessment of the Milky Way’s Vertical Structure Near the Solar Neighborhood”. In: Colorado College Student Summer Research Symposium.

Outreach Talks

1. **Hinkel, Austin** (2026b). “Please Stop Letting Astronomers Name Things”. In: Thomas More University Observatory Public Lecture Series.
2. **Hinkel, Austin** (2025a). “Earth in Cosmic Context”. In: Thomas More University Observatory Public Lecture Series.
3. **Hinkel, Austin** (2025b). “Practical, Down-to-Earth Astronomy”. In: Thomas More University Observatory Public Lecture Series.
4. **Hinkel, Austin** (2025d). “Something Dark and Spooky is Out There…” In: Thomas More University Observatory Public Lecture Series.
5. **Hinkel, Austin** (2025e). “Temperatures in the Universe”. In: Thomas More University Observatory Public Lecture Series.
6. **Hinkel, Austin** (2025g). “Understanding The Immensity of the Cosmos”. In: Thomas More University Observatory Public Lecture Series.
7. **Hinkel, Austin** (2024c). “Exoplanets and How to Find Them”. In: Thomas More University Observatory Public Lecture Series.
8. **Hinkel, Austin** (2024d). “Starstuff: The Remarkable Story of Nearly Everything”. In: Thomas More University Observatory Public Lecture Series.
9. **Hinkel, Austin** (2024e). “Studying the Milky Way Galaxy with the Gaia Space Telescope”. In: Thomas More University Observatory Public Lecture Series.
10. **Hinkel, Austin** (2023). “The Solar System’s Time Capsules: Unlocking the Secrets of Asteroids & Comets”. In: Thomas More University Observatory Public Lecture Series.
11. **Hinkel, Austin** (2020a). “Okay, the Climate’s Changing... What Can We Do About It?” In: West Sixth Suds and Science Public Lecture Series.

12. **Hinkel, Austin** (2020b). “Swing Sets, Stars, and the Secrets of the Universe”. In: U. of Kentucky Virtual Three Minute Thesis Competition (Finalist).

13. **Hinkel, Austin** (2019). “The Leftovers of Solar System Formation”. In: Kentucky SkyTalk Lecture Series.

Honors & Awards

Colorado College Dean of the Faculty Teaching Excellence Award	2022-2023 AY
Universities Research Association Visiting Scholars Program at Fermilab (3X)	2018-2021
U. Kentucky College of Arts & Sciences Dean’s Competitive Fellowship	Fall 2020
GAANN Fellow, U.S. Dept. of Education for study at the U. Kentucky	Fall 2018
American Physical Society Five Sigma Physicist Award	2016
U. Kentucky Dept. of Physics & Astronomy Outstanding Senior	2016
U. Kentucky Dept. of Physics & Astronomy Outstanding Junior	2015
U. Kentucky Presidential Scholarship	2012-2016
U. Kentucky Department of Physics & Astronomy Scholarship	2014-2016
Sigma Pi Sigma Physics Honor Society inductee	2015
Kentucky Educational Excellence Scholarship	2012-2016
U. Kentucky Dean’s List	2012-2016
Kentucky Governor’s Scholar	2011

Grants

NASA KY EPSCoR, KY Space Grant Consortium - REU Grant	$9,992	2024-2025 AY
Thomas More University Faculty Development Grant	$1,000	2024-2025 AY
NASA KY EPSCoR, KY Space Grant Consortium - Enhanced Mini Grant	$21,274	2023-2024 AY
Thomas More University Faculty Development Grant	$1,000	2023-2024 AY
Colorado College Faculty-Student Collaborative Research Grant	$4,000	Spring 2022
Colorado College Divisional Research & Development Grant	$5,000	2023
Colorado College Divisional Research & Development Grant	$1,000	2022

Leadership Activities, Professional Development, & Service

Faculty Coordinating Committee Member at Thomas More University	2026-present
Saints Serve Committee Member at Thomas More University	2025-present
Saints Serve Site Lead	2025
Physics Program Coordinator at Thomas More University	2024-present
Sustainability Committee Member at Thomas More University	2024-present
Search Committee Chair: Physics Hire at Thomas More University	Spring 2024
Saints Serve Participant	2023-present
American Association of Physics Teachers New Faculty Workshop	July 2022
QPR Suicide Intervention Certification	2022-2023
Various Kaggle Machine Learning Certifications	2023
Colorado College Senior Seminar Advisor	2022-2023
Student Sustainability Council Representative at U. Kentucky	2020-2021
Graduate Student Congress Leadership Team: Sustainability Advocate at U. Kentucky	2020-2021
Vice President of the Society of Physics Students at U. Kentucky	2015

Other Projects, Interdisciplinary Work, & Activities

Fall Risk Identification Project – Interdepartmental collaborator on a Human Biology and Kinesiology research project wherein I designed and implemented a data reduction and processing pipeline, filtered Fourier Transform data, and developed a moving-window analysis to automatically identify particular data collection outliers inherent in the experimental setup. I also formulated a novel metric to highlight a particular type of human movement of interest. The metric was ultimately able to predict fall risk in elderly patients with very high accuracy.

Energy Savings Advisor Software and Sensor System – Provisional patent filed in 2021 for a software-enabled hardware solution intended to lower energy usage of the built environment through thermodynamics calculations, building envelope monitoring, and consumer engagement.

Commission for Environmental Cooperation Youth Innovation Challenge Semi-Finalist – Semi-finalist in the Commission for Environmental Cooperation's Youth Innovation Challenge for the invention above.

ESG Student Managed Investment Fund at University of Kentucky – Led a student movement to move the University of Kentucky towards more sustainable practices, including carving out a multi-million dollar, student managed sustainable investment fund from the university's endowment. This fund is now being used to help prepare future sustainability leaders at the University.

Solar Photovoltaic Incentives Data Science Project – Open-sourced a data set I curated by computing projected returns on investment for non-profit institutions leveraging Inflation Reduction Act direct pay incentives to install solar panels. Combined institutional data with solar irradiance geospatial data and incentive eligibility geospatial data.

Kaggle Machine Learning Competition: Prediction of Parkinson's Disease Freezing of Gait from Accelerometer Data – Participated in a machine learning competition to identify and predict Freezing of Gait symptoms in Parkinson's Disease patients from accelerometry.

Course Design: Physics of Modern, International Issues – Designed a special topics course that covered the physics of climate change, solutions to the climate crisis, nuclear energy and weapons, and a number of other international issues related to physics.

Open-Source Introductory Astronomy and Data Science Course – Developed open-source course material for a skills-based intro astronomy course focused on gently introducing students to programming topics.

Volunteer Data Consulting for Cincinnati Zoo – Consulted with the Cincinnati Zoo to analyze carbon emissions data from the shipment of lettuce and kale from various vendors, and helped develop a data schema for organizing carbon emissions from hydroponic container farms. The goal was to grow lettuce and kale for the animals on site and avoid the emissions associated with transportation.

Professional Memberships

American Physical Society – Member, District Advocate, & 5-sigma Physicist
American Astronomical Society – Member
American Association for the Advancement of Science – Member
Union of Concerned Scientists – Science Network Member

Selected Press Coverage

Thomas More Observatory Public Talk – Outreach coverage
Astronomy Class Press Release – Teaching coverage
Milky Way Structures Press Release – Research coverage
Sustainable Finance at the University of Kentucky – Leadership coverage