

AUSTIN HINKEL

📍 Colorado College, Department of Physics 📞 859-XXX-XXXX @ X
🌐 www.orcid.org/0000-0002-9785-914X 🌐 github.com/ahinkel
📖 Research Interests: Galactic Structure, Galactic Archaeology, Physics & Astronomy Education/Outreach

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

EDUCATION

2016 - 2021	PH.D., M.S. IN PHYSICS Dissertation: "Axial Symmetry Tests of Milky Way Disk Stars Probe the Galaxy's Matter Distribution", GPA: 3.94	University of Kentucky
2015 - 2015	Summer study abroad program in geopolitics and history	Danish Institute for Study Abroad
2012 - 2016	B.S. IN PHYSICS, MINOR IN MATHEMATICS Honors Program, summa cum laude, GPA: 4.00	University of Kentucky

APPOINTMENTS

2021 - 2023	VISITING ASSISTANT PROFESSOR	Colorado College
2016 - 2021	TEACHING AND RESEARCH ASSISTANT	University of Kentucky

COURSES TAUGHT

INTRODUCTORY ASTRONOMY Sole lecture instructor for 34 students. Designed course around lecture tutorial worksheets, Think-Pair-Share activities, and other active learning techniques I learned at the AAPT's New Faculty Workshop.	Fall 2022
INTRODUCTORY PHYSICS FOR THE PHYSICAL SCIENCES II - LAB Sole laboratory instructor for 37 students. Designed inquiry-based learning labs to challenge common misconceptions and elicit opportunities for peer teaching.	Fall 2022
ASTRONOMY AND DATA ANALYSIS WITH THE GAIA SPACE TELESCOPE Sole lecture instructor for 7 upper-level students. Facilitated the use of real astronomy data for students to learn programming, databases, data analysis techniques, and astrophysics. Designed course around mini-tutorials, mini-lectures, and more involved labs and projects.	Spring 2022
INTRODUCTORY PHYSICS FOR THE LIFE SCIENCES I Sole lecture instructor for around 20 students. Designed course around lecture tutorial worksheets.	Spring 2022
INTRODUCTORY PHYSICS FOR THE PHYSICAL SCIENCES II - LAB Sole laboratory instructor for around 10 students.	Spring 2022
INTRODUCTORY PHYSICS FOR THE LIFE SCIENCES II Sole lecture instructor for around 20 students. Designed course around lecture tutorial worksheets.	Fall 2021
INTRODUCTORY PHYSICS FOR THE LIFE SCIENCES I - LAB Sole laboratory instructor for around 20 students.	Fall 2021
INTRODUCTORY PHYSICS FOR THE PHYSICAL SCIENCES I - LAB Sole laboratory instructor for around 10 students.	Fall 2021

PUBLICATIONS

Peer-Reviewed Journal Articles

- Hinkel, Austin**, Susan Gardner, and Brian Yanny (2022). "Two-Point Correlation Function Studies for the Milky Way: Discovery of Spatial Clustering from Disk Excitations and Substructure". In: *The Astrophysical Journal* (Accepted). doi: [10.48550/arXiv.2210.13450](https://doi.org/10.48550/arXiv.2210.13450).
- Gardner, Susan, **Hinkel, Austin**, 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.

3. **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.
4. **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.

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*.

Journal Articles In Preparation

1. **Hinkel, Austin** (2023). “The Brocard-Ramanujan Problem and an Unexpected Connection to Primitive Pythagorean Triples”. In: *Mathematics Magazine* (In Prep.)



CONFERENCE PROCEEDINGS, POSTERS, & OUTREACH

Conference Proceedings

1. **Hinkel, Austin**, Susan Gardner, and Brian Yanny (2023). “Two-Point Correlation Function Studies for the Milky Way: Discovery of Spatial Clustering from Disk Excitations and Substructure”. In: 241st Meeting of the AAS (Accepted).
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

1. **Hinkel, Austin**, Susan Gardner, and Brian Yanny (2021c). “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 (Non-Presenting Coauthor)

1. Yin, Ziyuan and **Hinkel, Austin** (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** (2020a). “Okay, the Climate’s Changing... What Can We Do About It?” In: West Sixth Suds and Science Public Lecture Series.
2. **Hinkel, Austin** (2020b). “Swing Sets, Stars, and the Secrets of the Universe”. In: U. of Kentucky Virtual Three Minute Thesis Competition (Finalist).
3. **Hinkel, Austin** (2019). “The Leftovers of Solar System Formation”. In: Kentucky Sky Talk Public Lecture Series.


HONORS, GRANTS, & AWARDS


Colorado College Faculty-Student Collaborative Research Grant Spring 2021
Colorado College Divisional Research & Development Grant Spring 2021
Universities Research Association Visiting Scholars Program grant winner (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


LEADERSHIP ACTIVITIES, PROFESSIONAL DEVELOPMENT, & SERVICE


American Association of Physics Teachers New Faculty Workshop	July 2022
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

 **Two-Point Correlation Studies of the Milky Way** – Building on our previous work with the Two-Point Correlation Function (2PCF), my collaborators and I are working to develop an accurate model of the local Milky Way to allow for a traditional 2PCF analysis of the halo. By constraining the power spectrum of dark matter, our work may help to discriminate between particle physics models of dark matter.

 **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.

★ PROFESSIONAL MEMBERSHIPS

American Physical Society – Member, District Advocate, & 5-sigma Physicist

American Astronomical Society – Member

American Association for the Advancement of Science – Member

American Association of Physics Teachers – New Faculty Workshop Participant

Union of Concerned Scientists – Science Network Member

📡 SELECTED PRESS COVERAGE

Astronomy Class Press Release [🔗](#) – Teaching coverage

Milky Way Structures Press Release [🔗](#) – Research coverage

Sustainable Finance at the University of Kentucky [🔗](#) – Leadership coverage