

Brian Thomas Cook

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Education

MSc Astronomy Research, Leiden University, 2020 (expected).

MS Physics, Georgia Institute of Technology, 2018.

BS Physics with Honors and Astronomy/Astrophysics, University of Michigan, 2017.

Work Experience

Summer Research Program Intern, Applied Space Systems Group, MIT Lincoln Laboratory, 2019. Utilized a hierarchical clustering algorithm to discern structures comprised of RR Lyrae variable stars in the Milky Way's stellar halo. Wrote a manuscript describing our results, which is to be submitted for review in early 2020. Contributed a random forest classification element to an optical image data analysis pipeline as part of an existing collaboration with scientists at the Jet Propulsion Laboratory and Caltech.

Graduate Teaching Assistant, Georgia Institute of Technology School of Physics, 2017-2018. Taught lab sections for an introductory electromagnetism course. This involved helping students with "pen and paper" problems, taking data, and writing computer programs in VPython.

Undergraduate Student Instructor, Michigan Math and Science Scholars, 2016-2017. Led coding tutorials for a two week cosmology course for high school students. Lectured on stellar astrophysics and relativity.

Grader and Laboratory Assistant, University of Michigan Physics Department, 2015-2017. Graded problem sets and exams for two introductory physics courses. Helped develop a lab section for Physics 390, a course that introduces Michigan undergraduates to modern physics.

Research Experience

Written Work

Refereed Publications

B. T. Cook, J. J. Tobin, M. F. Skrutskie, M. J. Nelson: "Time variability in the bipolar scattered light nebula of L1527 IRS: A possible warped inner disk", *A&A* **626**, A51 (2019).

Theses

First Research Project, Leiden Observatory: "Predictions for the Circumgalactic Medium of Low-mass, Star-forming Galaxies". Advised by Nastasha Wijers and Joop Schaye.

Honors Thesis, University of Michigan Physics Department: "The Wave Turbulence Approach to Gravitational Collapse in Anti-de Sitter Space". Advised by Leopoldo Pando Zayas.

In Preparation

Master's Research Project, Leiden Observatory: "Star Cluster Phase Mixing in a Milky Way-like Background Potential". Advised by Simon Portegies Zwart.

B. T. Cook, D. F. Woods, J. D. Ruprecht, J. Varey, R. Mastandrea, K. de Soto, J. Harburg, U. Rebbapragada, A. A. Mahabal, "Agglomerative, hierarchical clustering of RR Lyrae variable stars".

Presentations

Talks

Cosmic Coffee, Center for Relativistic Astrophysics, Georgia Institute of Technology, 2019.
 Group 97 Technical Seminar, Space Systems and Technology Division, MIT Lincoln Laboratory, 2019.
 SPS Student Talks, University of Michigan Physics Department, 2016.

Poster Presentations

University of Michigan Undergraduate Astronomy Poster Session, 2017.
 229th AAS Meeting, 2017.

Miscellaneous Projects and Experience

Participant, NEWCRAFT 24 Hour Data Challenge. Used a k -nearest neighbors algorithm to identify customer classes for Praxis, a chain of Dutch hardware stores.

Special Problems. Explored the efficacy of using the Lattice Boltzmann Method to simulate turbulent fluid flows across a network of GPUs. Advised by Roman Grigoriev.

Introduction to Astronomical Research. Simulated hot Jupiter migration in protoplanetary disks using the FARGO3D N -body solver. Advised by Lee Hartmann and Jaehan Bae.

Computing Skills

Computing Languages

Proficient: Python (Cython, TensorFlow, NumPy, SciPy, pandas, Astropy, scikit-learn, astroML, h5py).
 Intermediate: Mathematica.
 Beginner: C/C++, R, Matlab, SQL, Maple.

Software Suites / Computing Environments

EAGLE, Sailfish, HoCHUNK, FARGO3D, MESA, AMUSE.
 \LaTeX , Git, Microsoft Office.
 Linux, macOS.
 Conda environments.

Honors and Awards

President's Fellowship, Georgia Institute of Technology. "President's Fellowships are offered annually to a select number of highly qualified U.S. nationals or permanent residents who intend to pursue doctoral degrees."

Sigma Pi Sigma, University of Michigan chapter. "Election to Sigma Pi Sigma is earned by outstanding academic achievement and involvement in the physics community at the University of Michigan."

LSA Honors, University of Michigan College of Literature, Science, and the Arts. Awarded to students who are admitted to the LSA Honors Program, complete the course requirements, and write a senior thesis.

Natural Sciences Department Award, Grandville High School. Awarded to the highest achieving natural sciences (physics and chemistry) student in the graduating class as determined by the GHS faculty.

Outreach, Service Experience

"How Are Galaxies Formed? An Explainer.", The Prompt Magazine, 2019.

Volunteer, SPS outreach event at Burns Park Elementary School, 2016.

Volunteer, COSMO-16 Conference, 2016.

Languages

English, native.

Dutch, basic working proficiency.

Last updated: December 1, 2019