Brian Thomas Cook

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Education

University of North Carolina at Chapel Hill *2028 (expected)*
Astrophysics PhD
A New Basis-Expansion N-Body Code and its Applications to Galactic Archaeology

Leiden University *2020*
Astronomy MSc, specialization in Astronomy Research
Star Cluster Phase Mixing in a Milky Way-like Background Potential

Georgia Institute of Technology *2018*
Physics MS

University of Michigan *2017*
Physics BS with Honors, Astronomy & Astrophysics BS
The Wave Turbulence Approach to Gravitational Collapse in anti-de Sitter Space

Publications

First-author papers

3.) **B.T. Cook**, K. Tep, C.L. Rodriguez, *et al.*: "Modeling Globular Cluster Stellar Streams with a Basis-Expansion N-body Code", submitted to ApJ, arXiv: 2602.13385.

2.) **B.T. Cook**, D.F. Woods, J.D. Ruprecht, *et al.*: "Tracing Milky Way substructure with an RR Lyrae hierarchical clustering forest", Monthly Notices of the Royal Astronomical Society 513, 2 (2022).

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

Second-Nth author papers

2.) N. Panithanpaisal, R.E. Sanderson, C.L. Rodriguez (+6 co-authors and **B.T. Cook**) "Breaking Down the CosmoGEMS: Toward Modeling and Understanding Globular Cluster Stellar Streams in a Fully Cosmological Context", Astrophysical Journal 997, 182 (2026).

1.) K. Tep, **B.T. Cook**, C.L. Rodriguez, *et al.*: "KRIOS: A new basis-expansion N-body code for collisional stellar dynamics", Astrophysical Journal 993, 180 (2025).

Presentations

Talks

CIERA Stars Meeting, 2025.
CIERA Theory Meeting, 2025.
Carnegie Observatories Coffee Hour, 2025.
56th DDA Meeting, 2025.
North Carolina Space Symposium, 2025.
Master's Colloquium, Leiden Observatory, 2020.
Cosmic Coffee, Center for Relativistic Astrophysics, Georgia Tech, 2019.
Group 97 Technical Seminar, Space Systems and Technology Division, MITLL, 2019.

Poster Presentations

Dwarf Galaxies, Star Clusters, and Streams in the LSST Era, KICP, 2024.

229th AAS Meeting, 2017.

Relevant Work Experience

Graduate Research Assistant, UNC Department of Physics and Astronomy: Lead developer and project manager for KRIOS, an N-body code written in C++ designed to simulate self-gravitating systems with large N (e.g., globular clusters). (*August 2023 - present.*)

Data Scientist, Entertainment Data Oracle, Inc.: Made several improvements to EDO's automated content recognition software. Created an unsupervised clustering routine to deliver reports on small creative differences. Created a model trained on thousands of hours of content capable of programmatically identifying commercial and programming blocks. (*September 2021 - August 2023.*)

Graduate Teaching Assistant, Georgia Tech School of Physics: Served as TA for introductory physics courses designed for undergraduate engineering and biological science majors. These assignments involved helping students with analytic problems, collecting data in a variety of contexts, and writing VPython source code. (*August 2017 - August 2018, August 2020 - May 2021.*)

Summer Research Program Intern, Applied Space Systems Group, MIT Lincoln Laboratory: Utilized a hierarchical clustering algorithm to discern structures containing RR Lyrae variable stars in the Milky Way's stellar halo. 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. (*June - August 2019.*)

Miscellaneous Projects and Experience

Master's Research Project, Leiden Observatory: Designed a set of AMUSE simulations and built statistical analysis tools to quantitatively analyze the tidal disruption of Milky Way open clusters. Advised by Simon Portegies Zwart. (*September 2019 - June 2020.*)

First Research Project, Leiden Observatory: Built a Python-based EAGLE cosmological simulations post-processing pipeline and wrote "Predictions for the Circumgalactic Medium of Low-mass, Star-forming Galaxies", a report in which I describe my subsequent findings. Advised by Nastasha Wijers and Joop Schaye. (*September 2018 - July 2019.*)

Honors and Awards

Graduate Research Fellowship, North Carolina Space Grant. "The objective of the NC Space Grant Graduate Research Fellowship program is to encourage graduate students to pursue research and careers in STEM fields that support NASA's Mission Directorates."

President's Fellowship, Georgia Tech. "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, U of M chapter. "Election to Sigma Pi Sigma is earned by outstanding academic achievement and involvement in the physics community at the University of Michigan."