

## Curriculum Vitae: Samuel John Dunham

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### Education

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**Vanderbilt University**, Nashville TN  
*Ph.D. Astrophysics*, May 2024 (expected)

**Fisk University**, Nashville TN  
*M.A. Physics*, December 2018

**University of Michigan**, Ann Arbor MI  
*B.S. Astronomy and Astrophysics*, May 2016  
*B.S. Interdisciplinary Physics with Astronomy*, May 2016

- Graduated Magna Cum Laude

**Washtenaw Community College**, Ann Arbor MI  
*Associate's Degree in General Studies in Math and Natural Science*, May 2013

### Fellowships/Grants

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- Earned McMinn summer research fellowship for outstanding students in the Department of Physics and Astronomy (May 2020)
- Earned McMinn summer research fellowship for outstanding students in the Department of Physics and Astronomy (May 2019)
- Earned McMinn summer research fellowship for outstanding students in the Department of Physics and Astronomy (May 2018)
- Earned honors grant for poster presentation at American Astronomical Society (AAS) conference (January 2016)

### Research Experience

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**Vanderbilt University**, Nashville TN  
*Research Assistant*, 08/2016 - Present

- Developing Fortran90 code to solve general relativistic hydrodynamics equations with Runge-Kutta discontinuous Galerkin methods for execution on leadership-class supercomputers
- Porting code to run on GPUs via OpenACC and OpenMP Offloading
- Coupling code to AMReX for MPI parallelism and adaptive mesh refinement

**University of Michigan**, Ann Arbor MI  
*Research Assistant*, 06/2014 - 05/2016

- Analyzed data for multiple images of background sources due to strong gravitational lensing by galaxy clusters

- Found robust lens models for several galaxy clusters, from which was deduced the mass of the cluster core, the total magnification provided by the cluster, the location of the source, and its morphology

## Training/Development

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**Michigan State University**, East Lansing MI

*Binary Neutron Star Merger Summer School*, 05/16/2018 – 05/18/2018

**Vanderbilt University**, Nashville TN

*Statistics Workshop for Astronomers*, 05/05/2017 – 05/11/2017

## Publications

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Samuel J. Dunham et al., “thornado-Hydro: A Discontinuous Galerkin Hydrodynamics Solver for Core-Collapse Supernova Simulations using the Extended Conformally-Flat Condition”, (2024) (in prep.)

Samuel J. Dunham et al., “A Parametric Study of the SASI Comparing General Relativistic and Non-Relativistic Treatments”, (2023) arXiv:2307.10904 (in press)

David Pochik et al., “thornado-hydro: A Discontinuous Galerkin Method for Supernova Hydrodynamics with Nuclear Equations of State”, (2021) ApJ, **253** 21

Samuel J. Dunham et al., “A discontinuous Galerkin method for general relativistic hydrodynamics in thornado”, (2020) J. Phys.: Conf. Ser. **1623** 012012

Eirik Endeve et al., “thornado-hydro: towards discontinuous Galerkin methods for supernova hydrodynamics”, (2019) J. Phys.: Conf. Ser. **1225** 012014

Samuel J. Dunham et al., “Lens Model and Source Reconstruction Reveal the Morphology and Star Formation Distribution in the Cool Spiral LIRG SDSS J1438+1454”, (2019) ApJ, 875:18

## Presentations

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“A Parametric Study of the SASI Comparing General Relativistic and Non-Relativistic Treatments”, MICRA 2023, oral

“A Discontinuous Galerkin Method for General Relativistic Hydrodynamics in **thornado**”, AstroNum 2019, oral

“A Discontinuous Galerkin Method for General Relativistic Hydrodynamics in **thornado**”, APS April 2019, oral

“A Discontinuous Galerkin Method for General Relativistic Hydrodynamics”, APS April 2018, poster

“Strong Lens Models for 10 Galaxy Clusters from the Sloan Giant Arcs Survey”, AAS January 2016, poster

## Outreach

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- Led a two-week computational bootcamp for incoming Fisk-Vanderbilt Masters-to-PhD Bridge students (August 2022)
- Participated twice in Skype-a-Scientist (2020)

## Skills

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- Proficient in Python and Fortran90
- Familiar with Julia and C++
- Experience with submitting and monitoring jobs on leadership-class supercomputers
- Experience with programming for GPUs via OpenACC and OpenMP offloading

## Misc

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- GitHub page: <https://www.github.com/dunhamsj>
- Personal website: <https://www.samueljdunham.com>