Andrew Luke Robbins

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Research Interests

- Observational cosmology and extragalactic astronomy, focusing on dynamical systems, dark matter/energy, galaxy formation and evolution. Interests also include near-field cosmology, galaxy-halo connections, and ultra-faint dwarf/low surface brightness systems.

Education

- **PhD in Physics: Astrophysics**
  Tufts University, Medford, MA
  August 2023 – Present

- **MS in Physics: Astrophysics**
  Tufts University, Medford, MA
  September 2021 – May 2023, Graduated: May 2023

- **Bachelor of Arts in Astronomy & Origins Science**
  Case Western Reserve University, Cleveland, OH
  August 2016 – May 2020, GPA: 3.926, *Summa Cum Laude*

Research Experience

- **Photometry Extraction for Large-Scale HSC-Deep Galaxy Survey**
  December 2021 – Present, Medford, MA
  Advised by Danilo Marchesini & Anna Sajina.
  Expanded the HSC-Deep catalog to include de-blended Spitzer IRAC photometry for use as part of the Subaru Prime Focus Spectrograph (PFS) Collaboration.

- **Rotation Curve Measurements in Hydrodynamic Simulation**
  September 2021 – Present, Medford, MA
  Independent Project under guidance of Stacy McGaugh.
  Designed and implemented a project to test the Radial Acceleration Relation on the IllustrisTNG data.

- **Mass-to-Light Ratio Constraints using the Radial Acceleration Relation**
  August 2019 – May 2020, Cleveland, OH
  Advised by Stacy McGaugh.
  Analyzed Spitzer data to model and independently constrain "average" disk and bulge M/L ratios in late-type galaxies.

- **Cosmic Void Growth-Rate Measurements in f(R) Gravity**
  March 2019 – August 2019, Munich, Germany
  Advised by Jochen Weller.
  Conducted study into constraining various f(R) modified GR theories using the linear growth-rate parameter in stacked cosmic void velocity profiles using simulated Euclid data.

Teaching Experience

- **Teaching Assistant**
  Tufts University, Medford, MA, August 2022 – Present
  Recitation TA and grader for Physics 12 (electricity, magnetism, waves, sound, and light).

- **Content-Creator and TA for Online Course**
  Case Western Reserve University/Kaplan, Inc., New York, NY, August 2020 – Present
  Developed and taught an online course titled "Astrophysics and Evolutionary Biology: The Origins of Life" through the Kaplan University Partners program.

- **Physics and Mathematics Tutor**
  East Bidwell, LLC, North Miami Beach, FL, November 2021 – Present
  Physics and mathematics tutor for undergraduate and high-school students. Teaching experience in: Classical Mechanics, Electromagnetism, Optics, Calculus and Linear Algebra.

Non-Refereed Works & Presentations

- "A History of the Hubble Space Telescope and its Impact on Modern Astrophysics", Oral Presentation, Tufts Astrophysics Journal Club Talk, May 2022, Medford, MA.

- "The Missing Mass Problem and the Radial Acceleration Relation; Constraints on Spiral Galaxy M/L Ratios", Oral Presentation, Tufts Astrophysics Journal Club Talk, December 2021, Medford, MA.

- "Fitting Functional Forms to the Radial Acceleration Relation", Senior Thesis, May 2020, Cleveland, OH.

- "Statistical Constraints on the Linear Void Structure Growth-Rate for Modified f(R) Models in Simulation", Capstone Paper, EuroScholars program, August 2019, Munich, Germany.

- "Using Cosmic Voids to Study Modified f(R) Gravity Theories", Oral presentation to KU Leuven Faculty, EuroScholars program, May 2019, Leuven, Belgium.

Honors, Grants, and Awards

- **Tufts University Research Stipend** - $3,500, May 2022

- **Tufts University Merit Scholarship** - $21,680, April 2021

- **Van Horn Society Award**, Case Western Reserve University, May 2020

- **All-UAA Student-Athlete Award**, January 2017

Service and Outreach

- **City Year AmeriCorps Member**
  Buffalo, NY, August 2020 – June 2021
  Served in a 7th and 8th grade mathematics classroom, addressing systemic barriers in education and preparing students with the skills and mindsets to succeed.

Skills

- Python, TensorFlow, Machine Learning, High Performance Computing (HPC), Bash Scripting, IRAF Tasks, FITS Image Processing & Reduction, ds9,

Languages

- English (Native), Spanish (Functional)