Ishan F. Ghosh-Coutinho

Curriculum Vitae*

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Education

B.S. in Astronomy University of Washington (UW) 2024
B.F.A. Minor in Drama: Design for Performance (UW) 2024

Research Experience

Undergraduate Researcher (UW Massive Star Group & DiRAC Institute) 2020 – 2024
Post-Baccalaureate Researcher (DiRAC Institute) 2024 – Present

Supervisor: Prof. James R.A. Davenport, Prof. Emily M. Levesque, Dr. Trevor Dorn-Wallenstein
(Published: Ghosh-Coutinho et al. 2023, 2025 (in preparation))
(Conference Proceedings: Ghosh-Coutinho et al. 2023, 2024)

30" Telescope Operator (Manashtash Ridge Observatory) 2023 – Present
Supervisor: Prof. Oliver Fraser (University of Washington)

Publications & Conference Proceedings

Publication: Photometric Classification of Evolved Massive Stars: Spectroscopic Verification and Validation
Ishan Ghosh-Coutinho, Trevor Dorn-Wallenstein, Emily Levesque, & James Davenport. Research Notes of the American Astronomical Society (November 2023)

Publication: ARC SDSS V Blue Skies Proposal: Time-Domain Spectroscopy of Be Stars and Other Emission Objects
Ishan Ghosh-Coutinho (August 2024)

iPoster: Photometric Classification of Evolved Massive Stars: High-Resolution Spectroscopic Validation
Ishan Ghosh-Coutinho, Trevor Dorn-Wallenstein, Emily Levesque, & James Davenport. Bulletin of the American Astronomical Society, (January 2023)

iPoster: Census of Variability of Luminous Blue Stars in Gaia and ZTF
Ishan Ghosh-Coutinho, James Davenport, Emily Levesque, & Trevor Dorn-Wallenstein. Bulletin of the American Astronomical Society, (January 2024)

Honors & Awards

2025 U.S. National Science Foundation Graduate Research Fellowship Program, Honorable Mention (NSF GRFP) 2025
Woodie Flowers Award Nominee (FIRST) 2024
President Pro Tempore of the ASUW Student Senate (Honorary Title) (UW) 2024
Deans List (UW) 2023
Invited Panelist, Panel on Undergraduate Research in Phys. and Astro. (UW) 2023
Chambliss Award Runner Up, American Astronomical Society 241, (AAS) 2023
Senator Parliamentarian of the ASUW Senate (Honorary Title) (UW) 2023
2022 DiRAC Summer Research Prize (DiRAC) 2022

*A live copy of my CV is available at the flowing link: https://ifgc.github.io/images/CV.pdf

Successful Observing Proposals

Manastash Ridge Observatory 30", Telescopes (15 full nights) - Certified Observer 2023 – Present
Multiple projects, including multiband variable star photometry with Evora.
P-I: **I. Ghosh-Coutinho**

APO 0.5-m ARCSAT (4 Half Nights) - Trained Observer 2023
Observing variable massive stars identified from ZTF for the Astronomy 480 course.
P-I: S. Tuttle

APO 3.5-m (3 half nights) - Trained Observer 2021
Co-observing massive stars with the echelle spectrograph.
P-I: T. Dorn-Wallenstein

Speaking & Conference Experience

Invited Talk, Theodore Jacobson Observatory 2024
Contributed Talk, Mary Gates Undergraduate Research Symposium 2024
Contributed Talk, Astronomy on Tap 2024
Invited Talk, Theodore Jacobson Observatory 2024
Contributed iPoster, 243rd Meeting of the American Astronomical Society, iPoster 2024
Invited Talk, Battle Point Astronomical Association 2023
Invited Panelist, Panel on Undergraduate Research in Physics and Astronomy 2023
Attendee, Dark Universe Science Center & Institute for Nuclear Theory, Cosmic Intersections 2023
Invited Speaker, Pacific Science Center 2023 Eclipse & Meet a Scientist Day 2023
Contributed Science Talk, Astro Fest 2023
Contributed Structural Talk, Astro Fest 2023
Contributed Talk, Mary Gates Undergraduate Research Symposium 2023
Contributed iPoster, 241st Meeting of the American Astronomical Society 2023
Contributed Talk, Mary Gates Undergraduate Research Symposium 2022
Contributed Talk, Mary Gates Undergraduate Research Symposium 2021

Relevant Employment

Committee Chair October 2023 – June 2024
Associated Students of the University of Washington (ASUW),
Senate Committee for Resolution Follow-Up, Seattle, WA

Grader Jan 2024 – June 2024
University of Washington, Department of Astronomy, Seattle, WA

Technical Skills

Programming Languages: Python, SQL/ADQL, Java,
Other: Unix Shell, IRAF, SAO DS9, LaTeX, PhotUtils, PyMC, Emcee, Adobe Suite, Visual Basic for Applications (VBA)
Research Skills: Proposing, planning, and carrying out spectroscopic and photometric observations, Survey & time-domain data retrieval and analysis; machine learning methods (regression & classification);
Languages: English, Hindi, Bengali (Spoken), German, French

Service, Outreach, & Experience

UW Sexual-Orientation and Gender Minorities in Astronomy,
Founder & Co-Chair (UW) 2023 – 2024
Planetarium Presenter, 100+ shows and events and counting (UW) 2021 – Present
UW Astro Undergraduate Volunteer Coordinator & Undergraduate
Outreach Site Lead for Pacific Science Center Eclipse Event 2023
School of Drama, Lead Costume Designer - *Airness* (UW) 2024
School of Drama, Assistant Costume Designer - *The Moors* & Misc. (UW) 2023
ASUW Senator, Chair of the Committee on Governance And Verification of Enacted Legislation 2023 – 2024
ASUW Senator, Committee for Senate Steering 2023 – 2024
ASUW Senate's Liaison to UW Office of Government Relations,

Committee on Legislative Steering	2023 – 2024
ASUW Senator, Member of Committee for Resolution Follow Up	2022 – 2024
ASUW President's Liaison to UW Tri-Campus Committee on Preparedness Oversight	2022 – 2024
ASUW Senate's Liaison to the Husky Union Building, Board of Reps.	2020 – 2021
ASUW Senator, Member of On Campus Committee	2020 – 2021
Volunteer Game Master, Pen and Paper Gaming Association	2020 – Present
FIRST Washington, FIRST Lego League Judge	2024 –Present
FIRST Washington, FIRST Tech Challenge Judge	2025 –Present
FIRST Washington, FIRST Robotics Competition PNW District Judge	2025 –Present
FIRST Washington, FIRST Robotics Competition PNW District Offical Scorer	2025 –Present
FIRST Washington, FIRST Robotics Competition PNW District Referee	2025 –Present
FIRST Washington, FIRST Robotics Competition PNW District Control Systems Advisior	2022 – Present
FIRST Washington, FIRST Robotics Competition PNW District Robot Inspector	2021 –Present
FIRST Washington, Consulting Mentor to FRC Team 4180 Iron Riders	2020 – 2024
FIRST Washington, Mentor to FRC Team 4180 Iron Riders	2024 – Present
FIRST Washington, Mentor to FRC Team 8248 ChainLynx	2019 – Present

Highlighted Teaching & Mentoring

Research Mentorship 2025 – Present
Mentoring Undergraduate student through their first research project related to stellar time domain astronomy

Mentor for Lincoln Highschool and Roosevelt Highschool Career Technology Eduction Programs & FIRST Programs 2019 – Present
Mentored >120 students in skills such as effective design strategies, control systems design and programming. Taught students effective scientific and engineering problem-solving, programming, and troubleshooting. Guided students through the design and design review processes. Guided students through team management, leadership soft skills, curriculum development and peer mentoring. Provided students with networking opportunities.

Annual Data Science for Highschoolers Workshop 2022, 2023, 2025
Taught students basic use of Jupyter Notebooks, Python, GitHub, and APIS to pull data and analysis through various packages such as pandas, scipy, matplotlib, etc. Introduced students to basic data science concepts and Bayesian statistics.

Journal Club for High Schoolers 2022 – 2023
Initiated a program for high school students that used a combination of `astrobites` and presentations to simplify astronomy and astrophysics papers whose titles students found interesting and selected. There have been 14 such Journal Clubs.

High School Tutor 2020 – Present
Helped >30 high school students work through assignments and concepts related to science, engineering, history, social science, and math as well as preparing for AP Tests and SAT.

Peer Tutor & Mentor 2022 – 2024
Helped ¿20 students work through assignments and concepts in lower-division physics, astronomy and math coursework and gave advice on how to approach upper-division coursework and research and college life as a whole.

Notable Astronomy Courses

17. Astro 541 (Audited): Interstellar Matter (Audited) Winter 2025
Physical conditions and motions of neutral and ionized gas in interstellar space. Interstellar dust,

magnetic fields, formation of grains, clouds, and stars. Prerequisite: modern physics or permission of instructor.

16. Astro 499: Undergraduate Research (Capstone Class)
    33 Credits between Winter 2021 and Spring 2024
    Credit for working on various research projects, talks, and publications.
15. Astro 482 (Audited): Scientific Writing Spring 2024
    Add description
14. Astro 531 (Audited): Stellar Atmospheres (Audited) Spring 2024
    Physical laws governing the temperature, pressure, and mass distribution in stars. Equation of state, opacity, nuclear energy generation, computational methods. Models of main sequence stars and star formation.
13. Astro 507: Graduate Physical Foundations of Astrophysics Winter 2024
    Introduction to astronomical hydrodynamics and magnetohydrodynamics, basic theorems and application to stellar and interstellar magnetic fields. Introduction to plasma physics and waves in a plasma.
12. Astro 519: Graduate Radiative Processes In Astrophysics Winter 2024
    Theory and applications of astrophysical radiation processes: transfer theory; thermal radiation; theory of radiation fields and radiation from moving charges; bremsstrahlung; synchrotron; compton scattering; plasma effects. (Will count for Phys 322 completion)
11. Astro 423: High-Energy Astrophysics Autumn 2024
    High-energy phenomena in the universe. Includes supernova, pulsars, neutron stars, x-ray and gamma-ray sources, black holes, cosmic rays, quasi stellar objects, active galactic nuclei, diffuse background radiations. Radiative emission, absorption processes, and models derived from observational data.
10. Astro 481: Astronomical Observation Summer 2023
    Theory and practice of obtaining optical data at a telescope. Preparation and operation of a telescope, obtaining data with a CCD and subsequent data analysis for completion of a self-guided research project.
9. Astro 480: Astronomical Data Analysis Spring 2023
    Hands-on experience with electronic imaging devices (CCDs) and software for image reduction and analysis. Introduction to operating systems, reduction software, and statistical analysis with applications to CCD photometry.
8. Astro 513: Cosmology And Particle Astrophysics Spring 2023
    Big bang cosmology; relativistic world models and classical tests; background radiation; cosmological implications of nucleosynthesis; baryogenesis; inflation; galaxy and large-scale structure formation; quasars; intergalactic medium; dark matter.
7. Astro 324: Astrostatistics and Machine Learning in Astronomy Spring 2023
    Kinematics, dynamics, and contents of the galaxy. Spiral structure. Structure and evolution of galaxies.
6. Astro 497 (Astr 511 Crosslist): Graduate Galactic Structure Winter 2023
    Kinematics, dynamics, and contents of the galaxy. Spiral structure. Structure and evolution of galaxies.
5. Astro 300: Programming for Astronomical Applications Winter 2023
    Introduction to programming needed for astronomical applications: Linux operating systems, Python, SQL/ADQL.
4. Astro 321: The Solar System Spring 2022
    Solar system; planetary atmospheres, surfaces and interiors, the moon, comets. The solar wind and interplanetary medium. Formation of the solar system.
3. Astro 323: Extragalactic Astronomy and Cosmology Winter 2021
    Galaxies, optical and radio morphology and properties. Clusters of galaxies, radio sources, and quasars. Observational cosmology.

2. Astro 322: The Contents of Our Galaxy — Autumn 2021
   Basic properties of stars, stellar systems, interstellar dust and gas, and the structure of our galaxy.
1. Astro 192: Pre-Major in Astronomy Research Seminar — Autumn 2020
   Pre-MAP is for UW students without experience in programming and/or scientific research who are traditionally underrepresented in astronomy and allows them to learn astronomical research techniques and apply them to research projects conducted in small groups. These projects involve the use of cutting-edge facilities and/or data available to UW astronomers.

Notable Physics Courses

11. Phys 324: Quantum Mechanics I — Autumn 2023
    Introduction to nonrelativistic quantum mechanics: need for quantum theory, Schrodinger equation, operators, angular momentum, the hydrogen atom, identical particles, and the periodic table.
10. Phys 322: Electromagnetism II — Winter 2023
    Charges at rest and in motion; dielectric and magnetic media; electromagnetic waves; relativity and electromagnetism; physical optics. (Course requirement completion contingent on Astro 519)
9. Phys 321: Electromagnetism I — Autumn 2023
   Charges at rest and in motion; dielectric and magnetic media; electromagnetic waves; relativity and electromagnetism; physical optics.
8. Phys 228: Mathematical Physics II — Winter 2023
   Applications of mathematics in physics with emphasis on the mechanics of particles and continuous systems. Develops and applies computational methods, both analytic and numerical.
7. Phys 225: Introduction to Quantum Mechanics — Winter 2023
   Introduces spin and applications in nuclear magnetic resonance. Emphasizes two-state systems.
6. Phys 227: Mathematical Physics I — Winter 2023
   Applications of mathematics in physics with emphasis on the mechanics of particles and continuous systems. Develops and applies computational methods, both analytic and numerical.
5. Phys 294: Introduction to Research: Frontiers of Physics — Winter 2023
   Provides a survey of contemporary research in experimental and theoretical physics, with an emphasis on subfields seeing revolutionary changes in understanding.
4. Phys 224: Thermal Physics — Spring 2022
   Introduces heat, thermodynamics, elementary kinetic theory, and statistical physics.
3. Phys 123: Waves, Light, and Heat — Spring 2022
   Explores oscillatory motion, electromagnetic waves, optics, waves in matter, fluids, thermodynamics, and related experiments for physical science and engineering majors. Lecture, laboratory, and tutorial components.
2. Phys 122: Electromagnetism — Autumn 2022
   The basic principles of electromagnetism and experiments in these topics for physical science and engineering majors. Lecture, laboratory, and tutorial components.
1. Phys 121: Mechanics — AP 2020
   Concepts such as kinematics; Newton's laws of motion, work, energy, and power; systems of particles and linear momentum; rotation; oscillations; and gravitation. Hands-on laboratory work and in-class activities to investigate phenomena and use calculus to solve problems.