Erik Solhaug

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Education

University of Chicago — Chicago, IL

PhD in Astronomy & Astrophysics (Expected: Spring 2027) — *September 27th, 2022 - present*

- Current GPA: 3.95/4.00
- Teaching Assistant (TA) for undergraduate students at the University of Chicago in Stars (Autumn 2022), Galaxies (Winter 2023), and Exoplanets (Spring 2023)
- Completed training in responsible research and conduct in Winter 2023

University of Washington — Seattle, WA

B.S. in Astronomy and Physics: Comprehensive Physics, cum laude — *September 25th, 2019 - June 10th, 2022*

- GPA: 3.91/4.00
- Honors in Astronomy, Honors in Physics: Comprehensive Physics
- Honor Societies: Phi Beta Kappa (invited, accepted), Sigma Pi Sigma (invited, accepted)
- Dean's List: Autumn 2019, Spring 2020, Autumn 2020, Winter 2021, Spring 2021, Autumn 2021, Winter 2022, Spring 2022

Research Experience

Resolving the Ionizing Photon Escape in the Early Universe

Graduate Researcher. Supervisor: Prof. Hsiao-Wen Chen — *September 2023 – present*

- Conducted on-site and remote observations of intermediate redshift galaxies with the 6.5m Magellan Telescopes at Las Campanas Observatory in the Atacama Desert in Chile.
- Analyzed spectral signatures of spatially resolved Lyman-α emission profiles to derive physical conditions for the star-forming regions and gaseous halos of reionization analog galaxies.
- Applied the radiative transfer code *TLAC* on a computer cluster to produce simulated spectral profiles of resonantly scattered Lyman-α.
- Utilized neural networks to interpolate spectra for a continuous range of physical parameters within galaxies and estimate reliable error budgets for the analysis.
- Created gravitational lens models with the lens modeling code *GLAFIC* to infer the mass distribution of foreground galaxy clusters and resolve the properties of spatially distorted galaxies.

Estimating Emission from Diffuse Galactic Halos — incl. summer research internship

Undergraduate Research Assistant. Supervisor: Prof. Matthew McQuinn — *March 2021 – June 2022*

- Produced models relating expected emission from the circumgalactic medium (CGM) of galaxies with properties such as temperature, density and ion abundances by running computer simulations in the radiative transfer code *CLOUDY*.
- Co-lead author of research paper presenting emission intensity estimates and relating theoretical results to empirical constraints.

Kinematic Alignment in Galaxy Halos — summer research internship

Undergraduate Research Assistant. Supervisor: Prof. Jessica Werk — *July 2021 – August 2021*

- Developed program for visualizing and stacking plots of kinematic alignment of observed absorption lines in the circumgalactic medium and published code in GitHub repository.
- Applied large datasets from the *COS-Halos* and *CGM*^{2} surveys to connect absorption kinematics with galaxy properties.

Spectral Analysis and Chemical Enrichment of Galaxy Halos

Student Quasar Absorption Diagnostician in the WerkSQuAD. Supervisor: Prof. Jessica Werk — *September 2020 – June 2022*

- Optimized Voigt profile fits of absorption lines in observed spectra from the Hubble Space Telescope's Cosmic Origins Spectrograph (COS) and connected observable parameters in the spectral signatures of distant galaxies with physical properties of the gas.
- Adapted scripts to identify true host galaxies of absorbers using catalogs of redshift.

Husky Satellite Lab at UW

Instrument Developer — *September 2019 – March 2020*

- Designed and fabricated a Langmuir plasma probe for the PHAT-2 weather balloon experiment.
- Developed scientific testing procedure and analyzed performance of pulsed plasma thruster (PPT) with the Langmuir probe in a 2m×1m vacuum chamber.

Scientific Publications

- **Solhaug, Erik**; Chen, Hsiao-Wen et al. (in prep.). *Spatially resolved Lyα profiles in the Sunburst Arc at $z \sim 2.37$.*
- Piacitelli, Daniel; **Solhaug, Erik** (co-lead and corresponding author); Faerman, Yakov & McQuinn, Matthew. (2022). *Absorption-based circumgalactic medium line emission estimates.*

Presentations

- **Solhaug, Erik**. *Identifying and Estimating the Faint Light Emitted from Diffuse Gas Around Galaxies*, for the 2022 Mary Gates Research Symposium.

Honors and Awards

- **Brinson Summer Fellowship (Summer 2023):** $9,250 to support graduate research position at the University of Chicago
- **Mary Gates Research Scholarship (Winter 2022 and Spring 2022):** $5,000 to support research on CGM emission at the University of Washington
- **Husky100 (2022):** Awarded to 100 outstanding juniors, seniors, or graduate students from all three University of Washington campuses who are applying what they learn to make a difference on campus, in their communities, and for the future. Nominations are made by students, faculty and staff, and the selection process includes an essay portion.

Teaching Experience

Teaching Assistant (TA) for Undergraduate Courses

University of Chicago *September 27th, 2022 – June 2nd, 2023*

- *Exoplanets*
  Managed lab sections, demonstrated scientific concepts in a practical lab setting, conducted weekly office hours, attended professor's lecture weekly, review/summary of theory, graded homework, assignments and exams.
  (16 hours per week)
  Professor: Daniel C. Fabrycky.
  Spring quarter 2023
- *Galaxies*
  Managed lab sections, demonstrated scientific concepts in a practical lab setting, conducted weekly office hours, review/summary of theory, graded homework, assignments and exams.
  (15 hours per week)
  Professor: Jeff McMahon.
  Winter quarter 2023
- *Stars*
  Managed lab sections, demonstrated scientific concepts in a practical lab setting, conducted weekly office hours, review/summary of theory, graded homework, assignments and exams.
  (15 hours per week)
  Professor: Damiano Caprioli.
  Autumn quarter 2022

Grader for Undergraduate Courses

University of Washington *March 28th, 2022 - June 3rd, 2022*

- *Measuring the Universe*
  Graded homework assignments and exams, communicated with students by email about course contents and assigment policies.
  (8-10 hours per week)
  Professor: Matthew McQuinn.
  Spring quarter 2022

Outreach and Leadership

Undergraduate Research Leader

Undergraduate Research Program (URP) at the University of Washington *September 2021 – June 2022*

- Promoted participation in undergraduate research across all disciplines by visiting first-year undergraduate classes at the University of Washington.
- Created and presented engaging research presentations twice per month for audiences of around 30 undergraduate students.

Technical Skills

Computational: Python, Matlab, JavaScript, Mathematica, LaTeX, Git, SQL, HTML, CSS, Bash, SolidWorks, OnShape
Experimental: on-site telescope observations, machine learning, spectroscopic analysis, gravitational lens modeling, HST image stacking