

# THOMAS K. WATERS

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## EDUCATION

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**University of Michigan** | *PhD, Astronomy & Astrophysics* **2022-Present**

- Currently a 2nd-year pre-candidate in the Astronomy & Astrophysics program.

**University of Washington** | *BS, Comprehensive Physics & Astronomy* **2022**

- Cumulative GPA: 3.77
- Graduated with honors in the Comprehensive Physics and Astronomy majors.
- Pre-Major in Astronomy Program Member.

**South Seattle College** | *AS, Physics* **2019**

- Cumulative GPA: 4.0
- RST S-STEM Scholarship Recipient.
- Capstone Project: "An Exploration of Black Holes: Calculating the Mass of Sagittarius A\*" <sup>1</sup>

## RESEARCH EXPERIENCE

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**University of Michigan Pre-Candidate Research** **Aug 2022 – Present**

*Advisor: Kayhan Gültekin*

- Conducted post-processing on Multi Unit Spectroscopic Explorer (MUSE) Integral Field Unit (IFU) data.
- Binned data, extracted line of sight velocity dispersion information from spectra, and ran axisymmetric Schwarzschild models to constrain galaxy properties.
- Measured the mass of the supermassive black hole in NGC3258 (Waters et al. in prep).

**Center for Astrophysics, Harvard & Smithsonian** **Jun 2021 – Jan 2024**

*Advisor: Razieh Emami*

- Inferred, classified, and analyzed gaseous halo morphologies for Milky Way-like galaxies in the IllustrisTNG TNG50 simulation.
- Implemented a Local Shell Iterative Method to quantify triaxiality of halos for three temperature regimes.
- Discovered a strong correlation between dark matter halo morphologies with warm-hot gas distribution morphologies.

**University of Washington Undergraduate Research** **Sep 2020 – Jun 2022**

*Advisor: Jessica Werk*

- Constrained properties of cold gas within the circumgalactic medium (CGM) using analytic models and observational data.
- Utilized several Python packages in conjunction with Veeper, a curve fitting algorithm, to perform Voigt profile fitting on CGM absorbers.
- Crossmatched CGM absorbers to their associated galaxies via observed photometric redshift and other galaxy properties.

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<sup>1</sup><https://korbinwaters94.wixsite.com/blackholeswam>

## California Institute of Technology, GROWTH SURF

Jun 2020 – Sep 2020

Advisor: Kishalay De

- Optimized parameters for Source Extractor to detect astronomical sources in Palomar Gattini-IR images, which contain correlated pixel noise.
- Crossmatched resultant Source Extractor catalogs to Two-Micron All Sky Survey to assess performance of parameter sets.
- Drafted a detailed final report to present the results of the parameter optimization to the collaboration.

## University of Washington Undergraduate Research

Jan 2019 – Jun 2020

Advisor: Meredith Rawls

- Conducted an analysis of a subset of high probability quasi-stellar object variability from the High Cadence Transient Survey (HiTS) data release.
- Crossmatched QSOs detected with the Vera C. Rubin Observatory LSST science pipeline with known QSOs from the Million Quasar Catalog (MILLIQUAS) using Astropy.
- Presented results at the 2020 Undergraduate Research Symposium at the University of Washington.

## University of Washington Pre-Major in Astronomy Program

Oct 2019 – Dec 2019

Advisor: Meredith Rawls

- Used Unix, Python, and Jupyter Notebooks to access and analyze data from the HiTS data release.
- Filtered bad data, plotted the locations of variable objects on the sky, and plotted light curves for a subset of these.
- Compared light curves of HiTS variable objects with light curves produced by the LSST Science Pipelines software.

## TEACHING EXPERIENCE

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### Graduate Student Instructor, University of Michigan

Winter 2023

ASTRO 101 – Introductory Astronomy: The Solar System and the Search for a New Earth

### Graduate Student Instructor, University of Michigan

Fall 2024

ASTRO 101 – Introductory Astronomy: The Solar System and the Search for a New Earth

### Graduate Student Instructor, University of Michigan

Winter 2024

ASTRO 115 – Introductory Astrobiology: The Search for Life in the Universe

## PUBLICATIONS

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**Waters, T. K.**, Peterson, C., Emami, R., et al. 2024, The Astrophysical Journal, 961, 193, doi: 10.3847/1538-4357/ad165a

## OUTREACH ACTIVITIES

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2023 Women+ Excelling More in Math Engineering and the Sciences (FEMMES)

## PRIOR WORK EXPERIENCE

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### United States Marine Corps

June 2013 – May 2017

0311 Infantry Rifleman