DHVANIL D. DESAI

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EDUCATION

University of Hawai'i at Mānoa, Honolulu, HI Aug 2021 – Present
Doctor of Philosophy, Astronomy *GPA: 3.97*

- Graduate Student at the Institute for Astronomy

The Ohio State University, Columbus, OH Aug 2016 – May 2020
Bachelor of Science, Astronomy & Astrophysics *cGPA: 3.975*

- Summa Cum Laude with Research Distinction in Astronomy
- Second Major: Physics (4.0 GPA in both majors)

RESEARCH EXPERIENCE

Graduate Research Assistant Aug 2022 – Present
Institute for Astronomy, University of Hawai'i at Mānoa
Advisor: *Dr. Colby Haggerty*

- Running fully kinetic, particle-in-cell (PIC) simulations on the Anvil supercomputer to show the plausibility of trapping an initially anisotropic distribution of high-energy positrons through self-generated plasma streaming instabilities and applying this to collisionless astrophysical scenarios involving radioactive decay which produces high-energy positrons (e.g., supernovae) and quantifying the role of streaming instabilities to trap such positrons.

Graduate Research Assistant Aug 2021 – Jul 2022
Institute for Astronomy, University of Hawai'i at Mānoa
Advisors: *Dr. Chris Ashall & Dr. Benjamin Shappee*

- Analyzed, modeled, and compared the fast and faint Type IIb SN 2021bxu, which showed interesting features, using optical photometry and spectroscopy from a variety of resources.

Research Assistant Sep 2020 – Aug 2021
Department of Astronomy, The Ohio State University
Advisor: *Dr. Christopher Kochanek & Dr. Benjamin Shappee*

- Worked on computing the volumetric rate of Type Ia SNe in the local universe using the largest sample of Type Ia SNe from ASAS-SN. Performed magnitude and completeness corrections on the rate using simulations to improve the systematic error over previous studies.

Data Analyst & Research Assistant Aug 2020 – Aug 2021
Department of Astronomy, The Ohio State University
Supervisor: *Dr. Krzysztof Stanek*

- Worked with the All-Sky Automated Survey for SuperNovae (ASAS-SN) global team, primarily on image quality control and naming/releasing new transients to the public. Followed up on newly discovered transient candidates and wrote occasional ATels for interesting discoveries. Inspected images from ASAS-SN telescopes around the globe for bad image reductions and fixed them.

Undergraduate Research Assistant May 2019 – Dec 2020
Department of Astronomy, The Ohio State University
Advisor: *Dr. Barbara Ryden*

- Studied the alignments of galaxies with their local structure at low redshifts using SDSS data and found that the luminous red galaxies, on average, tend to have their major-axis aligned parallel to the surrounding structure.

Undergraduate Research Assistant Jan 2019 – May 2019
High Energy Density Physics, The Ohio State University
Principal Investigator: *Dr. Douglass Schumacher*

- Ran particle-in-cell simulations using the Ohio Supercomputer Center and reduced/analyzed data for interactions of a dust particle in an electron-ion plasma and explored the results.

PUBLICATIONS

First-Author Papers:

- "The Type Ia Supernovae Rate and Luminosity Function in ASAS-SN," **Desai, D. D.** et al., 2023, in prep.
- "Fast and Not-so-Furious: Case Study of the Fast and Faint Type IIb SN 2021bxu," **Desai, D. D.** et al., 2023, Submitted to *MNRAS*, arXiv:2303.13581
- "Galaxy Alignments with Surrounding Structure in the Sloan Digital Sky Survey," **Desai, D. D.** and Ryden, B. S., 2022, *ApJ*, 936, 25

Co-Author Papers:

- "Multiple flares in the changing-look AGN NGC 5273," Neustadt, J. M. M. et al, incl. **Desai, D. D.**, 2023, *MNRAS*, 521, 3810
- "The ASAS-SN bright Supernova catalog - V. 2018-2020," Neumann, K. D. et al, incl. **Desai, D. D.**, 2023, *MNRAS*, 520, 4356
- "SCAT uncovers ATLAS's first tidal disruption event ATLAS18mlw: a faint and fast TDE in a quiescent Balmer strong Galaxy," Hinkle, J. T. et al, incl. **Desai, D. D.**, 2023, *MNRAS*, 519, 2035
- "The Spectroscopic Classification of Astronomical Transients (SCAT) Survey: Overview, Pipeline Description, Initial Results, and Future Plans," Tucker, M. A. et al, incl. **Desai, D. D.**, 2022, *PASP*, 134, 124502
- "Once is an Instance, Twice is a Hobby: Multiple Optical and Near-Infrared Changing-Look Events in NGC 5273," Neustadt, J. M. M. et al, incl. **Desai, D. D.**, 2022, submitted to *MNRAS*, arXiv:2211.03801
- "ASAS-SN follow-up of IceCube high-energy neutrino alerts," Necker, J. et al, incl. **Desai, D. D.**, 2022, *MNRAS*, 516, 2455

Selected Astronomer's Telegrams:

- "ASASSN-21ay: Discovery of an RGB Star Undergoing an Unusual, Long-Term Variation," Way, Z., **Desai, D.**, et al. 2021, ATel #14379
- "ASAS-SN Discovery of ASASSN-20mg, a Likely Bright Microlensing Event in the Galactic Disk," **Desai, D.**, et al. 2020, ATel #14037
- "ASAS-SN Discovery of a Luminous Star undergoing a Deep Dimming Event," Way, Z., **Desai, D.**, et al. 2020, ATel #14007
- "ASAS-SN Discovery of an Unusual Cataclysmic Variable (ASASSN-20jo)," Way, Z., **Desai, D.**, et al. 2020, ATel #13942

Undergraduate Thesis:

- "Galaxy Alignment with Surrounding Large-Scale Structure," **Dhvanil Desai**, Advisor: Barbara Ryden, 2020, https://kb.osu.edu/handle/1811/91714

A total of 25 Astronomer's Telegrams, 13 Transient Classification Reports on TNS, and 5 Transient Discovery Reports on TNS, listed on ADS.

PRESENTATIONS

Institute for Astronomy Graduate Research Talk Sep 2022
Institute for Astronomy, University of Hawai'i at Mānoa *Honolulu, HI*

- Presented my work on SN 2021bxu to the IfA as part of my first-year graduate project.

Carnegie Supernova Project (CSP) and Precision Observation of Infant Supernovae (POISE) Meeting Jul 2022
Carnegie Observatories *Pasadena, CA*

- Presented my work on SN 2021bxu, an object followed-up by POISE, to a group of experts in the supernova community.

Denman Undergraduate Research Forum March 2020
The Ohio State University *Columbus, OH*

- Presented a poster of my work on "Galaxy Alignment with Surrounding Large-Scale Structure" to the general scientific audience at OSU.

235$^{\text{th}}$ AAS Meeting Poster Session January 2020
American Astronomical Society *Honolulu, HI*

- Presented a poster of my work on "Galaxy Alignment with Surrounding Large-Scale Structure" at the AAS poster session.

Summer Undergraduate Research Program Symposium July 2019
Department of Astronomy, The Ohio State University *Columbus, OH*

- Presented my work on "Galaxy Alignment with Surrounding Large-Scale Structure" to everyone in the Astronomy Department at OSU.

OBSERVING EXPERIENCE

Telescope Operator and Co-Primary Observer Aug 2021 – Aug 2022
University of Hawai'i 2.2-meter (UH2.2m) Telescope

- One of the primary observers for the Spectroscopic Classification of Astronomical Transients (SCAT) program. Observed for ∼100 hours collecting spectra using the SuperNova Integral Field Spectrograph (SNIFS) on UH2.2m and classified the transients.

Observer Nov 2021
NASA Infrared Telescope Facility (IRTF)

- Observed Nova Cas 2021 for ∼1 hour as part of the introductory Institute for Astronomy (IfA) observing program for first-year graduate students.

TEACHING/MENTORING EXPERIENCE

Research Mentor Summer 2020
Department of Astronomy, The Ohio State University
Advisor: *Dr. Barbara Ryden*

- Assisted in mentoring Prof. Ryden's SURP student to help solve problems regarding SQL queries and other useful programming techniques.

Physics Tutor/Grader/TA: Intermediate Mechanics Aug 2018 – Apr 2020
Department of Physics, The Ohio State University

- Attended class to assist the professor in answering questions, graded weekly homework, tutored students outside of class discussing physics topics and arranged and hosted review sessions for students before exams.

Instructional Assistant: Astronomy 1101 Lab Jan 2018 – May 2018
Department of Astronomy, The Ohio State University

- Attended class to assist the instructor as needed, answered questions and helped students work through worksheets understanding astronomy topics, and prepared and conducted labs with students.

LEADERSHIP & OUTREACH

Graduate Admissions Committee Aug 2022 – Present
Institute for Astronomy, University of Hawai'i at Mānoa *Honolulu, HI*

- Served as an equal member of the graduate admissions committee at the IfA, being the student representative, and helped in deciding the admitted applicants. Assisted in planning and organizing the protograd visit.

Hawaii Geek Meet Sep 2022
Magic Island *Honolulu, HI*

- Set up and operated telescopes at a local park. Guided people of all ages and helped them understand the night sky and observations of the sun.

Stargazing Night Jun 2022
Honolulu Zoo *Honolulu, HI*

- Set up and operated science experiments and telescopes at the local zoo. Guided people of all ages and helped them understand the night sky.

AstroDay Hilo May 2022
Prince Kuhio Plaza *Hilo, HI*

- Set up display tables and operated science experiments for visitors of all ages.

Institute for Astronomy Open House Apr 2022
Institute for Astronomy, University of Hawai'i at Mānoa *Honolulu, HI*

- Set up display tables and operated science experiments and telescopes at the IfA for visitors of all ages.

Stargazing Night Mar 2022
Waimanalo Public Library *Waimanalo, HI*

- Set up and operated telescopes at a local public library. Guided people of all ages and helped them understand the night sky.

Treasurer Mar 2019 – May 2020
Astronomical Society at OSU *Columbus, OH*

- Acquired operating and programming funds for the club. Helped organize and host club events: Green Bank Observatory, John Glenn Astronomy Park, and more. Organized fundraising events.

Star Parties 8+ star parties while at OSU
Astronomical Society at OSU *Columbus, OH*

- Volunteered for and organized star parties. Set up and operated telescopes on the roof. Guided people and helped them understand the night sky.

Astronomy Night 3 events in Summer 2019
Upper Arlington Library *Upper Arlington, OH*

- Conducted science experiments with kids and adults. Engaged the public with scientific thinking. Set up and operated telescopes for public viewing.

HONORS & AWARDS

Institute for Astronomy Director's Research Excellence Award August 2021
Awarded to the top graduate applicant at the IfA

Smith Senior Award April 2020
Awarded to high achieving seniors in physics at OSU

Ann Slusher Tuttle Scholarship July 2019
Awarded for research during the astronomy Summer Undergraduate Research Program at OSU

Smith Junior Award April 2019
Awarded to high achieving juniors in physics at OSU

Smith Sophomore Award April 2018
Awarded to high achieving sophomores in physics at OSU

President's Award for Educational Excellence June 2016
Awarded for outstanding academic excellence while graduating from high school

SKILLS

Programming & Software	Python, Tristan-mp v2, ds9, SQL, LINUX, C++, LaTeX, Mathematica, MATLAB
Other	teamwork, teaching, simulations, photometry, spectroscopy, observing, large datasets, parallel processing

AFFILIATIONS

American Astronomical Society	2019 – Present
Astronomical Society at OSU	2016 – 2021
Society of Physics Students at OSU	2016 – 2020
Sigma Pi Sigma Physics Honors Society	2016 – 2020