Sai Krishanth P.M.

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Education

University of Arizona, College of Science August 2018-May 2022
B.S. Astronomy and Physics with a minor in Mathematics

Research Experience

Research Staff at The University of Arizona September 2022-Present
Advisor: Dr. Ewan Douglas, Steward Observatory

- Wrote an NMF based post-processing pipeline for use with high contrast imaging data from ground and space based observatories.
- Made the NMF implementation faster by rewriting code to run on GPUs.
- Built a website for the Center for Astronomical adaptive optics.

Testing Universal Relations in Neutron Stars September 2021–Present
Advisor: Dr. Vasileios Paschalidis, Steward Observatory

- Quantified violations in universal relations using millions of equations of states of neutron stars.
- Implemented momentum of inertia computations for equations of state in the slow rotation limit.

Determining the dominant source of uncertainty in FoM calculations July 2020-May 2022
Advisor: Dr. Tim Eifler, Steward Observatory

- Ran simulated likelihood analysis of DES Y3 and LSST Y1 data.
- Quantified the dominant source of uncertainty by performing figure of merit (FoM) calculations.
- Used self organizing maps (SOMs) to generate photometric redshift probability distribution functions (PDFs).

Characterizing HI distributions in nearby massive spiral galaxies September 2018–May 2022
Advisor: Dr. Alyson Ford, Steward Observatory

- Reduced Green Bank Telescope (GBT) spectroscopic data of neutral hydrogen (HI) for low redshift spiral galaxies.
- Calculated column density and error boundaries from generated FITS files.
- Co-wrote proposal for an expanded survey based on the results of reduced data and observed targets at GBT.
- Reduced HI data from quiescent elliptical galaxies and created deep maps to measure cool gas content and distribution.

Pipeline development for the NEID spectrograph January 2020-August 2021
Advisor: Dr. Chad Bender, Steward Observatory

- Manually checked for errors in lightcurves obtained by the NEID spectrograph.
- Debugged the NEID control software.
- Wrote and implemented error-correcting code in the NEID data collection pipeline.
- Designed and built shutter control boxes for the NEID and HPF spectrographs.

Summer internship at Paramium Technologies May 2021-August 2021
Advisor: Dr. Justin Hyatt

- Built a test bench to generate a hysteresis curve of the stepper motor response on an adjustable radio dish mold test bench.
- Designed and 3D printed components for use in the test bench.
- Quantified test results by writing a technical report and generating a GIF of the mold for qualitative analysis.

Publications

1. *Deepest limits on scattered light emission from the Epsilon Eridani inner debris disk with HST/STIS*
   Sai Krishanth P.M., Ewan S. Douglas, Ramya Anche, Justin Hom, John H. Debes, Kerri Cahoy, Hannah

Jang-Condell, Isabel Rebollido, Bin B. Ren, Christopher C. Stark, Robert Thompson, Yinzi Xin, submitted to the Astronomical Journal (2024).

2. *NMF-based GPU accelerated coronagraphy pipeline*
   Sai Krishanth P.M., Ewan S. Douglas, Justin Hom, Ramya M. Anche, John Debes, Isabel Rebollido, Bin B. Ren, Proceedings of the SPIE, Volume 12680, id. 1268021 12 pp. (2023), `https://doi.org/10.1117/12.2677739`.
3. *A temperate super-Jupiter imaged with JWST in the mid-infrared*
   E. C. Matthews, A. Carter, P. Pathak, C. Morley, M. W. Phillips, **S. Krishanth P.M.**, F. Feng, M. Bonse, L. Boogaard, J. Burt, I. J. M. Crossfield, E. S. Douglas, Th. Henning, J. Hom, C.-L. Ko, A.-M. Lagrange, D. Petit dit de la Roche, F. Philipot, Nature (2024), `https://doi.org/10.1038/s41586-024-07837-8`
4. *Accelerating cosmological inference with Gaussian processes and neural networks - an application to LSST Y1 weak lensing and galaxy clustering*
   Supranta S. Boruah, Tim Eifler, Vivian Miranda, **P M Sai Krishanth**, Monthly Notices of the Royal Astronomical Society, Volume 518, Issue 4, February 2023, Pages 4818–4831, `https://doi.org/10.1093/mnras/stac3417`.
5. *Approaches to lowering the cost of large space telescopes*
   Ewan S. Douglas et al. credited as **Sai Krishanth P.M.**, Proceedings of the SPIE, Volume 12677, id. 126770D 20 pp. (2023), `https://doi.org/10.1117/12.2677843`.

Proposals

1. *A Survey of Extended HI Disks Around Nearby Galaxies*, Alyson Ford, Joel Bregman, Edmund Hodges-Kluck, Jeremy Bailin, Michael Hardegree-Ullman, **Sai Krishanth Pulikesi Mannan**, Observed during the Spring 2022 semester at GBT, `https://dss.gb.nrao.edu/project/GBT22A-287/public`.

Technical Skills

Programming Languages: Python, C++, Fortran, IDL, HTML, CSS, JavaScript, LaTeX
Software: MATLAB, GBTIDL (Custom version of IDL for GBT), IRAF, SLURM, AstroImageJ, DS9, Solidworks, Adobe Inventor
Other: Certified observer at GBT, Soldering, Circuit Design, Contributions to open source software (Poppy, `https://github.com/spacetelescope/poppy`)

Outreach

Vice President, Astronomy Club December 2019 - September 2021

- Student-led organization to promote outreach and education in Astronomy.
- Responsibilities:
  - Facilitated the Astrophotography program in the club.
  - Organized and planned field trips.
  - Acted as liaison between officers and club members
  - Led the diversity and inclusion initiative.
  - Organized a graduate student panel to discuss diversity and equity in STEM.

TIMESTEP Leader, Steward Observatory August 2020 - January 2021

- Organization to promote minority student engagement and retention in STEM.
- Responsibilities:
  - Participated in a discussion panel about undergraduate research.
  - Aided in organizing other panels and proposed future meeting ideas.

Talks and Presentations

- Colloquium, Astronomy club, Depart of Astronomy, Tucson, AZ, USA.
- Poster, SPIE O+P 2023, San Diego, CA, USA.
- Colloquium, High Contrast Images of Exoplanets (HICE) talk series, Steward Observatory, Tucson, AZ, USA.

- Contributed talk, Dust Devils: Debris disks in the Sonoran desert, Tucson, AZ, USA.