Ilija **Medan**

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Education

Georgia State University — *Atlanta, GA, USA*

Expected Doctor of Philosophy in Astronomy — *Aug. 2018 - PRESENT*

- Expected Graduation Date: May 2023
- Advisor: Dr. Sebastien Lepine
- Research Focus: Astroinformatics, Astrostatistics, Milky Way Structure and Evolution

Santa Clara University — *Santa Clara, CA, USA*

Bachelor of Science in Mechanical Engineering with a Minor in Physics — *Sep. 2012 - Dec. 2016*

- Overall GPA: 3.19

Skills

Proficient Python, LaTeX, R, bash scripting, DS9

Familiar MATLAB, HTML, Julia, IRAF, C++

Research Experience

Georgia State University — *Atlanta, GA, USA*

Graduate Research Assistant — *Aug. 2018 - PRESENT*

- Cross match high proper motion sources ($\pi > 40\ mas\ yr^{-1}$) from Gaia and SUPERBLINK to catalogs from the Galaxy Evolution Explorer (GALEX), the Sloan Digital Sky Survey (SDSS), the Panoramic Survey Telescope and Rapid Response System (Pan-STARRS), the Radial Velocity Experiment (RAVE), the Two-Micron Sky Survey (2MASS) and Wide-field Infrared Survey Explorer (WISE) using a newly developed Bayesian method producing higher match percentages then current Gaia cross match catalogs
- Develop Bayesian methods to find high probability binary star systems where only the parallax of the primary star is known. This method has been validated out to angular separations of ~ 6" based on catalogs of known wide binaries, and when used in combination with catalogs that go deeper than Gaia (i.e. SDSS and Pan-STARRS), previously undetected candidate binary systems have been identified.
- Advisor: Dr. Sebastien Lepine

SOFIA Science Center — *Moffet Field, CA, USA*

Research Assistant — *Jul. 2017 - Aug. 2018*

- Used polarmetric observations with HAWC+ on SOFIA of the AGB carbon star IRC +10216 to derive the temperature profile, from radiative transfer modeling, in the circumstellar envelope allowing for the study of grain alignment mechanisms for carbon grains
- Expanded data analysis of Local Bubble project from the Summer of 2016 by adding all of the nearby field stars to my model of the radiation field in order to show that the degree of polarization is largely insensitive to the radiation field from red field stars
- Completed and published manuscript for research on grain alignment in the Local Bubble that was initiated in the Summer of 2016
- Organized an observing run at the Wyoming Infrared Observatory (WIRO) to conduct a multi-band polarimetry study of the stellar contents around the Per OB3 association to probe the origins of the “Super Serkowski” effect
- Provided guidance to undergraduate summer research student who processed and performed the data anlysis on the Per OB3 observations from WIRO
- Advisor: Dr. B-G Andersson

Universities Space Research Association — *Mountain View, CA, USA*

Student Intern — *Jan. 2017 - Jun. 2017*

- Used Hubble Space Telescope (HST) images of Kepler’s Supernova Remnant (SN 1604) from two epochs to catalog and study the stellar contents and radiative knots
- Wrote Python scripts to detect sources, calculate calibrated magnitudes in four bands (UBVI) and measure stellar proper motions in the field of view to search for the surviving companion of the progenitor
- Used the stellar catalog and an unsupervised machine learning Python module to map the extinction of the remnant
- Cataloged the bright knots in the remnant, and calculated calibrated fluxes and surface brightnesses to track changes in morphology and intensity over the epoch
- Advisor: Dr. Ravi Sankrit

SOFIA Science Center *Moffet Field, CA, USA*

Summer Research Student *Jun. 2016 - Sep. 2016*

- Supported a large polarization survey with archival photometric and spectroscopic data in order to study the effects of radiatively driven grain alignment in the Local Bubble
- Demonstrated that the degree of polarization in the wall of the Local Bubble was correlated with the radiation field that is dominated by the light from the OB associations within 200 pc of the Sun, which supports radiatively driven grain alignment
- Advisor: Dr. B-G Andersson

Observing Experience

Hard Labor Creek Observatory *Hard Labor Creek State Park, GA, USA*

Three nights of observing with APOGEE CCD on the 24" Miller Telescope *February 2019*

Lick Observatory *Mount Hamilton, CA, USA*

Three nights of observing with the Kast Dual Channel Spectrograph on the Shane 3m telescope *May 2018*

Wyoming Infrared Observatory *Laramie, WY, USA*

Ten nights of observing with the OptiPol polarimeter on WIRO's 2.3m telescope *Nov. 2017*

Awards

2019 **Scholarship,** La Serena School of Data Science: Applied Tools for Data-driven Sciences *La Serena, Chile*

2018 **Recipient,** Georgia State University Second Century Initiative (2CI) Fellowship *Atlanta, GA, USA*

2016 **Recipient,** Geoff and Josie Fox Summer Research Fellowship *Santa Clara, CA, USA*

Publications and Presentations

Publications

Magnetic Field Strengths and Variations in Grain Alignment in the Local Bubble Wall

The Astrophysical Journal

- Medan & Andersson 2019, ApJ, 873, 87

Presentations

University of California, Santa Cruz *Santa Cruz, CA, USA*

Interstellar and Galactic Medium Program of Studies (IMPS) Seminar *May 2018*

- Seminar presentation of results of study on grain alignment in the wall of the Local Bubble

231st AAS Meeting *Washington, DC, USA*

Poster Presentation *Jan. 2018*

- Poster presentation of results of study on grain alignment in the wall of the Local Bubble
- Medan & Andersson 2018, Abstract 247.13, 231, AAS

230th AAS Meeting *Austin, TX, USA*

Poster Presentation *Jun. 2017*

- Poster presentation of results from data analysis of multi-epoch images of Kepler's SNR
- Medan et al. 2017, Abstract 318.12, 230, AAS

Santa Clara University *Santa Clara, CA, USA*

Research Symposium *Nov. 2016*

- Presentation of results from my summer research project on grain alignment in the wall of the Local Bubble

SOFIA Science Center *Moffet Field, CA, USA*

Seminar *Aug. 2016*

- Seminar presentation of results from my summer research project on grain alignment in the wall of the Local Bubble