Ilija **Medan**

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Education

Georgia State University — *Atlanta, GA, USA*

Expected Doctor of Philosophy in Astronomy — *May 2020 - PRESENT*

- Expected Graduation Date: May 2022/2023
- Advisor: Dr. Sébastien Lépine
- Research Focus: Astroinformatics, Astrostatistics, Milky Way Structure and Evolution

Georgia State University — *Atlanta, GA, USA*

Masters in Physics — *Aug. 2018 - Dec. 2020*

- Advisor: Dr. Sébastien Lépine

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

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

Skills

Proficient Python, LaTeX, bash scripting, DS9, SQL, ADQL

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

Research Experience

Sloan Digital Sky Survey

FPS Design Implementation Lead — *Sep. 2020 - PRESENT*

- Develop and maintain a Python package that compiles SDSS-V FPS designs (configurations of targets to be observed using a focal plane system of re-configurable robots) to and from the targeting database, and validates these designs based on desired observing conditions.
- Coordinate with other software leads to ensure FPS design software is compatible with existing SDSS-V software products.
- Supervisor: Dr. Kevin Covey

Georgia State University — *Atlanta, GA, USA*

Graduate Research Assistant — *Aug. 2018 - PRESENT*

- Cross-match ∼6 million high proper motion sources from Gaia to six photometric surveys from various wavelength regimes using a newly developed Bayesian method. The resulting cross-match produces higher match percentages than the current Gaia archive cross-match catalogs, with the largest increase of 21% (Gaia archive)to 98% (new method) for Pan-STARRS within the survey footprint.
- 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 for pairs with relatively small angular separations based on catalogs of known wide binaries, showing promise for the identification of previously undetected candidate binary systems.
- Calibrate a photometric metallicity relationship for K and early M dwarfs of $3500 < T_{eff} < 5280$ K using a Gaussian Process Regressor. The calibrated relationship is largely free of systematic errors, which were present in past works, due to the removal of unresolved binaries in the training sample using a newly developed iterative method.
- Advisor: Dr. Sébastien Lépine

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

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

- Use polarized flux images from HAWC+ on SOFIA of the AGB carbon star IRC +10216 to derive the temperature profile in the circumstellar envelope via. the radiative transfer modeling code DUSTY, that was optimized using differential evolution, allowing for the study of grain alignment mechanisms for carbon grains.
- Expand data analysis of Local Bubble project from the Summer of 2016 by adding all of the nearby field stars to the model of the local radiation field to show that the degree of polarization is largely insensitive to the radiation field from red field stars.
- Organize 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.
- Provide guidance to an undergraduate summer research student who processed and analyzed data from the observations at WIRO.
- Advisor: Dr. B-G Andersson

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

Student Intern *Jan. 2017 - Jun. 2017*

- Write Python scripts to detect sources, calculate calibrated magnitudes and measure stellar proper motions from Hubble Space Telescope (HST) images of Kepler's Supernova Remnant from two epochs to search for the surviving companion of the supernova progenitor.
- Use the stellar catalog from the HST images to map the extinction in the direction of the remnant using an unsupervised machine learning Python module.
- Catalog the bright knots in the remnant, and calculate 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*

- Support a large polarization survey by data mining archival photometric and spectroscopic data to study the effects of radiatively driven grain alignment in the Local Bubble.
- The above data was used to demonstrate 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

A Catalog of 531 White Dwarf Candidates in the Local Galactic Halo from *Gaia* Data Release 2

The Astrophysical Journal

- Kim, Lépine & Medan 2020, ApJ, 889, 83

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

The Astrophysical Journal

- Medan & Andersson 2019, ApJ, 873, 87

Presentations

237th AAS Meeting *Virtual*

Oral Presentation *Jan. 2021*

- Oral presentation of improved photometric metallicity relationship for K/M dwarfs from APOGEE spectra.
- Medan & Lépine 2020, Abstract 513.03, 237, AAS

Royal Astronomical Society Early Career Poster Exhibition *Virtual*

Poster Presentation *Sep. 2020*

- Poster presentation of improved photometric metallicity relationship for K/M dwarfs from APOGEE spectra.

SDSS-V Team Meeting *Virtual*

Poster Presentation *Jun. 2020*

- Poster presentation of improved photometric metallicity relationship for K/M dwarfs from APOGEE spectra.

235th AAS Meeting *Honolulu, HI, USA*

Poster Presentation *Jan. 2020*

- Poster presentation of Bayesian cross-matching of high proper motion stars in *Gaia*.
- Medan & Lépine 2020, Abstract 273.05, 235, AAS

Georgia State University Dunwoody Campus *Dunwoody GA, USA*

Georgia State University Dunwoody Campus Astronomy Conference *October 2019*

- Conference presentation to undergraduate physics and astronomy students on graduate research concerning cross-matching astronomical surveys.

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 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 summer research project on grain alignment in the wall of the Local Bubble.