Ilija **Medan**

✉ imedan1@gsu.edu | ⌂ www.astro.gsu.edu/ medan/ | ⌗ imedan

Education

Georgia State University   *Atlanta, GA, USA*

EXPECTED DOCTOR OF PHILOSOPHY IN ASTRONOMY   *Aug. 2018 - PRESENT*

- Expected Graduation Date: June 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, SQL, ADQL, bash scripting, DS9
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, `sdss-mugatu`, 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*

- Develop Bayesian cross-matching method to match Gaia sources to various photometric catalogs. The resulting cross-match for high proper-motion sources produces higher match rates than the current Gaia DR2 archive, with the largest increase of 21% (Gaia archive) to 98% (new method) for Pan-STARRS within the survey footprint. See Medan, Lépine & Hartman 2021, AJ, 161, 234.
- 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. See Medan, Lépine & Hartman 2021, AJ, 161, 234.
- Use photometric metallicities of low-mass stars to analyze chemodynamical substructure in the Solar Neighborhood.
- 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. See Andersson, Lopez-Rodriguez, Medan, et al. 2022 ApJ, 931, 80
- 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. See Medan& Andersson 2019, ApJ, 873, 87
- 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

Gemini South *Cerro Pachon, Chile*

1 August 2022 - 31 January 2023

7.0 hours Queue Observing at Gemini South with Zorro *(GS-2022B-Q-313)*

Gemini North *Mauna Kea, Hawaii, USA*

1 February 2022 - 31 July 2022

3.5 hours Queue Observing at Gemini North with 'Alopeke *(GN-2022A-Q-313)*

Gemini South *Cerro Pachon, Chile*

1 February 2022 - 31 July 2022

4.9 hours Queue Observing at Gemini South with Zorro *(GS-2022A-Q-316)*

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

Grain Alignment in the Circumstellar Shell of IRC+10°216

THE ASTROPHYSICAL JOURNAL

- Andersson, Lopez-Rodriguez, **Medan**, et al. 2022 ApJ, 931, 80

Vetting the Lobster Diagram: Searching for Unseen Companions in Wide Binaries using NASA Space Exoplanet Missions

THE ASTRONOMICAL JOURNAL

- Hartman, Lépine & **Medan** 2022 (forthcoming)

Bayesian Cross-Matching of High Proper Motion Stars in *Gaia* DR2 and Photometric Metallicities for ∼1.7 million K and M Dwarfs

THE ASTRONOMICAL JOURNAL

- **Medan**, Lépine & Hartman 2021, AJ, 161, 234

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

The 20th (and a half) Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun

POSTER PRESENTATION

Virtual

Mar. 2021

- Poster presentation of improved photometric metallicity relationship for K/M dwarfs from APOGEE spectra.
- Medan, Lépine & Hartman 2021, Zenodo. DOI: 10.5281

237th AAS Meeting

ORAL PRESENTATION

Virtual

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

POSTER PRESENTATION

Virtual

Sep. 2020

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

SDSS-V Team Meeting

POSTER PRESENTATION

Virtual

Jun. 2020

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

235th AAS Meeting

POSTER PRESENTATION

Honolulu, HI, USA

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

GEORGIA STATE UNIVERSITY DUNWOODY CAMPUS ASTRONOMY CONFERENCE

Dunwoody GA, USA

October 2019

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

University of California, Santa Cruz

INTERSTELLAR AND GALACTIC MEDIUM PROGRAM OF STUDIES (IMPS) SEMINAR

Santa Cruz, CA, USA

May 2018

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

231st AAS Meeting

POSTER PRESENTATION

Washington, DC, USA

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*

<small>POSTER PRESENTATION</small> *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*

<small>RESEARCH SYMPOSIUM</small> *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*

<small>SEMINAR</small> *Aug. 2016*

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

Volunteer Work

AstroPAL *Atlanta, GA, USA*

<small>FACULTY LIASON</small> *September 2021 - PRESENT*

- Act as liason between graduate students and faculty as part of AstroPAL, a peer mentoring group which seeks to mentor 1st and 2nd year graduate students.

Imagining The Future *Atlanta, GA, USA*

<small>VOLUNTEER SPEAKER</small> *March 2020*

- Spoke to a total of ~125 elementary school students throughout one day about distances to objects in the Solar System and how astronomers measure distances via. trigonometric parallax. This program was organized by the Atlanta Science Festival.

Georgia Outreach Team for Space (GOT Space) *Atlanta, GA, USA*

<small>VOLUNTEER SPEAKER</small> *January 2019 - January 2020*

- Speak with high school classes about various topics in astronomy. Participate in outreach events 2-3 times per semester.