

Maša Kilibarda

Curriculum Vitae

Haverford, PA — mkilibarda@haverford.edu — linkedin.com/in/maša-kilibarda —

EDUCATION

Bachelor's of Science in Astronomy and Physics with a Concentration in Scientific Computing

Expected: May 2026

4.00 GPA

Department of Physics and Astronomy, Haverford College

John P. Chesick Scholar

Relevant Coursework: Stellar Astrophysics, Extragalactic Data Science, Observational Astronomy, Introduction to Astrophysics, Quantum Physics, Waves and Optics, Linear Algebra, Multivariable Calculus

RESEARCH EXPERIENCE

Elemental Abundances in HII Regions Using Mid-infrared Spectroscopy

June 2024 - present

Center for Interdisciplinary Exploration and Research in Astrophysics (CIERA) at Northwestern University

Advised by Dr. Noah S. J. Rogers and Professor Allison L. Strom.

A project examining elemental abundances of sulfur and argon in HII regions of two local spiral galaxies - Pinwheel (M101/NGC5457) and Triangulum (M33/NGC598) galaxies. Combined optical data from the CHAOS Survey with spatially resolved mid-infrared spectroscopy collected with James Webb Space Telescope's Mid-Infrared Instrument (JWST MIRI). Compared empirical elemental abundances with theoretical predictions from photoionization models. Found models tend to underpredict elemental abundances, especially in high-ionization regions.

Stellar Mass Densities of Spiral Galaxies in the MaNGA Survey

May 2023 - present

Haverford College

Advised by Professor Karen L. Masters.

A project to examine spiral arm stellar mass density excess in MaNGA survey spiral galaxies. Discovered stellar mass density excess in spiral arms increases slightly with radius. Developed a code in Python that combines data from different catalogs and performs analysis on large data samples (data for over 1000 galaxies). Analyzed how stellar mass density varies with global galaxy properties and found bluer galaxies with a higher star formation rate have a higher overdensity in spiral arm stellar mass. Performed data reductions for the HI-MaNGA survey - follow up program of the MaNGA survey that aims to obtain HI data using the Greenbank telescope for galaxies which lack data from other sources.

TEACHING EXPERIENCE

Undergraduate Teaching Assistant

September 2023 - Present

Physics and Astronomy Department, Haverford College

Responsibilities: Assist students in introductory Physics and Astronomy classes (Classical Mechanics - Fall 2023, Electromagnetism - Spring 2024 - lead TA, pending assignment - Fall 2024). Hold weekly sessions to help students work on homework and post-lab write-up assignments individually and in groups. Hold pre-exam review lectures to help students synthesise material learned. Work with students on improving their problem solving, data analysis and science communication skills. Provide feedback on the students' learning progress and collaborate with professors to tailor the course material to student needs. Help grading weekly homework assignments. As a lead TA, organize and distribute work among TAs and graders.

Peer Tutor

September 2023 - Present

Office of Academic Resources (OAR), Haverford College

Responsibilities: Assist students in mastering concepts in Math, Physics, and Astronomy classes. Work with students one-on-one in weekly 1h sessions. Organize Physics working groups with the aim to develop physics tutoring techniques guides that help future tutors. Act as a Physics tutors community lead, holding weekly sessions to assist other tutors. Take part in various peer educator training sessions focusing on diversity, equity and inclusion in tutoring.

PUBLICATIONS

Conference Proceedings

Testing Ionization Correction Functions for Sulfur and Argon Using JWST Mid-Infrared Spectroscopy of Local HII Regions

Proceedings of the 2024 Keck Northeast Astronomy Consortium (KNAC) Undergraduate Research Symposium

Exploring the Spiral Arm Stellar Mass Density Excess of Galaxies in the SDSS MaNGA Survey

Proceedings of the 2023 KNAC Undergraduate Research Symposium

AWARDS AND HONORS

National Exceptional University Student Award

Year: 2023/2024 and 2024/2025

Awarded by: Ministry of Education of Montenegro

Best Poster Award, 3rd Place

Year: 2024

Awarded by: American Physical Society (APS) Conference for Undergraduate Women+ in Physics (CUW+iP) at the University of Pennsylvania

Kathryn Innes, Arland Innes and Lois Sexton Scholarship

Year: 2022/2023 and 2023/2024

Awarded by: Haverford College

FELLOWSHIPS

Wintner/Love Summer Research Fellowship

June 2024 - August 2024

Awarded by: Haverford College

Location: CIERA - Northwestern University

Chesick Summer Experience Fellowship

May 2023 - July 2023

Awarded by: Haverford College

Location: Haverford College

CONFERENCE ACTIVITY

Talks Presented

Testing Ionization Correction Functions for Sulfur and Argon Using JWST Mid-Infrared Spectroscopy of Local HII Regions

Date: September 2024

KNAC Undergraduate Research Symposium - selected talk

Exploring the Spiral Arm Stellar Mass Density Excess of Galaxies in the SDSS MaNGA Survey

Date: October 2023

KNAC Undergraduate Research Symposium - selected talk

Posters Presented

Exploring the Arm-Interarm Stellar Mass Difference in MaNGA Spiral Galaxies

Date: January 2024

243rd Meeting of the American Astronomical Society

Stellar Mass Density Trends in MaNGA Spiral Galaxies

Date: January 2024

APS CUW+iP at the University of Pennsylvania

Test of Ionization Correction Functions for Sulfur and Argon with JWST

Date: August 2024

CIERA REU Poster Presentation

Exploring the Arm-Interarm Stellar Mass Difference in MaNGA Spiral Galaxies

Date: September 2023

Haverford College KINSC Undergraduate Research Symposium

CAMPUS AND DEPARTMENT ACTIVITY

Underrepresented Genders in Physics and Astronomy

Date: August 2023 - Present

Organization Co-Head. Organize monthly events with a focus on promoting gender diversity in Physics and Astronomy. Host successful colloquia with notable Physics gender minority speakers. Work on fostering a more tolerant department culture and providing a safe space for gender minorities. Help raise awareness about gender inequity in Physics among students and faculty through organizing educational workshops.

Haverford College Public Observing

Date: September 2023 - Present

Volunteer at Haverford College's Public Observing outreach events. Help with running open observatory public events at the Haverford College Strawbridge Observatory. Operate the 8" and 12" telescopes for the public to observe different celestial objects. Gave short presentations on the 12" and 16" telescopes, answered public questions about telescopes, Astronomy, and the department at Haverford.

OUTREACH

Start Talking Science

November 1st 2024

Selected poster presentation at the Science History Institute in Philadelphia. Presented a general public version of my research on stellar mass density in spiral galaxies.

PROFESSIONAL SKILLS

Technical

Python (advanced) - experience working with various libraries including NumPy, AstroPy, SciPy, Matplotlib, Pandas, Marvin (Python tool for MaNGA Survey data), Jdaviz, PyNeb;

Jupyter Notebook (advanced);

Unix (intermediate);

Wolfram Mathematica (advanced);

HTML/CSS/JavaScript (beginner) - developed my personal website;

TOPCAT (intermediate);

Anaconda (intermediate);

git and GitHub (intermediate);

Visual Studio Code (intermediate);

LaTeX (advanced);

Canva (advanced)

Language

Montenegrin/Serbian/Croatian/Bosnian (native), Italian (intermediate)

General

scientific writing, science communication, data analysis, design, problem solving, leadership, organization, project management

PROFESSIONAL MEMBERSHIPS

American Astronomical Society

Undergraduate Student Member; October 2023 - present

American Physical Society

Undergraduate Student Member; January 2023 - present

NASA Cosmic Pathfinders

Undergraduate Student Member; July 2023 - present

Society of Physics Students

Haverford College Chapter Member; September 2023 - present