

BRANDON MARSHALL

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University of Nebraska at Kearney

Department of Physics, Astronomy, and Engineering

PROFESSIONAL EXPERIENCE

Assistant Professor of Physics and Astronomy

University of Nebraska at Kearney

August 2019 - Present

EDUCATION

Doctor of Philosophy, *Iowa State University*

Astrophysics - "An examination of the environments impacted by high-mass stars and their formation"

December 2018

Bachelor of Science, *Western Michigan University*

Major: Physics, Minors: Astronomy, Mathematics

May 2012

RESEARCH EXPERIENCE

Graduate Research

Iowa State University, Ames IA

2012 - 2018

- Analysis of high-mass star forming regions and investigating the phenomena of Lyman-excess regions including, but not limited to:
 - Infrared photometry of compact/ultra-compact HII regions
 - Determination of luminosity, distance, size and spectral indices of HII regions
- Classification and modeling spectral energy distributions of Young Stellar Objects and reddened stellar photospheres
- Mass determination of molecular clouds from ^{12}CO and ^{13}CO maps
- Searching for candidate high mass O stars with circumstellar material found in young molecular ring structures
- Inspecting molecular ring structures to determine candidate ionization sources and confirm through spectral classification of high mass stars through SED modeling
- Writing Python, IDL, and C++ code to identify young stellar objects through data reduction of stars in HII regions
- Analyzing spectroscopic data from Wyoming Infrared Observatory, Gemini Observatory through IRAF

Advisor: Dr. Charles Kerton

Undergraduate Research

Western Michigan University, Kalamazoo MI

2011 - 2012

- Calculated sizes of Active Galactic Nuclei components and modeled the features using modeling code for various size central black holes
- Analyzed spectral energy distributions of model AGN for different masses and inclination angles to build a reference atlas

Advisor: Dr. Manuel Bautista

PUBLICATIONS AND PROFESSIONAL PRESENTATIONS

B. Marshall, C. R. Kerton, “Triggered Star Formation in a Cometary Atomic/Molecular Cloud in the Cep OB3 Association”, *MNRAS*, vol. 489, pp. 4809–4816, Nov. 2019

B. Marshall, S.-j. Kang, C. R. Kerton, Y. Kim, M. Choi, and M. Kang, “High-resolution Observations of the Molecular Clouds Associated with the Huge H II Region CTB 102”, *ApJ*, vol. 876, p. 45, May 2019.

B. Marshall and C. R. Kerton, “The Long-lived Double-peaked H Emission of VES735: A Herbig Oe Star?”, *Research Notes of the American Astronomical Society*, vol. 2, p. 221, Dec. 2018.

B. Marshall and C. R. Kerton, “A Refined Sample of Lyman Excess H II Regions”, *MNRAS*, vol. 478, pp. 5579–5590, Aug 2018.

B. Marshall and M. Bautista, “The Ideal AGN Atlas of AGN Theoretical Images and Spectra,” in *American Astronomical Society Meeting Abstracts 219*, vol. 219 of *American Astronomical Society Meeting Abstracts*, p. 435.11, Jan. 2012.

TECHNICAL STRENGTHS

Current Research

- Data reduction through Python, C++, and IDL coding
- Data cube analysis via Karma packages
- Reduction and analysis of spectra using IRAF
- Data analysis and plotting using Python and iPython
 - Spectral Energy Distribution Fitting
 - Identification of young stellar object classification
- Calculating photometry and coordinate systems of stars using DS9, Photvis, Kvis, Koords
- Coding with LaTeX, Overleaf
- Creating astronomical image mosaic using Montage

Previous Experiences Working Knowledge

- Coding in C++, AWK, and mathematical computation using Mathematica
- Analysis of Herschel astronomical data using HIPE
- Creating spectral energy distributions and AGN modeling using Shape It software

TEACHING EXPERIENCE

Astronomy

University of Nebraska - Kearney

2020 - Present

- PHYS 210 - “Astronomy”
 - Lecture instructor for introductory astronomy for non-science majors covering topics including motions in the sky, the solar system, stars, galaxies.

Iowa State University

- ASTRO 102/103 - “North Star Astronomy / Evening Star Astronomy”
 - Online course grader and main contact point for introductory astronomy.
- ASTRO 120 - “Sky and Solar System”
 - Recitation instructor for introductory astronomy for non-science majors.
- ASTRO 125L - “The Sky and the Solar System Laboratory”
 - Recitation instructor for introductory astronomy for non-science majors.
- ASTRO 150 - “Stars, Galaxies, and Cosmology”
 - Recitation Instructor for introductory astronomy for non-science majors.
- ASTRO 344L - “Astronomy Laboratory”
 - Teaching assistant for junior level astronomy class focusing on telescope observation and data analysis.

Physics

2019 - Present

University of Nebraska - Kearney

- PHYS 100/100L - “Physical Science” / “Physical Science Laboratory”
 - Lecture and laboratory instructor for non-science major course covering introductory mechanics, EM, optics, chemistry, and astronomy.
- PHYS 205L - “General Physics I Laboratory”
 - Laboratory instructor for science major course covering first-semester algebra based physics topics.
- PHYS 206 - “General Physics II”
 - Lecture instructor for science major course covering second-semester algebra based physics topics.

2014 - 2018

Iowa State University

- PHYS 111 - “General Physics I”
 - Recitation and instructor for non-calculus based physics.
- PHYS 221- “Introduction to Classical Physics I”
 - Recitation and lab instructor for calculus based physics.
- PHYS 222 - “Introduction to Classical Physics II”
 - Recitation and lab instructor for calculus based physics.
- PHYS 241 - “Principles and Symmetries in Classical Physics I”
 - Flipped classroom with lead professor by creating and finding resources and demonstrations

OUTREACH**University of Nebraska - Kearney Planetarium Volunteer**

2019 - Present

Plan and present planetarium shows to public audiences, future science majors and classes on school trips.

Science Communication Fellowship

2018

Present astronomy research in an informal setting at the Iowa State gardens to the general public including demos and poster presentations.

Emcee - Totality Solar Eclipse Festival

2017

Educated and instructed ~2,500 attendees of solar eclipse festival in Missouri.

Iowa State Planetarium Volunteer

2012 - 2018

Plan and present planetarium shows to public audiences, future science majors and classes on school trips.

Iowa State Graduate Learning Community Mentor

2015 - 2018

Meet with prospective graduate students and mentor 1st year graduate students seeking Ph.D. candidacy via small group meetings and upper-class graduate panels.

HONORS AND AWARDS

2018

2nd place Three-Minute Thesis presentation at the Graduate and Professional Student Research Conference (Iowa State)

Science Communication Fellow (Iowa State)

Iowa State Graduate Teaching Excellence Award

2017

Preparing Future Faculty Associate (Iowa State)

2014

Iowa State Teaching Excellence Award

2011

Undergraduate Research Excellence Award