

Matthew C. De Furio

4117 W DeLeon St, Tampa, FL 33609
(813) 466-8577 defurio@umich.edu

Education

University of Michigan – Ann Arbor (UM) Fall 2019 - Present
PhD Candidate: Astronomy & Astrophysics
University of Michigan – Ann Arbor August 2019
Master of Science: Astronomy & Astrophysics GPA 3.66
University of Florida (UF) December 2016
Bachelor of Science (Summa cum Laude): Physics, Astronomy Minor: Mathematics GPA 3.90

Professional Experience

Graduate Student Research Assistant, UM Fall 2017-Present
Working in conjunction with Prof. Michael Meyer and Dr. Megan Reiter, I created an algorithm to model binary stars with HST data on ACS through empirical PSF-fitting which is capable of identifying companions at separations below the diffraction limit. With this infrastructure, we described the low-mass binary population of the ONC and are currently expanding our sample to sub-stellar primaries in the ONC and IC 348.

Research Mentor, UM Fall 2019-Present
I designed a research program for an undergraduate student through the Undergraduate Research Opportunity Program. As a mentor, I teach my student the crucial aspects of the project, work with them on understanding the data analysis procedures, and tailor the program to develop their practical computational and critical thinking skills.

Research Assistant, UF, Physics Department 2015-2017
In a biophysics lab, I fabricated and designed microfluidic devices, enhanced the control of the microscope setup through creating a computer-controlled camera shutter, and developed a microscope auto-focusing algorithm to optimize the user interface for single cell experiments. I also developed and executed single cell experiments on bacteria to test their genetic response to an oxidized medium using fluorescence reporting.

Research Assistant, UF, Astronomy Department 2014-2017
With Prof. Elizabeth Lada and Dr. Naibi Marinas, I classified low-mass stars in young, embedded star forming regions in Orion B using spectra from the FLAMINGOS instrument on Kitt Peak 2.1m and 4m telescopes. Combining NIR FLAMINGOS and mid-IR Spitzer photometry with the determined spectral types, we created SEDs to investigate the prevalence of circumstellar disks around early to late M-type stars.

Astronomy & Physics Tutor, UF, Broward Teaching Center 2014-2015
As an undergraduate, I structured lesson plans, group teaching strategies, and created review materials for the many sections of AST1002 (Discover the Universe) and PHY2048 (Physics with Calculus 1).

Observing Proposals

PI: Magellan – FIRE, awarded one night in May 2020 to constrain the fundamental parameters of four wide sub-stellar companions.

Co-I: Magellan – MagAO-X, awarded one night in May 2020 to observe a candidate accreting proto-planet around AS 209 and constrain accretion properties.

Publications

De Furio, M., Reiter, M., Meyer, M., Greenbaum, A., Dupuy, T., Kraus, A. (2019) A Search for Intermediate-separation Low-mass Binaries in the Orion Nebular Cluster. *The Astrophysical Journal*, Vol. 886, 2.

De Furio, M., Ahn, S.J., Burne, R.A., Hagen, S.J. (2017) Oxidative Stressors Modify the Response of *Streptococcus mutans* to Its Competence Signal Peptides. *Applied Environmental Microbiology*, 83.

Investigations of the Circumstellar Disk Fraction as a Function of Mass in Young Embedded Clusters in Orion B (<http://ufdc.ufl.edu/AA00060876/00001>).
Senior Thesis published in University of Florida Digital Collections.

Presentations

Special Talk at Understanding the Nearby Star-forming Universe with JWST 2019 Conference: “HST to JWST: Investigating Multiplicity in the ONC”

Poster Presentation at 233rd Meeting of the American Astronomical Society: “A Search for Intermediate-separation Low-mass Binaries in the Orion Nebular Cluster.”

Poster Presentation at 227th Meeting of the American Astronomical Society: “Investigations of the Circumstellar Disk Fraction as a Function of Mass in Young Embedded Clusters in Orion B.”

Honors and Awards

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| Rackham Travel Grant , UM | 2018 |
| Dorothy W and Terry Smiljanich Outstanding Senior Thesis Award , UF | 2016 |
| University Scholars Award , UF | 2015 - 2016 |
| Center for Condensed Matter Sciences Undergraduate Fellowship , UF | 2015 - 2016 |
| University of Florida President’s Honor Roll | Fall 2013 |
| University of Florida Dean’s List (earned 8 times) | Fall 2012 - Spring 2016 |
| Florida Bright Futures Academic Scholar | 2012 – 2016 |
| Eagle Scout Award , Boy Scouts of America | 2012 |
| St. Michael’s Book Award | 2011 |