Karl JAEHNIG

Contact Information

Vanderbilt University
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Citizenship: United States of America

Education

Vanderbilt University, Nashville, Tennessee, USA
Ph.D, Astrophysics, Sept 2017 –
Thesis Advisor: Dr. Kelly Holley-Bockelmann

Fisk University, Nashville, Tennessee, USA
M.A., Physics, Aug 2015 – Aug 2017
Thesis: "Evidence for a decreasing spectroscopic binary fraction within the IN-SYNC sample."
Thesis Advisor: Dr. Keivan G. Stassun

University of Florida, Gainesville, Florida, USA
B.S., Major: Astronomy – December 2011

Research Experience

Vanderbilt University - PhD Candidate (May 2018 –)

Vanderbilt University - Graduate Teaching Assistant (Aug 2017 – Apr 2019)
Teaching assistant for class of ∼250 students
Research radius inflation in low-mass star possibly originating from magnetic activity within convective layers
Develop simulations of star clusters involving binary star dynamics, and stellar evolution to understand role of binary star perturbation in formation of blue straggler stars

Vanderbilt University - Graduate Research Assistant (Aug 2015 – Aug 2017)
Discovered possible binaries in young nebulous clouds through analysis of radial velocity variations
Investigated raw binary fractions as a function of age in young star forming regions
Developed Monte Carlo simulations to reconstruct true binary fractions using Bayesian Inference

University of Florida - Post-Baccalaureate Researcher (Aug 2013 – Jul 2015)
Developed statistical algorithm, the *Angular Dispersion Parameter* (ADP) to quantify sub-structure in star forming clusters
Applied ADP to Orion Nebula Cluster and older globular clusters to study systematics and biases
Studied sub-structure of 20 young star forming regions within MYStIX survey using ADP

Research Interests

- Analyses of star clusters populations and dynamics utilizing machine-learning methods in both Python and R
- Development of automated pipelines to fit star clusters with gaussian mixture models to develop membership lists across large catalogs.
- N-body simulations focusing on formation, evolution, and dissolution of triple star systems in star clusters.

Publications: Refereed

1. **Jaehnig, Karl O.**, Somers, Garrett, and Stassun, Keivan G., Radius Inflation at Low Rossby Number in the Hyades Cluster, 2019, 12 pages, ApJ, 879, 39

2. **Jaehnig, Karl O.**, Bird, Jonathan C., Stassun, Keivan G., Da Rio, Nicola, Tan, Jonathan C., Cotaar, Michiel, and Somers, Garrett, IN-SYNC. VII. Evidence for a Decreasing Spectroscopic Binary Fraction (from 1 to 100 Myr) within the IN-SYNC Sample, 2017, 18 pages, ApJ, 851, 14

3. **Jaehnig, Karl O.**, Da Rio, Nicola, and Tan, Jonathan C., The Structural Evolution of Forming and Early Stage Star clusters, 2015, 7 pages, ApJ, 798, 126

4. Da Rio, Nicola, Tan, Jonathan C., and **Jaehnig, Karl O.**, The Structure, Dynamics, and Star Formation Rate of the Orion Nebula Cluster, 2014, 16 pages, ApJ, 795, 55

Presented Talks

Jan 2019 "Radius Inflation in the Hyades Cluster"
233^{rd} American Astronomical Society Meeting, ID 420.06, Seattle, Washington State

Jan 2016 "Binaries at Birth: Stellar Multiplicity in Embedded Clusters from Radial Velocity Variations in the INSYNC Survey"
227^{th} American Astronomical Society Meeting, ID 404.02, Kissimmee, Florida

Conference Posters & Abstracts

- "An Analysis of Bulk Cluster Rotation Signatures Present Within Open Clusters Using Gaia DR2 Data"
  Jaehnig, Karl O., Holley-Bockelmann, Kelly
  2019, 233^{rd} American Astronomical Society Meeting, ID 266.04, Seattle, Washington State
- "Binaries at Birth: Stellar Multiplicity in Embedded Clusters from Radial Velocity Variations in the INSYNC Survey"
  Jaehnig, Karl O., Bird, Jonathan, Stassun, Keivan G., and the INSYNC Survey Team
  2016, Statistical Challenges in Modern Astronomy VI, Pittsburgh , PA
- "The Structural Evolution of Forming and Early Stage Star clusters"
  Jaehnig, Karl O., Da Rio, Nicola, and Tan, Jonathan C.
  2016, 47^{th} Division of Dynamical Astronomy Meeting, Nashville, Tennessee

Professional Workshops

April 2018 Modest 18a Workshop, Leiden University, Netherlands

Jan 2017 Graduate Student Professional Development Workshop, Vanderbilt University

June 2016 Summer School in Statistics for Astronomers XII, Penn State University, State College

May 2016 Astro-Statistics Workshop, Vanderbilt University

Professional and Academic Affiliations

- Sigma Xi Scientific Research Honor Society: 2016–2019
- Division of Dynamical Astronomy (DDA): 2016–present
- American Astronomical Society (AAS): 2015–present

Scholarships, Fellowships, & Competitive Awards

- LSSTC Data Science Fellowship: 2018–2021
- Fisk-Vanderbilt Master's to Ph.D Program Bridge Fellow: 2017–present