PHILLIP A. CARGILE

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Education

PH.D., PHYSICS, VANDERBILT UNIVERSITY	MAY 2010
Thesis: *Testing the Chronometric Accuracy of Stellar Evolution Models Using Young Stars in Open Clusters*	
Advisors: Keivan G. Stassun & David J. James	
M.S., PHYSICS, VANDERBILT UNIVERSITY	MAY 2008
B.S., ASTRONOMY, UNIVERSITY OF TEXAS AT AUSTIN	MAY 2004
B.S., PHYSICS, UNIVERSITY OF TEXAS AT AUSTIN	MAY 2004

Professional Appointments

RESEARCH ASSOCIATE, Harvard University	2018 - PRESENT
POSTDOCTORAL RESEARCHER, Harvard University	2014 - 2018
POSTDOCTORAL FELLOW, Vanderbilt University	2010 - 2014

Research Interests

Connecting the observed light from stars to our fundamental models and theories of stellar structure and evolution, namely:

- Understanding and improving the accuracy of *ab initio* models of stellar atmosphere and radiative transfer.
- Optimizing predictions of stellar spectral energy distributions and other observables through machine learning (e.g., artificial neural networks).
- "Industrial scale" inference of stellar parameters using Bayesian techniques.
- Characterization of individual stars and stellar populations in order to produce benchmarks for our stellar models.

Project & Skill Summary

FITTING ALL THE LINES:
Leading an effort to curate and test ATLAS/SYNTHE spectral synthesis codes, specifically, empirically tuning the atomic and molecular transition parameters used to generate model stellar spectra.

DEVELOPMENT OF THE PAYNE:
Co-developed with Dr. Yuan-Sen Ting the use of artificial neural networks to emulate ab initio models of stellar spectra. Leads an effort to generate training data for The Payne, as well as optimizing training of spectral ANNs using GPUs.

DEVELOPMENT OF MINESWEEPER:
Creator and lead developer of the stellar parameter inference code MINESweeper. Built code framework to quickly and efficiently derive stellar properties using MIST isochrone priors.

ORGANIZING, PLANNING, AND CARRYING OUT H3 SURVEY:
Core member of the H3 survey. Involved in the planning, observations, data archiving, and processing of MMT Hectochelle spectra obtained in this survey.

Selected Funding

THE H3 SPECTROSCOPIC SURVEY AND THE ORIGIN OF THE GALAXY
National Science Foundation AAG —PI: Conroy — Aug 2021-2024

TRIANGULATING ON THE AGES OF STARS: USING OPEN CLUSTERS TO CALIBRATE STELLAR CHRONOMETERS FROM MYR TO GYR AGES
National Science Foundation AAG — PI: Cargile— Aug 2011-2016

Teaching Experience	TEACHING ASSISTANT, VANDERBILT UNIVERSITY 2007–2008 *Instructor for observational-based astronomy laboratory for science and non-science majors.*
Students Supervised	ALISHA KUNDERT, VANDERBILT UNIVERSITY 2010–2012 AARON JUAREZ, FISK UNIVERSITY, 2012-2014 MARIALIS ROSARIO-FRANCO, VANDERBILT UNIVERSITY, 2012-2015 KESHAWN IVORY, HARVARD UNIVERSITY, 2015 PRISCILLA HOLGUIN LUNA, HARVARD UNIVERSITY, 2018-2019
Community Involvement	RESEARCH ADVISER — Fisk-Vanderbilt Bridge Program 2005-2014 VOLUNTEER SPEAKER — Dyer Observatory 2005-2014 "SPEAK TO A SCIENTIST" AFTER SCHOOL PROGRAM, Shady Hill School, Cambridge MA. 2016-2018 PYTHON "BOOTCAMP" INSTRUCTOR — SAO Latin Initiative Program 2019-2021

First Author Publications

1. **Cargile, P. A.**, Conroy, C., Johnson, B. D., et al., *MINESweeper: Spectrophotometric Modeling of Stars in the Gaia Era*, 2020, ApJ, 900, 28.
2. **Cargile, P. A.**, James, D. J., Pepper, J., et al., *Evaluating Gyrochronology on the Zero-age-main-sequence: Rotation Periods in the Southern Open Cluster Blanco 1 from the KELT-South Survey*, 2014, ApJ, 782, 29.
3. **Cargile, P. A.**, James, D. J., Jeffries, R. D., *Identification of the Lithium Depletion Boundary and Age of the Southern Open Cluster Blanco 1*, 2010, ApJ, 725L 111.
4. **Cargile, P. A.**, James, D. J., *Employing a New, BVIc Photometric Survey of IC 4665 to Investigate the Age of This Young Open Cluster,* 2010, AJ, 140, 677.
5. **Cargile, P. A.**, James, D. J., Platais, I., *A New X-Ray Analysis of the Open Cluster Blanco 1 Using Wide-Field BVIc Photometric and Proper Motion Surveys*, 2009, AJ, 137, 3230.
6. **Cargile, P. A.,** Stassun, K. G., Mathieu, R. D., *Discovery of Par 1802 as a Low-Mass, Pre-Main-Sequence Eclipsing Binary in the Orion Star-Forming Region*, 2008, ApJ, 674, 329.

Other Key Publications

1. Conroy, C., Bonaca, Ana, **Cargile, P.**, et al., *Mapping the Stellar Halo with the H3 Spectroscopic Survey*, 2019, ApJ, 883, 107.
2. Ting, Y.-S., Conroy, C., Rix, H.-W., **Cargile, P.**, *The Payne: Self-consistent ab initio Fitting of Stellar Spectra*, 2019, ApJ, 879, 69.
3. Petigura, E. A., [14 co-authors including **Cargile, P.**] et al., *The California-Kepler Survey. I. High-resolution Spectroscopy of 1305 Stars Hosting Kepler Transiting Planets*, 2017, ApJ, 154, 107.
4. Dotter, A., Conroy, C., **Cargile, P.**, Asplund, M., *The Influence of Atomic Diffusion on Stellar Ages and Chemical Tagging*, 2017, ApJ, 840, 99.
5. Stassun, K. G., Mathieu, R. D., **Cargile, P. A.,** et al., *Surprising dissimilarities in a newly formed pair of `identical twin' stars*, 2008, Nature, 453, 1079.