Caleb R. Choban

Computational Astrophysicist · Interstellar Dust Enthusiast

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Education

University of California San Diego — *San Diego, CA*

Ph.D. in Physics — *Sept. 2016 - August 2023*

University of California San Diego — *San Diego, CA*

B.S. in Physics w/ Spec. in Astrophysics (Cum Laude) — *Sept. 2011 - Dec. 2015*

Research Experience

Inaugural Sullivan Prize Fellow

IU Bloomington Department of Astronomy — *2023-PRESENT*

Graduate Student Researcher — *Advisor: Dušan Kereš*

UC San Diego Department of Physics — *2016 - 2023*

- Developed and integrated galactic dust evolution models into the massively parallel C package GIZMO
- Investigated the evolution of galactic dust populations utilizing cosmological zoom-in simulations

Undergraduate Student Researcher — *Advisor: Adam Burgasser*

UC San Diego Department of Physics — *2014-2016*

- Contributed to the development of the public SPLAT Python package, used to access and analyze brown dwarf spectra
- Developed a machine-learning clustering algorithm to identify rare populations of stars and brown dwarfs

Skills

Programming Python · C/C++ · Mathematica · LaTeX · Parallel programming with MPI and OpenMP · Meshless finite mass codes

Other Big data analysis · Running simulations on several national supercomputers

Publications

First Author

1. "The Galactic Dust-Up: Modeling Dust Evolution in FIRE"
   C. R. Choban, D. Kereš, P. F. Hopkins, K. M. Sandstrom, C. C. Hayward, C. Faucher-Giguère, 2022, MNRAS, 514, 4506

In Progress

1. "A Dusty Locale: Evolution of Galactic Dust Populations from Milky Way to Dwarf-Mass Galaxies"
   C. R. Choban, D. Kereš, et al., in prep

Contributor

1. "FIRE-3: Updated Stellar Evolution Models, Yields, & Microphysics and Fitting Functions for Applications in Galaxy Simulations"
   P. F. Hopkins, A. Wetzel, C. Wheeler, R. Sanderson, M. Y. Grudić, O. Sameie, M. Boylan-Kolchin, M. Orr, X. Ma, C. Faucher-Giguère, D. Kereš, E. Quataert, K. Su, J. Moreno, R. Feldmann, J. S. Bullock, S. R. Loebman, D. Anglés-Alcázar, J. Stern, L. Necib, **C. R. Choban**, C. C. Hayward, 2023, MNRAS, 519, 3154

2. "Characterization of the Very Low Mass Secondary in the GJ 660.1AB System"
   C. Aganze, A. J. Burgasser, J. K. Faherty, **C. R. Choban**, I. Escala, M. A. Lopez, Y. Jin, T. Tamiya, M. Tallis, W. Rockward, 2016, AJ, 151, 6A

3. "The First Brown Dwarf in the 32 Orionis Association"
   A. J. Burgasser, M. A. Lopez , E. E. Mamajek, J. Gagne , J. K. Faherty, M. Tallis, **C. R. Choban**, I. Escala, C. Aganze, 2016, ApJ, 820, 32B

Honors, Awards, & Grants

Distinguished Senior Graduate Teaching Award *2023*

UCSD Graduate Student Association Travel Grant *2019*

NSF Graduate Research Fellowship, Honorable Mention *2018*

UCSD Physical Sciences Dean's Undergraduate Award for Excellence *2015-2016*

Provost Honours, UCSD *2013-2015*

Presentation/Poster

Illuminating the Dusty Universe: A Tribute to the Work of Bruce Draine *Galileo Galilei Institute, Italy*
Contributed Talk *2023*

Olympian Symposium: Star Formation in the Era of JWST *Paralia, Greece*
Contributed Talk *2023*

Friday Lunch Time Astrophysics Seminar *UC Santa Cruz*
Invited Talk *2023*

Star Formation/ISM Rendezvous (SFIR) Seminar *Princeton*
Invited Talk *2022*

CCA Galaxy Formation Meeting *Flatiron*
Contributed Talk *2022*

Galaxy Formation and Evolution in Southern California *California Institute of Technology*
Contributed Talk *2016, 2018, 2019,2022*

FIRE Collaboration Seminar *Virtual*
Invited Talk *2021*

Osterbrock Sierra Conference *Sequoia National Park*
Poster/Talk *2021*

Dusting the Universe Conference *Univ. of Arizona*
Poster *2019*

UCSD Undergraduate Research Conference *UC San Diego*
Contributed Talk *2015*

Summer Undergraduate Research Conference *UC San Diego*
Contributed Talk *2014*

Outreach

Graduate/Undergraduate Peer-to-Peer Mentoring Program, Founder *2019-2023*

Physics Graduate Council, Representative *2018-2023*

San Diego Air & Space Museum Space Day *2022,2023*

Transfer Student STEM Research Seminar *2021*

UCSD Young Physicists Program *2018-2020*

San Diego Festival for Science and Engineering *2015-2020*

Southern California Physics Graduate Admissions Bootcamp, Presentor and Tutor *2016-2017*

Institute of the Americas Science & Innovation Camp *2015-2017*

Intertribal Youth: Indigenize Education *2015-2017*

Society of Physics Students, Vice President *2014-2016*

Teaching Experience

Lab Assistant

PHYS 105A/B: Mathematical and Computational Physics I/II

PHYS 164: Observational Astrophysics Research Lab

PHYS 124: Laboratory Projects w/ Arduinos

PHYS 120: Circuits and Electronics Lab

PHYS 2CL: Physics Lab E&M, Waves, & Optics

Lecture Assistant

PHYS 163: Galaxies and Quasars

PHYS 162: Cosmology

PHYS 1B: Electricity and Magnetism

PHYS 13: Life in the Universe

PHYS 7: Galaxies and Cosmology

Workshop Instructor

Intermediate Introduction to Python

Time Management

Coding Design