Stanley A. Baronett

barons2@unlv.nevada.edu
unlv-spfg.github.io/team/baronett-stanley
pfitsplus.github.io/team/baronett-stanley
simonsfoundation.org/people/stanley-a-baronett

Curriculum Vitae

Education

University of Nevada, Las Vegas (UNLV) — Las Vegas, NV
Ph.D. in Astronomy — Fall 2022–present

- Advisor: Zhaohuan Zhu
- Dissertation: "From Dust to Planets: Dust–Gas Dynamics and Radiation Transport in Protoplanetary Disks"

UNLV — Las Vegas, NV
M.S. in Astronomy, GPA: 4.00/4.00 — Fall 2020–Spring 2022

- Advisors: Zhaohuan Zhu, Chao-Chin Yang
- Thesis: "Dust-Gas Dynamics Driven by the Streaming Instability with Various Pressure Gradients"

UNLV — Las Vegas, NV
B.S. in Physics, GPA: 3.76/4.00 — Fall 2018–Spring 2020

- Concentration in Computational Physics
- Sigma Pi Sigma (physics and astronomy honor society)

University of Hawai'i at Mānoa (UHM) — Honolulu, HI
M.A. in Philosophy, GPA: 3.96/4.00 — Fall 2013–Fall 2015

- Advisors: Roger Ames, Kenneth Kipnis
- Thesis: "Sustaining Harmony Through Professional Roles"

UHM — Honolulu, HI
B.A. in Philosophy, GPA: 3.88/4.00 — Fall 2007–Spring 2012

- Magna Cum Laude
- Phi Beta Kappa (academic honor society)

Experience

UNLV — Las Vegas, NV
UNLV Foundation Board of Trustees Graduate Fellow — Fall 2024–Spring 2026

- Dust–gas dynamics and radiation transport in protoplanetary disks
- Developing global Athena++ radiation-hydrodynamic models with self-consistent dust dynamics and feedback

UNLV — Las Vegas, NV
Graduate Research Assistant under Zhaohuan Zhu — Summer 2021–Spring 2024

- Dust-gas dynamics driven by the streaming instability with various pressure gradients
- Developed and analyzed Athena++ models with Lagrangian particles

Center for Computational Astrophysics (CCA), Flatiron Institute (FI) — New York, NY
Pre-Doctoral Research Analyst under Yan-Fei Jiang and Phil Armitage — Sept. 2023–Jan. 2024

- Frequency-dependent dust opacities for irradiated disks
- Developed and compared hydrostatic models between Athena++ with multigroup radiation and RADMC-3D

FI Computational Fluid Dynamics for Astrophysics Summer School — New York, NY
One of 20 invited students out of 200 applicants — July 2023–Aug. 2023

- Finite-volume, spectral, smooth-particle-hydrodynamics, moving-mesh, and high-order numerical techniques
- Applied tutorials on physical processes (MHD and radiation transport) and architectures (CPU and GPU)

UNLV — Las Vegas, NV
Jason Steffen Research Group — Summer 2019–present

- Stellar evolution and tidal dissipation on planetary orbital dynamics
- Contributed REBOUNDx modules for dissipative tides and parameter interpolation of MESA stellar data

UNLV — Las Vegas, NV
Student Assistant under Qiang Zhu — Spring 2020

- Web application development
- Topological Phonon Database and Virtual X-ray Diffraction

Qdigital Technology Services — Las Vegas, NV
IT Consultant — Aug. 2016–Aug. 2018

- Managed services, networking, systems infrastructure, support, information security, cloud and on-premises project implementation and deployment, enterprise resource planning, and web development

Hawaii Natural Energy Institute — Honolulu, HI
IT Specialist — Feb. 2009–May 2016

- Procured, deployed, and managed hardware, software, networks, and web content

Publications

9. Lim, J., **Baronett, S. A.**, Simon, J. B., Yang, C.-C., Sengupta, D., Umurhan, O. M. & Lyra, W. Bridging Unstratified and Stratified Simulations of the Streaming Instability for $\tau_s = 0.1$ Grains. arXiv: 2505.23902 (Submitted to ApJ).
8. Lim, J., Simon, J. B., Li, R., Carrera, D., **Baronett, S. A.**, Youdin, A. N., Lyra, W. & Yang, C.-C. Probing Conditions for Strong Clumping by the Streaming Instability: Small Dust Grains and Low Dust-to-gas Density Ratio. ApJ **981,** 160. doi:10.3847/1538-4357/adb311 (Mar. 2025).
7. Lepp, S., Martin, R. G. & **Baronett, S. A.** Polar Orbits around the Newly Formed Earth–Moon Binary System. ApJ **971,** 73. doi:10.3847/1538-4357/ad62fa (Aug. 2024).
6. Chen, C., **Baronett, S. A.**, Nixon, C. J. & Martin, R. G. On the origin of polar planets around single stars. MNRAS **533,** L37–L42. doi:10.1093/mnrasl/slae058 (Sept. 2024).
5. **Baronett, S. A.**, Yang, C.-C. & Zhu, Z. Dust-gas dynamics driven by the streaming instability with various pressure gradients. MNRAS **529,** 275–295. doi:10.1093/mnras/stae272 (Mar. 2024).
4. Ferich, N., **Baronett, S. A.**, Tamayo, D. & Steffen, J. H. The Yarkovsky Effect in REBOUNDx. ApJS **262,** 41. doi:10.3847/1538-4365/ac8d60 (Oct. 2022).
3. **Baronett, S. A.**, Ferich, N., Tamayo, D. & Steffen, J. H. Stellar evolution and tidal dissipation in REBOUNDx. MNRAS **510,** 6001–6009. doi:10.1093/mnras/stac043 (Mar. 2022).
2. Li, J., Liu, J., **Baronett, S. A.**, Liu, M., Wang, L., Li, R., Chen, Y., Li, D., Zhu, Q. & Chen, X.-Q. Computation and data driven discovery of topological phononic materials. *Nature Communications* **12,** 1204. doi:10.1038/s41467-021-21293-2 (Jan. 2021).
1. **Baronett, S. A.** in *Distributing Worlds through Aesthetic Encounters* (eds Stoll, J., Xiang, S. & Underwood, B.) 141–153 (Cambridge Scholars Publishing, Nov. 2017). https://www.cambridgescholars.com/product/978-1-5275-0035-8.

(3 as first author, 3 as second author; h-index of 5)
Refereed authorship on the Astrophysics Data System (ADS)

Awards

- UNLV Foundation Board of Trustees Fellowship ($30,000/yr.) 2024–2026
- Summer Doctoral Research Fellowship (UNLV) ($7,000) 2024
- FI CCA Pre-doctoral Fellowship 2023–2024
- Russell L. and Brenda Frank Scholarship ($2,500, $2,830, $2,900) 2022–2025
- Nevada NASA Space Grant Consortium Graduate Fellowship ($20,000) 2021–2022
- Alumni Association Scholarship (UNLV) ($2,500) 2021–2022
- Donna Weistrop and David B. Shaffer Scholarship ($1,000) 2021–2022
- Patricia Sastaunik Scholarship ($2,500) 2021–2022
- Russell L. and Brenda Frank Scholarship ($2,500) 2020–2021
- Kenneth R. Sites Physics Scholarship ($1,500) 2019–2020
- Dean's Honor List (UNLV) 2018
- Departmental Merit Scholarship (Philosophy, UHM) 2013–2015
- Departmental Merit Scholarship (Philosophy, UHM) 2008–2011
- Dean's List (UHM) 2007–2012

Presentations

- **Poster**, Europlanet Science Congress 2024, Berlin, Germany 2024
  Radiation hydrodynamics of protoplanetary disks with frequency-dependent dust opacities (Sept. 8–13)
- **Poster**, Emerging Researchers in Exoplanet Science Symposium IX, Cornell University, Ithaca, NY 2024
  Radiation hydrodynamics of protoplanetary disks with frequency-dependent dust opacities (Jul. 10–12)
- **Poster**, 50 years of Binaries and Discs: Lubow@75, UNLV, Las Vegas, NV 2024
  Dust-Gas Dynamics Driven by the Streaming Instability with Various Pressure Gradients (May 6–9)
- **Talk**, 2024 CCA Pre-Doc Symposium, FI, New York, NY 2024
  Radiation Transport in Protoplanetary Disks (Jan. 19)
- **Poster**, Origins of Solar Systems Gordon Research Conference: Chemical and Dynamical Constraints on Planet Formation, Mount Holyoke College, MA 2023
  Dust-Gas Dynamics Driven by the Streaming Instability with Various Pressure Gradients (Jun. 11–16)
- **Poster**, Origins of Solar Systems Gordon Research Seminar: Constraining the Origin and Evolution of Planetary Systems Through a Multidisciplinary Approach, Mount Holyoke College, MA 2023
  Dust-Gas Dynamics Driven by the Streaming Instability with Various Pressure Gradients (Jun. 10–11)
- **Poster**, AASTCS 9: Exoplanets IV, Las Vegas, NV 2022
  Dust–Gas Dynamics Driven by the Streaming Instability with Various Pressure Gradients (May 2–6)
- **Exhibit** (Virtual), NASA@SC21, NASA Science and Engineering Powered by HPC 2021
  Protoplanetary Disk Simulations from Large to Small Scales (Nov. 8)
- **Seminar** (Virtual), Orbital Dynamics & Planetology Group, São Paulo State University, Brazil 2021
  Stellar Evolution and Tidal Dissipation in REBOUNDx (Apr. 16)

Teaching

- **Instructor** at UNLV — Fall 2020–Spring 2021
  Physics for Scientists and Engineers Lab III (PHYS 182L)
- **Grader** at UHM — Fall 2013
  Introduction to Deductive Logic (PHIL 110)

Mentoring

- **Sudat Khan**, Ph.D. student (UNLV) — Fall 2024–present
  Reviewed funding applications, provided Ph.D.-program and advisor–advisee-relationship guidance, helped optimize use of NASA Advanced Supercomputing (NAS) Division resources
- **Hening Wu**, Ph.D. student (UNLV) — Fall 2024–present
  Consulted on code development and use of the multigroup nonrelativistic radiation transport module for Athena++ and use of NAS resources

Service

- **Reviewer** for the following journals — 2024
  Monthly Notices of the Royal Astronomical Society
- **Organizer** for UNLV Star & Planet Formation Group Meetings — Fall 2024–present
  Scheduled, hosted, and facilitated talks, visitors, and weekly discussions

Outreach

- **Lead Organizer**, Astronomy on Tap, Las Vegas — 2022–present
  Organized the following events:
  "Astronomy on Tap, Las Vegas XIII" (Mar. 27, 2025)
  "Astronomy on Tap, Las Vegas XII" (Oct. 17, 2024)
  "Astronomy on Tap, Las Vegas XI" (Mar. 5, 2024)
  "VAR! 100 Years of Variable Stars & Extragalactic Astronomy" (Oct. 3, 2023)
  "Journey to the Center of the Earth" (June 20, 2023)
  "Universe in a Box" (Mar. 2, 2023)
  "Backyard Telescopes" (May 26, 2022)
  "The Horrors of Black Holes" (Oct. 27, 2022)
- **Judge**, Beal Bank USA Southern Nevada Regional Science & Engineering Fair — 2022–2025
  Elementary, middle, and high school divisions
- **Event Supervisor**, Nevada Science Olympiad State Tournament, Division B (middle school) — 2022–2023
  Developed and administered written exams for the Solar System event
- **Exhibit**, Inquiry IV: The Art of Scientific Discovery (UNLV College of Sciences) — Apr. 2025
  Submitted a display piece entitled "Streaming Instability II"
- **Exhibit**, Inquiry III: The Art of Scientific Discovery (UNLV College of Sciences) — Oct. 2022
  Submitted a display piece entitled "Streaming Instability"
- **Assistant Organizer**, Neighborhood Star Party, Las Vegas, NV — 2022
  Helped Prof. Jason Steffen organize the event at Sonoma at Summerlin by Coleman HOA (Oct. 8)