Evan H. Anders

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Research Interests

Computational fluid dynamics and its applications to stellar interiors and atmospheres.
The effects of stratification, rotation, and magnetism on stellar convection.

Education

May 2020 **Ph.D.**, *University of Colorado – Boulder*, Astrophysical & Planetary Sciences.
Thesis title: "Fundamental Studies of Stratified Stellar Convection: Simulations and Theory"

Dec. 2017 **M.S.**, *University of Colorado – Boulder*, Astrophysical & Planetary Sciences.

May 2014 **B.S.**, *Whitworth University*, Physics.

Research Experience

Sept 2020- **Postdoctoral Fellow**, *CIERA, Northwestern University*, Evanston, IL.

Summer 2020 **Postdoctoral Researcher**, *Laboratory for Atmospheric and Space Physics*, Boulder, CO.

2015-2020 **Graduate Research Fellow/Assistant**, *University of Colorado – Boulder & Laboratory for Atmospheric and Space Physics*, Boulder, CO.

2013 **NSF Summer Undergraduate Research Fellow**, *LIGO*, Hanford, WA.

2012 **DOE Summer Undergraduate Laboratory Intern**, *PNNL*, Richland, WA.

Grants & Fellowships Awarded

2020-Present **CIERA Postdoctoral Fellowship**, Evanston, IL.
Fellowship covers salary and provides $15,000 yearly research stipend

2018-2020 **NASA Earth and Space Science Fellowship**, *$90,000*, Boulder, CO.
Fundamental Studies Into the Solar Convective Conundrum: Do Giant Cells Exist?
Grant Number 80NSSC18K1199

2015-2018 **NSO George Ellery Hale Graduate Fellowship**, Boulder, CO.
Fellowship covers tuition, fees, and graduate research stipend for three full years.
Fellowship overview available online at https://www.nso.edu/students/hale-fellowships/

Invited Presentations

2020 5. *Massive Star Variability and other fun with Dedalus*
CIERA, Northwestern University. CIERA Virtual Happy Hour. Nov. 20.

2020 4. *Entropy Rain and the Solar Convective Conundrum: Dilution and Compression of Individual Convective Downflows*
Nordita, Stockholm. "The Shifting Paradigm of Stellar Convection: From Mixing Length Concepts to Realistic Turbulence Modeling" workshop. Mar. 4.

2019 3. *Entropy Rain and the Solar Convective Conundrum: Dilution and Compression of Individual Convective Downflows*
Princeton University. Star Formation/ISM Rendezvous (SFIR) Seminar. Dec. 4.

2. *Entropy Rain: Dilution and Compression of Thermals in Stratified Domains*
University of Colorado – Boulder. Applied Math Geophysical and Astrophysical Fluid Dynamics (GAFD) Seminar. Oct. 1.

2018 1. *Predicting the Rossby Number in Stratified, Compressible Convection*
National Solar Observatory. Solar Focus Meeting. Dec. 7.

Publications List

2021 9. *Surface Manifestation of Stochastically Excited Internal Gravity Waves*
Lecoanet, D.; Cantiello, M.; **Anders, E.H.**; Quataert, E.; Couston, L.; Bouffard, M.; Favier, B.; and Le Bars, M., Under review at MNRAS.

8. *A Refined Model of Convectively-Driven Flicker in Kepler Light Curves*
Van Kooten, S.J.; **Anders, E.H.**; and Cranmer, S.R, Accepted for publication in ApJ.

7. *eigentools: A Python package for studying eigenvalueproblems with an emphasis on stability*
Oishi, J.S.; Burns, K.J.; Clark, S.E.; **Anders, E.H.**; Brown, B.P.; Vasil, G.M.; and Lecoanet, D, Under review at JOSS.

2020 6. *Convective dynamics with mixed temperature boundary conditions: why thermal relaxation matters and how to accelerate it*
Anders, E.H.; Vasil, G.M.; Brown, B.P.; and Korre, Lydia, Submitted to PRFluids.

2019 5. *Entropy Rain: Dilution and Compression of Thermals in Stratified Domains*
Anders, E.H.; Lecoanet, D.; and Brown, B.P., ApJ 884, 65.

4. *Predicting the Rossby Number in Convective Experiments*
Anders, E.H.; Manduca, C.M.; Brown, B.P.; Oishi, J.S.; Vasil, G.M., ApJ 872, 2.

2018 3. *Accelerated evolution of convective simulations*
Anders, E.H.; Brown, B.P; and Oishi, J. S., Physical Review Fluids 3, 083502.

2017 2. *Convective heat transport in stratified atmospheres at low and high Mach number*
Anders, E.H. and Brown, B.P., Physical Review Fluids 2, 083501.

2016 1. *The Advanced LIGO photon calibrators*
Karki, S.; Tuyenbayev, D.; Kandhasamy, S.; Abbott, B.P.; Abbott, T.D.; **Anders, E.H.**; Berliner, J.; Betzwieser, J.; Cahillane, C.; Canete, L.; Conley, C.; Daveloza, H.P.; De Lillo, N.; Gleason, J.R.; Goetz, E.; Izumi, K.; Kissel, J.S.; Mendell, G.; Quetschke, V; Rodruck, M.; Sachdev, S.; Sadecki, T.; Schwinberg, P.B.; Sottile, A.; Wade, M.; Weinstein, A.J., West, M.; and Savage, R.L., Review of Scientific Instruments 87, 114503.

Awards & Honors

2019 **AAS 233 Chambliss Graduate Student Poster Contest**, *Honorable Mention*, American Astronomical Society.

2016 **Comprehensive Exam II High Pass**, University of Colorado – Boulder.
Awarded for the defense of publication-quality research

2016 **Carl Hansen Graduate Fellowship**, *$1,000*, University of Colorado – Boulder.
Awarded to a graduate student studying stellar interiors

2014 **President's Award for Outstanding Academic Achievement**, Whitworth Univ..
Awarded to students graduating with 4.0 GPAs

Conferences

2020 **APS Division of Fluid Dynamics**, *Virtual Talk*, Chicago, IL.
Convection in the Full Sphere: Predicting the Rossby Number of Mean & Fluctuating Flows

American Astronomical Society's 235th Meeting, *Dissertation Talk*, Honolulu, HI.
Numerical Explorations in Stellar Convection

2019 **APS Division of Fluid Dynamics**, *Talk*, Seattle, WA.
Dilution and Compression of Thermals in Stratified Domains

Compressible Convection Conference, *Talk*, Newcastle Upon Tyne, UK.
Entropy Rain: Dilution and Compression of Turbulent Thermals in Stratified Domains

Stellar Hydro Days V, *Poster*, Exeter, UK.
Accelerating the evolution of atmospheric structure in convective simulations

American Astronomical Society's 233rd Meeting, *Poster*, Seattle, WA.
Accelerating the evolution of simulated convective atmospheres

2018 **APS Division of Fluid Dynamics**, *Talk*, Atlanta, GA.
Predicting the Rossby number in stratified, compressible convection

2017 **APS Division of Fluid Dynamics**, *Talk*, Denver, CO.
The effects of Mach number and rotation on heat transport in stratified convection

Compressible Convection Conference, *Talk*, Lyon, Fr.
Convective heat transport in stratified atmospheres at low and high Mach number

2016 **APS Division of Fluid Dynamics**, *Talk*, Portland, OR.
Sustained shear flows in stratified convection

AAS Solar Physics Division, *Poster*, Boulder, CO.
Boundary Layer Structure in Stratified Convection

Departmental Service

2020-2021 Member of CIERA K12 outreach taskforce

2019-2020 Member of newly-formed admissions setup committee

2018-2019 Voting member of graduate admissions committee

Graduate student member of exams committee

2017-2018 Voting member of graduate admissions committee

2016-2017 Voting member of hiring committee for director of Fiske Planetarium

Graduate student member of search committee for NSO/CU faculty appointment

Graduate student member of exams committee

2015-2016 Graduate student member of search committee for three-year NSO/CU appointment

Referee Service

2021 One JAS article

2020 One JAS article; one DIRAC grant

Professional Development and Teaching Experience

2019 **UCSC ISEE Professional Development Program**, *Design Team Leader*.
Led a team through a 4-month, 100-hour program that involved the design and teaching of a day-long inquiry activity on buoyancy.

2017 **Co-Instructor of Record**, *ASTR 2600: Introduction to Scientific Programming*, University of Colorado – Boulder, Boulder, CO.
Redesigned course from scratch, including lectures, homeworks, tutorials, and projects.

2017 **UCSC ISEE Professional Development Program**, *Participant*.
Designed and taught a day-long inquiry activity on exoplanet transits.

2016-2017 **Lead Graduate Teacher**, *Astrophysical & Planetary Sciences Department*, University of Colorado – Boulder, Boulder, CO.
Led video consultations with graduate teaching assistants and acted as bridge between my department and the university-level Graduate Teacher Program.

2014-2017 **Graduate Teaching Assistant for ASTR 1010**, *Four semesters*, University of Colorado – Boulder, Boulder, CO.
Fulfilled laboratory and lecture TA roles

Outreach

2016-2019 **CU STARs**, *Graduate Student Coordinator*, University of Colorado – Boulder, Boulder, CO.
CU STARs (CU Boulder Science, Technology, and Astronomy RecruitS) visits underserved schools across all of Colorado and gives high school students an opportunity to learn about and engage with space science. Graduate students serve as mentors to undergraduates, help design and improve outreach courses, and ensure outreach visits run smoothly.

2014-2017 **Sommers-Bausch Observatory Open House Host**, University of Colorado – Boulder, Boulder, CO.
Operated telescopes and answered questions from the public during free observing nights once or twice per semester.

References

Prof. Benjamin P. Brown
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Prof. Jeffrey S. Oishi
Dept. Physics and Astronomy
Bates College
Email: joishi@bates.edu

Prof. Daniel Lecoanet
Dept. Engineering Sciences & Applied Mathematics
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