

Evan H. Anders

NASA EARTH AND SPACE SCIENCE GRADUATE RESEARCH FELLOW

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| [evanhanders](#) | 🎓 Evan H. Anders

Education

University of Colorado – Boulder (CU Boulder)

PH.D. IN ASTROPHYSICAL AND PLANETARY SCIENCES

M.SC. IN ASTROPHYSICAL AND PLANETARY SCIENCES

Boulder, CO

Jan. 2017 - Spring 2020

Aug. 2014 - Dec. 2016

Whitworth University

B.S. IN PHYSICS; MINORS IN COMPUTER SCIENCE & MATH

Cumulative gpa 4.0/4.0

Spokane, WA

Aug. 2010 - May 2014

Research Experience

CU Boulder & LASP (Laboratory for Atmospheric and Space Physics)

GRADUATE RESEARCH FELLOW / ASSISTANT

Boulder, CO

May 2015 - Present

- Published four first-author peer-reviewed journal articles.
- Gained proficiency creating, running, and analyzing massively parallel simulations using the [Dedalus](#) pseudospectral framework.
- Studied stratified, compressible convection and learned that it transports heats similarly to Boussinesq convection regardless of Mach number.
- Found a parameter, the “Predictive Rossby Number,” which controls the importance of rotational constraint on flows in convective simulations.
- Found and verified a mechanism for fast-forwarding past the long thermal relaxation of convective simulations, saving up to an order of magnitude of CPU time.
- Derived a laminar theory for the propagation of buoyant vortex rings in stratified atmospheres, a potentially important heat transport mechanism in stellar envelopes.

LIGO (Laser Interferometer Gravitational-Wave Observatory)

NSF SURF FELLOW

Hanford, WA

Summer 2013

- Developed a generalized Python script for analyzing calibration lines in LIGO’s power spectrum.
- Determined error in LIGO’s measurements using known input forcings from LIGO’s photon calibration system.

PNNL (Pacific Northwest National Laboratory)

DOE SULI INTERN

Richland, WA

Summer 2012

- Optimized functions in GAI (Global Arrays in NumPy), a Python module which applies PNNL’s Global Arrays parallel programming toolkit to the NumPy Python module.
- Designed new parallel algorithms for the GAI ‘reduce’ function and developed the foundation of the GAI ‘master-slave’ interface.

Research Interests

Stellar Pulsations, Asteroseismology, Stellar Structure, Hydrodynamical Simulations

Awards & Honors

2018-	NASA Earth And Space Science Fellowship – Heliophysics , providing full research funding	NASA
2015-18	George Ellery Hale Graduate Fellowship , providing funding for three years of graduate research	CU Boulder/ NSO
2016	High Pass , for defense of publication-ready research on CU APS Comprehensive Exam II	CU Boulder
2016	Carl Hansen Graduate Fellowship , awarded to a graduate student studying stellar interiors	CU Boulder
2014	President’s Award for Outstanding Academic Achievement , for graduating with a 4.0 GPA	Whitworth U.
2013	Johnston-Hansen Foundation Scholarship , awarded to a Physics student	Whitworth U.
2012	Carl Hansen Pre-Engineering Scholarship , awarded to an Engineering student	Whitworth U.
2012	Math / Comp. Sci. Departmental Scholarship , awarded to a student in the Math / Comp. Sci. department	Whitworth U.
2011	Carl Hansen Pre-Engineering Scholarship , awarded to an Engineering student	Whitworth U.
2010	Mind & Heart Scholarship , awarded to an entering undergraduate to assist with four years of tuition	Whitworth U.

Publications

- **Anders, E.H.**; Lecoanet, D.; and Brown, B.P. 2019. “Entropy Rain: Dilution and Compression of Thermals in Stratified Domains.” [Accepted for publication in The Astrophysical Journal](#).
- **Anders, E.H.**; Manduca, C.M.; Brown, B.P.; Oishi, J.S.; Vasil, G.M. 2019. “Predicting the Rossby Number in Convective experiments.” [The Astrophysical Journal 872, 2.](#)
- **Anders, E.H.**; Brown, B.P; and Oishi, J. S. 2018. “Accelerated evolution of convective simulations.” [Physical Review Fluids 3, 083502.](#)
- **Anders, E.H.** and Brown, B.P. 2017. “Convective heat transport in stratified atmospheres at low and high Mach number.” [Physical Review Fluids 2, 083501.](#)
- Karki, S.; Tuyenbayev, D.; Kandhasamy, S.; Abbott, B.P.; Abbott, T.D.; **Anders, E.H.**, et al. 2016. “The Advanced LIGO photon calibrators.” [Review of scientific Instruments 87, 114503.](#)

Conference Talks & Posters

International Conferences

COMPRESSIBLE CONVECTION CONFERENCE · SEPT. 2019 Newcastle, UK
25-minute talk. “Entropy Rain: Dilution and Compression of Turbulent Thermals in Stratified Domains”

STELLAR HYDRO DAYS V · JUNE 2019 Exeter, UK
Speed talk & Poster. “Accelerating the evolution of atmospheric structure in convective simulations”

COMPRESSIBLE CONVECTION CONVERENCE · SEPT. 2017 Lyon, France
25-minute talk. “Convective heat transport in stratified atmospheres at low and high Mach number”

Domestic Conferences

APS DIVISION OF FLUID DYNAMICS · NOV. 2019	Seattle, WA
10-minute talk. "Dilution and Compression of Thermals in Stratified Domains"	
AMERICAN ASTRONOMICAL SOCIETY'S 233RD MEETING · JAN. 2019	Seattle, WA
Poster. "Accelerating the evolution of simulated convective atmospheres"	
APS DIVISION OF FLUID DYNAMICS · NOV. 2018	Atlanta, GA
10-minute talk. "Predicting the Rossby number in stratified, compressible convection"	
APS DIVISION OF FLUID DYNAMICS · NOV. 2017	Denver, CO
10-minute talk. "The effects of Mach number and rotation on heat transport in stratified convection"	
APS DIVISION OF FLUID DYNAMICS · NOV. 2016	Portland, OR
10-minute talk. "Sustained shear flows in stratified convection"	
AAS SOLAR PHYSICS DIVISION · JUNE 2016	Boulder, CO
Poster. "Boundary Layer Structure in Stratified Convection"	

Departmental Service

2018-19	Graduate admissions committee , Full member	CU Boulder
2018	Exam committee for CU APS Comprehensive Exam 1 , Graduate Student Member	CU Boulder
2017-18	Graduate admissions committee , Full member	CU Boulder
2016-17	Hiring committee for director of Fiske Planetarium , Full member	CU Boulder
2016	Exam committee for CU APS Comprehensive Exam 1 , Graduate Student Member	CU Boulder
2016	Graduate student search committee for NSO/CU faculty appointment , Chair	CU Boulder
2015	Graduate student search committee for three-year NSO/CU faculty appointment , Member	CU Boulder

Professional Development and Teaching Experience

UCSC ISEE Professional Development Program	Monterey, CA
DESIGN TEAM LEADER & PARTICIPANT	2017 & 2019

- Developed two day-long inquiry activities which taught incoming college freshmen about exoplanet transits (2017) and buoyancy (2019).
- Approached course design in a backwards-design framework with special attention to equity & inclusion and meaningful assessments.
- Led a team of three fellow graduate students through a roughly 100-hour, 4-month design process.

CU Boulder	Boulder, CO
GRADUATE PART-TIME INSTRUCTOR FOR ASTR 2600	Summer 2017

- Instructor of record (co-instructed with Jhett Bordwell) for an introductory course on Python programming in astrophysics.
- Developed half of a new course curriculum including lectures, tutorials, homework, and the final exam.

GRADUATE TEACHING ASSISTANT FOR ASTR 1010

*August 2014 - December
2015, Fall 2017*

- Delivered mini-lectures to familiarize students with lab material, held office hours, and helped staff the Astronomy Help Room (AHR).

LEAD GRADUATE TEACHER

August 2016-May 2017

- Led video consultations with Graduate Teaching Assistants
- Coordinated and ran orientation for new Teaching Assistants in the department.

Whitworth University

COMPUTATIONAL PHYSICS TEACHING ASSISTANT

Spokane, WA

PHYSICS TUTOR

Fall 2012 - May 2014

PHYSICS LAB TEACHING ASSISTANT

August 2011 - May 2012

Public Outreach

CU STARS (CU Boulder Science, Technology, and Astronomy RecruitS)

Boulder, CO

GRADUATE COORDINATOR

August 2016-May 2019

- Guided undergraduate students in designing hands-on lessons to teach high schoolers basic concepts in astronomy and astrophysics.
- Assisted in coordination and execution of outreach trips to underserved middle and high schools across Colorado.

CU Boulder Department of Astrophysical and Planetary Sciences

Boulder, CO

SOMMERS-BAUSCH OBSERVATORY OPEN HOUSE HOST

Fall 2014 - Spring 2017

- Operated telescopes and interfaced with the public during free observing nights once or twice per semester.