

Adam Michael Bauer

NSF Graduate Research Fellow

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adam-bauer-34

Champaign, IL, USA

RESEARCH INTERESTS

Climate economics and risk

I am interested in understanding how tail risks in the climate system impact climate policy and the economy.

The clean energy transition

I am interested in how to guide the transition from dirty to clean energy in the United States and abroad.

Mathematical modeling

I enjoy rigorously construct models using a combination of theory, data, and simulations.

EDUCATION

Ph. D. Physics

University of Illinois at Urbana Champaign 2020 –

- Currently enrolled in the physics doctoral program.
- Cumulative GPA: 4.000

B.S. Physics & B.S. Mathematics

University of Arizona 2016 – 2020

- Minor: Astronomy and Astrophysics
- Cumulative GPA: 3.972 (Summa Cum Laude)
- Honors Thesis: *On the Behavior of Null Rays in Spherically Symmetric Spacetimes*

SOURCES OF FUNDING

Graduate Research Fellowship

National Science Foundation \$102k Aug 2022 – Aug 2025

RESEARCH POSITIONS HELD

NSF Graduate Research Fellow

University of Illinois at Urbana Champaign Aug 2022 – present Urbana, IL

- Developed a model for land-atmosphere interactions that highlights the nonlinear impact of soil moisture on heat waves.
- Carried out statistical analysis of climate reanalysis data to understand the drivers of continental heat waves.
- **Outcomes:** A first-author paper submitted for publication; presentation at the American Geophysical Union Fall Meeting.

Staff Associate II in the Faculty of Business

Columbia Business School Sep 2022 – Dec 2022 New York, NY

- Led development of the Carbon Asset Pricing model – AR6 (CAP6) written in Python and Julia.
- Distilled and interpreted IPCC AR6 data into workable CAP6 model components.
- Calibrated CAP6 with the most up-to-date, empirically-driven estimates of discount rates and technological growth rates.
- Wrote Jupyter notebooks to analyze model output and its implications for carbon dioxide emissions mitigation policy.
- **Outcomes:** A first-author *CESifo* working paper; presentations at the Columbia University Sustainable Development Seminar and at the American Geophysical Union Fall Meeting.

Graduate Research Assistant

University of Illinois at Urbana Champaign Jan 2021 – Jul 2022 Urbana, IL

- Performed analytic calculations of accretion flow properties in a generic theory of gravity.
- Built a ray tracing code to calculate the intensity profile of a black hole accretion disk in a modified theory of gravity.
- Investigated the feasibility of testing general relativity using the Event Horizon Telescope.
- **Outcome:** A first-author publication in *The Astrophysical Journal*.

NSF Research Experience for Undergraduates Intern

University of Arizona May 2019 – Aug 2019 Tucson, AZ

- Developed mathematical techniques and proofs to rigorously construct solutions to a dynamical system.
- **Outcome:** A first-author publication in the *SIAM Journal on Applied Dynamical Systems*.

NASA Space Grant Research Intern

University of Arizona Sep 2018 – May 2019 Tucson, AZ

- Developed Python and IDL code to reduce and analyze observational and spectroscopic telescope data.
- Processed telescope data to be assimilated into a large-scale gravitational lensing model.
- **Outcomes:** Two publications in *The Astrophysical Journal*.

TEACHING EXPERIENCE

Graduate Teaching Assistant

Course: *PHYS 102 – College Physics: E&M and Modern*

🏛️ University of Illinois Urbana Champaign 📅 Aug 2020 – Dec 2020 📍 Urbana, IL

- Made the **List of Teachers Ranked as Excellent By Their Students**.
- Led discussion sections for introductory physics course designed for non-physics majors.
- Prepared small lectures and held extra exam review sessions.

Undergraduate Teaching Assistant

Course: *PHYS 103 – Introductory Physics II*

🏛️ University of Arizona 📅 Aug 2019 – Dec 2019 📍 Tucson, AZ

- Oversaw problem solving sessions bi-weekly where I walked students through exam level practice problems.
- Held office hours to help students with homework and exam preparation.

PEER-REVIEWED PUBLICATIONS

SUBMITTED

A. M. Bauer, L. R. Vargas Zeppetello, C. Proistosescu. Soil moisture modulation of midlatitude heat waves. *In review for Nature Geoscience*, 2023.

PUBLISHED

M. Pascale, B. L. Frye, L. Dai, N. Foo, Y. Qin, R. Leimbach, **A. M. Bauer**, E. Merlin, D. Coe, J. Diego, H. Yan, A. Zitrin, S. H. Cohen, C. Conzelmann, H. Dole, K. Harrington, R. A. Jansen, P. Kamiński, R. A. Windhorst, M. Yun. Possible ongoing merger discovered by photometry and spectroscopy in the field of the galaxy cluster PLCK G165.7+67.0. *The Astrophysical Journal*, 932(85), 2022.

A. M. Bauer, A. Cárdenas-Avendaño, C. F. Gammie, N. Yunes. Spherical accretion in alternative theories of gravity. *The Astrophysical Journal*, 925(2), 2022.

A. Bauer, P. Carter. Existence of transonic solutions in the stellar wind problem with viscosity and heat conduction. *SIAM Journal on Applied Dynamical Systems*, 20(1), 2021.

B. L. Frye, M. Pascale, Y. Qin, A. Zitrin, J. Diego, G. Walth, H. Yan, C. J. Conzelmann, M. Alpaslan, **A. Bauer**, L. Busoni, D. Coe, S. H. Cohen, M. Dole, M. Donahue, I. Georgiev, R. A. Jansen, M. Limousin, R. Livermore, D. Norman, S. Rabien, R. A. Windhorst. PLCK G165.7+67.0: Analysis of a massive lensing cluster in a Hubble Space Telescope census of submillimeter giant arcs selected using Planck/Herschel. *The Astrophysical Journal*, 871(51), 2019.

WORKING PAPERS AND OTHER ACADEMIC WRITINGS

A. M. Bauer, C. Proistosescu, G. Wagner. Carbon Dioxide as a Risky Asset. *CESifo Working Paper No. 10278*, 2023.

A. M. Bauer, D. C. Lafferty, K. Schwarzwald, C. Proistosescu, G. Wagner. Comments on "Principles for Climate-Related Financial Risk Management for Large Financial Institutions". Docket No. OP-1793, The Federal Reserve (3 February 2023).

A. Bauer, B. Frye. THELI Reduction Software: A write up for inexperienced data reducers. Posted to THELI forums & Cloudynights.com, 2019. (Theli Forums Link.) (Cloudynights Link.)

TALKS AND PRESENTATIONS

(Upcoming) *Financial modeling of climate risk supports stringent mitigation action

Association of Environmental and Resource Economists Summer Meeting 📅 June 2023 📍 Portland, ME

(Upcoming) *Carbon dioxide as a risky asset

Center for Social and Environmental Futures 📅 April 2023 📍 Boulder, CO

Financial modeling of climate risk supports stringent mitigation action

American Geophysical Union Fall Meeting 📅 December 2022 📍 Chicago, IL

The role of local thermodynamics in midlatitude heat waves

American Geophysical Union Fall Meeting (Poster) 📅 December 2022 📍 Chicago, IL

*Financial modeling of climate risk implies stringent mitigation action

Columbia University Sustainable Development Seminar 📅 November 2022 📍 New York, NY

*Exploring the controls on temperature extremes in the midlatitudes

UC San Diego Climate Journal Club 📅 May 2022 📍 San Diego, CA

Characterization and Analysis of Massive Space Telescopes

Arizona Space Grant Symposium 📅 Apr 2019 📍 Tempe, AZ

Measuring the Dynamical Masses of Sub-millimeter Selected Gravitational Lenses

Steward Observatory Internal Symposium 📅 Sep 2018 📍 Tucson, AZ

Measuring Masses of Galaxy Clusters

Galileo Circle Scholarship Banquet (Poster) 📅 Apr 2018 📍 Tucson, AZ

(* implies an invited talk.)

ACADEMIC HONORS AND ACHIEVEMENTS

NSF Graduate Research Fellowship Program

On tenure – 2022-2025

List of Teachers Ranked as Excellent by Their Students

UIUC Department of Physics – 2020

NSF Graduate Research Fellowship Program

Honorable Mention – 2020

The Excellence in Undergraduate Research Award

UArizona College of Science – 2020

Phi Beta Kappa Society

Alpha of Arizona Chapter – 2018

Galileo Circle Scholar

2018 – 2019

Weaver Research Award

UArizona Department of Physics, 2017 – 2018

Highest Academic Achievement

UArizona, 2016 – 2017, 2018 – 2019, & 2019 – 2020

SCHOLARSHIPS AWARDED

Glenn C. Purviance Scholarship

UArizona Department of Physics, 2019 – 2020

Grogan Scholarship

UArizona Department of Mathematics, 2019 – 2020

Gregson Award

UArizona Department of Physics, 2019 – 2020

Douglass/Langadas Scholarship

UArizona Department of Astronomy, 2018 – 2019

TECHNICAL STRENGTHS

Strong:

Python, Mathematica, Jupyter notebooks, L^AT_EX

Intermediate:

Julia

Beginner:

C/C++, IDL, R

EXTRA CURRICULAR

Graduate Peer Mentor

University of Illinois Urbana Champaign (Department of Physics)

Undergraduate-Graduate Peer Mentor

University of Illinois Urbana Champaign (Department of Atmospheric Sciences)

Grad On-Call

University of Illinois Urbana Champaign

Undergraduate Peer Mentor

University of Arizona

Physics Discovery Team Member & Project Developer

University of Arizona