David C. Lafferty

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Education

University of Illinois Urbana-Champaign *Jan. 2019 – May 2024*
Ph.D in Atmospheric Science

Ruprecht-Karls-Universität Heidelberg *Sep. 2016 – Oct. 2018*
M.Sc. in Physics

University of Glasgow *Sep. 2012 – May 2016*
B.Sc. in Physics

Experience

Cornell University *Sep 2024 – Present*
Postdoctoral Associate, Department of Biological & Environmental Engineering

- Advisor: Vivek Srikrishnan
- Research Topics: power systems vulnerability to climate change, machine learning for environmental model calibration, climate risk

Amazon *May 2024 – July 2024*
Research Scientist, World Wide Sustainability

- Advisor: Maggie Zarekarizi
- Research topics: climate risk

University of Illinois Urbana-Champaign *Jan 2019 – May 2024*
Graduate Research Assistant, Department of Climate, Meteorology, & Atmospheric Sciences

- Advisor: Ryan Sriver
- Research topics: climate risk, coupled climate-environmental systems uncertainty analysis

Lawrence Livermore National Laboratory *May – Aug 2022*
Graduate Summer Student Intern, Climate Sciences

- Advisor: Hsi-Yen Ma
- Research topic: atmospheric feature tracking for precipitation extremes

Ruprecht-Karls-Universität Heidelberg *Nov 2017 – Oct 2018*
Graduate Research Assistant, Institute for Theoretical Physics

- Advisor: Alexander Rothkopf
- Research topic: heavy-ion collision phenomenology

Peer-Reviewed Publications

6. (*in prep.*) **Lafferty, D.C.**, Grogan, D.S., Zuidema, S., Haqiqi, I., Alipour, A., Sriver, R.L., Keller, K., Combined climate and hydrologic uncertainties shape projections of future soil moisture in the eastern United States. *Earth's Future* (2025)

5. Wu, WY., Ma, HS., **Lafferty, D.C.**, Feng, Z., Ullrich, P., Tang, Q., Golaz, JC., Galea, D., Lee, HH., Assessment of Storm-Associated Precipitation and its Extremes using Observations and Climate Model Short-Range Hindcasts. *JGR Atmospheres* 129, e2023JD039697 (2024) [10.1029/2023JD039697]

4. **Lafferty, D.C.** & Sriver, R.L., Downscaling and bias-correction contribute considerable uncertainty to local climate projections in CMIP6. *npj Clim. Atmos. Sci.* 6, 158 (2023). [10.1038/s41612-023-00486-0]

3. Srikrishnan, V., **Lafferty, D.C.**, Wong, T.E., Lamontagne, J.R., Quinn, J.D., Sharma, S., Nusrat, J.M., Herman, J.D., Sriver, R.L., Morris, J.F., Lee, B.S., Uncertainty analysis in multi-sector systems: Considerations for risk analysis, projection, and planning for complex systems. *Earth's Future* 10, e2021EF002644 (2022). [10.1029/2021EF002644]

2. **Lafferty, D.C.**, Sriver, R.L., Haqiqi, I., Hertel, T.W., Keller, K., Nicholas, R.E., Statistically bias-corrected and downscaled climate models underestimate the adverse effects of extreme heat on U.S. maize yields. *Commun Earth Environ* 2, 196 (2021). [10.1038/s43247-021-00266-9]

1. **Lafferty, D.** & Rothkopf, A., Improved Gauss law model and in-medium heavy quarkonium at finite density and velocity, *Phys. Rev. D* 101, 056010 (2020). [10.1103/PhysRevD.101.056010]

Selected Presentations

* denotes oral presentation; † denotes poster presentation

12. †Combined climate and hydrologic uncertainties shape projections of future soil moisture extremes, *AGU Fall Meeting*, Washington, DC. (2024) [Poster]

11. *Combined climate and hydrologic uncertainties shape projections of future soil moisture across the United States, *Cornell Energy Water & Resources Systems Seminar*, Ithaca, NY. (2024) [Slides]

10. *Downscaling and bias-correction contribute considerable uncertainty to local climate projections in CMIP6, *AGU Fall Meeting*, San Francisco, CA. (2023) [Slides]

9. †Pre-calibrating a simple soil moisture model to facilitate uncertainty analysis, *AGU Fall Meeting*, San Francisco, CA. (2023) [Poster]

8. †Do downscaling and bias-correction alter the uncertainty decomposition of climate projections? *AGU Fall Meeting*, San Francisco, CA. (2023) [Poster]

7. †Diagnosing the importance of climate uncertainty for sectoral analyses, *MultiSector Dynamics Workshop*, Davis, CA. (2023) [Poster]

6. *(invited)* *The challenges of generating and using local-scale climate information, *Biological & Environmental Engineering Department Seminar, Cornell University*, Ithaca, NY. (2023) [Slides]

5. *(invited)* *Uncertainty in Natural Systems Components of MultiSector Dynamics Systems, *Workshop on Uncertainty Characterization & Quantification in MultiSector Dynamics Research*, Snowmass, CO. (2023)

4. †Downscaling and bias-correction contribute considerable uncertainty to local climate projections in CMIP6, *Interdisciplinary Workshop on Weather and Climate Extremes*, Clemson, SC. (2023) [Poster]

3. *Uncertainty in the Representation of Climate Extremes Across Downscaled and Bias-Corrected CMIP Model Ensembles, *AGU Fall Meeting*, Chicago, IL. (2022) [Slides]

2. *Characterizing uncertainties in the crop switching decision problem for U.S. agriculture, *AGU Fall Meeting*, Virtual. (2021) [Recording]

1. †Statistically bias-corrected and downscaled climate models underestimate the adverse effects of extreme heat on U.S. maize yields, *AGU Fall Meeting*, Virtual. (2021) [Poster]

Service

- **Mentor** to Climatematch Academy students, 2024
- **Board Member** of the MultiSector Dynamics Working Group on Uncertainty Quantification and Scenario Development, 2021-2023
- **Mentor** to first year graduate students in the Department of Atmospheric Sciences at the University of Illinois, 2020-2023
- **Secretary** of the Department of Atmospheric Sciences Graduate Student Organization, 2021-2022
- **Co-Chair** of the Midwest Student Conference on Atmospheric Research at the University of Illinois, 2020

Awards & Honors

- Ogura Outstanding Graduate Student Research Paper Award *2024*
- AGU Outstanding Student Presentation Award *2023*
- Best Graduate Student Poster, Midwest Student Conference on Atmospheric Research *2021*
- University of Illinois Liberal Arts & Sciences COVID-19 Impact Award *2020*
- *(team)* Award for Advancing Reproducible Geospatial Research *2019*
  UCGIS-CyberGIS Center at University of Illinois Urbana-Champaign
- DAAD Study Scholarship for Graduates of All Disciplines *2016 – 2018*

Skills

Languages: Python (numpy, pandas, xarray, dask, JAX, pyMC), R, Julia, Git, Mathematica, LaTeX
Expertise: Climate science, uncertainty quantification, risk analysis, Bayesian statistics, differentiable modeling, data visualization, science communication, technical writing