

Fiaz Ahmed

Math Sciences Building 7235, University of California, Los Angeles, CA 90095

✉ fiaz@ucla.edu | 🏠 www.fahmed.net

Education

Ph.D., Atmospheric Sciences Texas A&M University Advisor: Courtney Schumacher	2016
B.Tech., Chemical Engineering National Institute of Technology Karnataka	2011

Professional Experience

Assistant Researcher UCLA Department of Atmospheric and Oceanic Sciences University of California, Los Angeles	2022-Present
Assistant Project Scientist UCLA Department of Atmospheric and Oceanic Sciences University of California, Los Angeles	2019-2022
Postdoctoral Scholar UCLA Department of Atmospheric and Oceanic Sciences University of California, Los Angeles Advisor: J. David Neelin	2016-2019
Graduate Research Assistant Department of Atmospheric Sciences Texas A&M University	2012-2016

Publications

19. Schiro, K., H. Su, **F. Ahmed**, N. Dai, C. Singer, P. Gentine, G. Elsaesser, J. Jiang and J.D. Neelin, 2022: Model spread in tropical low cloud feedback tied to overturning circulation response to warming. *Nat. Comm.* 13, 7119, doi: [10.1038/s41467-022-34787-4](https://doi.org/10.1038/s41467-022-34787-4)
18. Wolding, B., S.W. Powell, **F. Ahmed**, J. Dias, M. Gehne, G. Kiladis and J.D. Neelin, 2022: Tropical Thermodynamic-Convection Coupling in Observations and Reanalyses. *J. Atmos. Sci.*, 79(7), 1781-1803, doi: [JAS-D-21-0256.1](https://doi.org/10.1175/JAS-D-21-0256.1)
17. Neelin, J.D., C. Martinez-Villalobos, S. Stechmann, **F. Ahmed**, G. Chen, Y. Kuo and G. Lenderink, 2022: Precipitation extremes and water vapor: Relationships in current climate and implications for climate change. *Curr. Clim. Change Rep.*, 8, 17–33, doi: [s40641-021-00177-z](https://doi.org/10.1007/s40641-021-00177-z)
16. Mayta, V., Adames, Á.F. and **F. Ahmed**, 2022: Westward-propagating Moisture Mode over the Tropical Western Hemisphere. *Geophys. Res. Lett.*, 49, doi: [e2022GL097799](https://doi.org/10.1029/2022GL097799)
15. Dulgerov, L., **F. Ahmed** and J.D. Neelin, 2022: Extreme Tropical Precipitation Clusters show strong increases in frequency under global warming in CMIP6 models. *Geophys. Res. Lett.*, doi: [e2021GL096037](https://doi.org/10.1029/2021GL096037)
14. **Ahmed F.**, 2021: The MJO on the equatorial beta-plane: an eastward propagating Rossby wave induced by meridional moisture advection. *J. Atmos. Sci.*, 78(10), 3115-3135, doi: [10.1175/JAS-D-21-0071.1](https://doi.org/10.1175/JAS-D-21-0071.1)

[†]student advisee

13. **Ahmed F.** and J.D. Neelin, 2021: A process-oriented diagnostic to assess precipitation-thermodynamic relations and application to CMIP6 models. *Geophys. Res. Lett.*, 48, doi: [e2021GL094108](https://doi.org/10.1029/2021GL094108)
12. **Ahmed F.** and J.D. Neelin, 2021: Protected convection as a metric of dry air influence on precipitation. *J. Clim.*, 34(10), 3821-3838, doi: [10.1175/JCLI-D-20-0384.1](https://doi.org/10.1175/JCLI-D-20-0384.1)
11. Adames, Á.F., S.W. Powell, **F. Ahmed**, V. Mayta and J.D. Neelin, 2021: Tropical Precipitation Evolution in a Buoyancy-Budget Framework. *J. Atmos. Sci.*, 78(2), 509-528, doi: [10.1175/JAS-D-20-0074.1](https://doi.org/10.1175/JAS-D-20-0074.1)
10. **Ahmed F.**, J.D. Neelin and Á.F. Adames: Quasi-Equilibrium and Weak Temperature Gradient Balances in an Equatorial Beta-plane Model, 2021: *J. Atmos. Sci.*, 78(1), 209-227, doi: [10.1175/JAS-D-20-0184.1](https://doi.org/10.1175/JAS-D-20-0184.1)
9. **Ahmed F.**, Á.F. Adames and J.D. Neelin, 2020: Deep convective adjustment of temperature and moisture. *J. Atmos. Sci.*, 77, 2163–2186, doi: [10.1175/JAS-D-19-0227.1](https://doi.org/10.1175/JAS-D-19-0227.1)
8. Wolding B., J. Dias, G. Kiladis, **F. Ahmed**, S. Powell, E. Maloney and M. Branson, 2020: Interactions Between Moisture and Tropical Convection. Part I: The Co-evolution of Moisture and Convection. *J. Atmos. Sci.*, 77, 1783–1799, doi: [10.1175/JAS-D-19-0225.1](https://doi.org/10.1175/JAS-D-19-0225.1)
7. **Ahmed, F.** and J.D. Neelin, 2019: Explaining scales and statistics of tropical precipitation clusters with a stochastic model. *J. Atmos. Sci.*, 76, 3063–3087, doi: [10.1175/JAS-D-18-0368.1](https://doi.org/10.1175/JAS-D-18-0368.1)
6. **Ahmed, F.** and C. Schumacher, 2018: Spectral signatures of moisture-convection feedbacks over the Indian Ocean. *J. Atmos. Sci.*, 75, 1995-2015, doi: [10.1175/JAS-D-17-0138.1](https://doi.org/10.1175/JAS-D-17-0138.1)
5. **Ahmed, F.** and J.D. Neelin, 2018: Reverse engineering the tropical precipitation-buoyancy relationship. *J. Atmos. Sci.*, 75, 1587-1608, doi: [10.1175/JAS-D-17-0333.1](https://doi.org/10.1175/JAS-D-17-0333.1)
4. Schiro, K.A., **F. Ahmed**, S.E. Giangrande and J.D. Neelin, 2018: GoAmazon2014/5 campaign points to deep-inflow approach to deep convection across scales. *Proc. Natl. Acad. Sci.*, 115 (18) 4577-4582, doi: [10.1073/pnas.1719842115](https://doi.org/10.1073/pnas.1719842115)
3. **Ahmed, F.** and C. Schumacher, 2017: Geographical differences in the tropical precipitation-moisture relationship and rain intensity onset. *Geophys. Res. Lett.*, 44, 1114-1122, doi: [10.1002/2016GL071980](https://doi.org/10.1002/2016GL071980)
2. **Ahmed, F.**, C. Schumacher, Z. Feng and S. Hagos, 2016: A retrieval of tropical latent heating using the 3D structure of precipitation features. *J. Appl. Meteor. Climatol.*, 55, 1965-1982, doi: [10.1175/JAMC-D-15-0038.1](https://doi.org/10.1175/JAMC-D-15-0038.1)
1. **Ahmed, F.** and C. Schumacher, 2015: Convective and stratiform components of the precipitation-moisture relationship. *Geophys. Res. Lett.*, 42, 10, 453-10, 462, doi: [10.1002/2015GL066957](https://doi.org/10.1002/2015GL066957)

Manuscripts in Review

2. **Ahmed, F.**, J.D. Neelin, S. Hill, K. Schiro, H. Su : A process model for ITCZ narrowing under warming highlights clear-sky water vapor feedbacks and gross moist stability changes in AMIP models. *J. Clim.*, Submitted September 2022.
1. Beucler, T., M.S. Pritchard , J. Yuval, A. Gupta, L. Peng, S. Rasp, **F. Ahmed**, P.A. O'Gorman, J.D. Neelin, N. Lutsko and P. Gentine : Climate-Invariant Machine Learning. *Proc. Natl. Acad. Sci.*, Submitted December 2021. [arXiv:2112.08440 \[cs.LG\]](https://arxiv.org/abs/2112.08440)

Funded Grants

- *Thermodynamic and Non-thermodynamic Controls on Deep Convection in ARM Observations.* Agency: DOE; Role: **Lead PI**; Amount: \$739,851; Period: 08/2022 - 07/2025
- *Collaborative Research: Characterizing interactions between tropical deep convection and the environment using a buoyancy framework.* Agency: NSF; Role: **PI**; Amount: \$163,769; Period: 09/2022 - 08/2026
- *Extreme Precipitation Features and their Large-Scale Environments.* Agency: DOE; Role: **Co-PI** (PI: J.D. Neelin); Amount: \$897,156; Period: 09/2022 - 08/2025
- *An Open Framework for Process-Oriented Diagnostics of Earth System Models*
Agency: NOAA; Role: **Co-I** (PI: J.D. Neelin); Amount: \$608,010; Period: 09/2021 - 08/2024
- *The Role of Deep Convection and Large-scale Circulation in Driving Model Spread in Low Cloud Feedback and Equilibrium Climate Sensitivity.* Agency: DOE; Role: **Co-I** (PI: H. Su); Amount: \$769,708; Period: 10/2020 - 09/2023

Awards

- *Richard P. and Linda S. Turco Exceptional Research Publication Award,*
University of California, Los Angeles 2018
- *Summer Fellowship,* Pacific Northwest National Laboratory 2013
- *College of Geosciences Merit Scholarship,* Texas A&M University 2012
- *Summer Research Fellowship,* Indian Academy of Sciences 2010

Invited Talks

- Monash University, Melbourne, Australia: *Climate Seminar* 2022
- Yale University: *Atmosphere and Ocean Climate Dynamics Seminar* 2021
- Jet Propulsion Laboratory: *Science Visitor and Colloquium Program* 2021
- American Geophysical Union: *Session on MJO and Tropical waves* 2021
- Japan Geophysical Union Meeting: *Session on large-scale moisture and organized cloud systems* 2021
- SIAM Conference on Mathematics for Planet Earth: *Session on moisture-driven flows, clouds, and convection* 2020
- University of California, Davis: *Atmospheric Science Seminar* 2020
- Pacific Northwest National Laboratory 2020
- University of California, Santa Barbara: *Climate Seminar* 2020
- University of California, Los Angeles: *Departmental seminar in Atmospheric & Oceanic Sciences* 2019
- ARM/ASR Science Team Meeting: *Plenary Session* 2015

Selected Conference Talks

- “*The MJO as an eastward propagating Rossby wave induced by meridional moisture advection*”. 23rd Conference on Atmospheric and Oceanic Fluid Dynamics. Breckenridge, Colorado, June 2022
- “*The Moisture-Temperature Ratio and Dominant Balances in Tropical Waves*”. 34th Conference on Hurricanes and Tropical Meteorology Virtual Meeting. April 2021
- “*Consequences of the Precipitation-Buoyancy Framework: Convective Adjustment Timescales and Protected Convection*”. 100th AGU Fall Meeting, San Francisco, California, December 2019.
- “*Organization of Precipitation Clusters in a Simple Stochastic Model*”. 99th AMS Annual Meeting, Phoenix, Arizona, January 2019.
- “*The Tropical Precipitation-Buoyancy Relationship: Insights From Forward and Reverse-engineered Solutions, and Applicability to Climate Model Diagnostics*”. 2018 CFMIP Meeting on Clouds, Precipitation, Circulation, and Climate Sensitivity, Boulder, Colorado, October 2018.
- “*A Column Water Vapor Based View of the MJO During DYNAMO*”. 32nd Conference on Hurricanes and Tropical Meteorology, San Juan, Puerto Rico, April 2016.
- “*The Convective and Stratiform Components of the Precipitation - Water Vapor Relationship*”. AGU Fall Meeting, San Francisco, California, December 2015.
- “*CAM Heating Experiments and the Role of the Background Atmosphere in MJO Propagation*”. 95th AMS Annual Meeting, Phoenix, Arizona. January 2015.
- “*Diabatic Heating and Divergence Profiles from SMART-R during DYNAMO*”. 31st Conference on Hurricanes and Tropical Meteorology, San Diego, California, March 2014.
- “*Diabatic Heating and Divergence Profiles from SMART-R.*” 1st Pan-GASS Conference, Boulder, Colorado. September 2012

Selected Conference Presentations

- Emmenegger[†], T., J.D. Neelin, **F. Ahmed**, C. Zhang, C. Tao, and S. Xie: *Buoyancy-Based Diagnostics of Precipitation Onset Bias in CMIP6 Models at Tropical ARM Sites*. 2022 AMS Annual Meeting.
- Dulguerov[†], L., **F. Ahmed** and J.D. Neelin: *Precipitation clusters in the tropics exhibit increases in extreme size and intensity under global warming in CMIP6 models*. 2021 AGU Fall Meeting.
- **Ahmed, F.** and J.D. Neelin (2019): *Extreme rainfall in spatial precipitation clusters: observations and a simple stochastic prototype*. 12th International Precipitation Conference 2019, Irvine, California.
- Neelin, J.D., **F. Ahmed**, K. Schiro, S. Giangrande, Y.-H. Kuo, R. Padulles, J. F. Turk, M. de la Torre Juarez and C.O. Ao, (2018): *Precipitation-buoyancy relationships and dependence on free-tropospheric moisture: reverse-engineering and forward estimates of deep-inflow influence functions*. 2018 AGU Fall Meeting, Washington, D.C.
- Neelin, J. D., Y.-H. Kuo, **F. Ahmed**, C. Martinez-Villalobos, X. Jiang, E. D. Maloney, A. Gettelman and Y. Ming (2018): *The dialogue between fast-process diagnostics and stochastic process models for precipitation*. 2018 AGU Fall Meeting, Washington, D.C.

[†]student advisee

- Schiro, K., J.D. Neelin, H. Su, **F. Ahmed**, Y. Wang, B. Langenbrunner, S. Giangrande and J.H. Jiang (2018): *Deep convection in the tropics across scales: observations and directions toward improved parameterization*. 2018 AGU Fall Meeting, Washington, D.C.
- Schiro, K., **F. Ahmed** and J.D. Neelin, 2018: *Deep-inflow approach to mesoscale-organized and unorganized deep convection and the likely role of coherent structures*. APS March Meeting 2018, Los Angeles, California
- **Ahmed, F.** and J.D. Neelin (2017): *The tropical precipitation-buoyancy relationship and the vertical thermodynamic structure*. 2017 AGU Fall Meeting, New Orleans, Louisiana.
- **Ahmed, F.** and C. Schumacher (2017): *Geographical differences in the tropical precipitation-moisture relationship and rain intensity onset*. 2017 AMS Annual Meeting, Seattle, Washington.
- Mallinson[†], H., C. Schumacher and **F. Ahmed** (2015): *Vertical motions in convective clouds over Darwin, Australia*. 2015 AGU Fall Meeting, San Francisco, California.
- **Ahmed, F.**, C.L. Lappen and C. Schumacher (2013): *Moisture convergence experiments in CAM*. MJO Field Data and Science Workshop, Waimea, Hawaii.

Teaching and Mentorship

- Instructor: Weather and Climate Laboratory Spring 2013
- Guest Lecturer: Weather and Climate Fall 2013, Spring 2016
- Guest Lecturer: Tropical Meteorology Fall 2016
- **Co-supervised students:**
 - Leilani Dulgerov: “*Tropical precipitation cluster distributions in CMIP6 models*” 2020-2021
 - Holly Mallinson: “*Vertical motions in convective clouds over Darwin, Australia*” 2015
 - Katlin Rutt: “*Temporal and spatial variability of tropical rain rates over Kwajalein Atoll*” 2014

Professional Development

- *National Energy Research Scientific Computing Center (NERSC) AI for Science Bootcamp* 2022
- *Extreme Science and Engineering Discovery Environment (XSEDE) Big Data Workshop*, University of California, Los Angeles 2019

Service

- Lead convener for session on *Process-oriented Diagnostics for Weather and Climate Models*. AGU Fall Meeting 2021.
- Member, NOAA MAPP Modeling Diagnostics Task Force ([MDTF](#)), 2020-Present.
- Reviewer: *Nature Climate Change*, *Climate Dynamics*, *Geophysical Research Letters*, *Geoscientific Model Development*, *Journal of Advances in Modeling Earth Systems*, *Journal of Fluid Mechanics*, *Journal of Climate*, *Journal of Hydrometeorology*, *Journal of the Atmospheric Sciences*, *Journal of Geophysical Research - Atmospheres*, and *Journal of Applied Meteorology and Climatology*.
- Chair, Invited Speaker Committee: Department of Atmospheric Science Graduate Student Council, Texas A&M University, 2013-2014