

Education

Princeton University, Princeton, NJ

Ph.D., Atmospheric and Oceanic Sciences

Advisor: Yi Ming

Sept. 2019

Cornell University, Ithaca, NY

B.S., Engineering Physics; Honors in Research; magna cum laude

Thesis Advisor: Natalie Mahowald

May 2014

Experience

Allen Institute for Artificial Intelligence, Princeton, NJ

Senior Research Scientist

Jan. 2023 - Present

- Demonstrated that the Ai2 Climate Emulator can be coupled to a slab ocean model and trained to emulate the equilibrium climate response to changes in the concentration of carbon dioxide.
- Participated in the development of the Ai2 Climate Emulator (ACE) through the design and execution of custom reference simulations with physics-based models, data-processing pipelines, software contributions, and scientific experimentation.
- Led work to port the cloud-based end-to-end corrective ML workflow to run on HPC systems.

Allen Institute for Artificial Intelligence, Princeton, NJ

Research Scientist

Sept. 2021 - Dec. 2022

- Demonstrated that corrective ML could be used to improve the coarse resolution of land precipitation and surface temperature in multi-year simulations in multiple climates.
- Advanced corrective ML parameterization via coarse-graining by enabling learning and overriding the surface radiative fluxes and accurately applying corrections to the horizontal winds.
- Built an environment to run multi-node Python-wrapped FV3GFS simulations on HPC systems.

Vulcan Inc., Princeton, NJ

Software Engineer for Climate Model Development

Aug. 2019 - Aug. 2021

- Implemented the ability to compute and save online coarse-grained diagnostics and restart files in GFDL's SHIELD model, facilitating global storm resolving model research, including Vulcan's.
- Ran multiple global 3-km resolution simulations with online-coarsened outputs for machine learning model training and testing.
- Contributed to the development of the infrastructure to run a Python-wrapped version of NOAA's FV3GFS model for machine learning experiments, in which output from the 3-km runs was used to train ML models to improve coarse-resolution simulations.

Princeton University, Program in Atmospheric and Oceanic Sciences, Princeton, NJ

Research Assistant

Sept. 2014 - Aug. 2019

- Characterized the role of water vapor in the ITCZ response to hemispherically asymmetric perturbations.
- Demonstrated that South Asian monsoon low pressure systems can be simulated in an idealized moist GCM, and that the storms exhibit some properties consistent with moisture vortex instability theory, as well as some properties that deviate from it.
- Studied the sensitivity of equatorial wave variability in an idealized moist GCM to various forms of heating perturbations.

Cornell University, Department of Earth and Atmospheric Sciences, Ithaca, NY

Research Assistant

Jan. 2011 - Mar. 2017

- Characterized the episodicity of forest and grass fires and developed 7 new prescribed emissions cases to test the impact of fire episodicity on fire's aerosol direct and indirect radiative forcings.
- Implemented 8 GCM lightning parameterizations in CAM5, compared their results to LIS/OTD observations, and studied their future projections.

Publications

Submitted articles and preprints

2025 Perkins, W. A., Kwa, A., McGibbon, J., Arcomano, T., **Clark, S. K.**, Watt-Meyer, O., Bretherton, C. S., and Harris, L. M. HiRO-ACE: Fast and skillful AI emulation and downscaling trained on a 3 km global storm-resolving model. December 2025. doi: [10.48550/arXiv.2512.18224](https://doi.org/10.48550/arXiv.2512.18224)

Duncan, J. P. C., Wu, E., Dheeshjith, S., Subel, A., Arcomano, T., **Clark, S. K.**, Henn, B., Kwa, A., McGibbon, J., Perkins, W. A., Gregory, W., Fernandez-Granda, C., Busecke, J., Watt-Meyer, O., Hurlin, W. J., Adcroft, A., Zanna, L., and Bretherton, C. SamudrACE: Fast and Accurate Coupled Climate Modeling with 3D Ocean and Atmosphere Emulators. *Submitted to Geophysical Research Letters*, September 2025. doi: [10.48550/arXiv.2509.12490](https://doi.org/10.48550/arXiv.2509.12490)

Refereed journal articles

2025 Guendelman, I., Merlis, T. M., Cheng, K.-Y., Harris, L. M., Bretherton, C. S., Bolot, M., Zhou, L., Kaltenbaugh, A., **Clark, S. K.**, and Fueglistaler, S. Detecting changes in large-scale metrics of climate in short integrations of a global storm-resolving model of the atmosphere. *Environmental Research: Climate*, 4(2):025010, May 2025. ISSN 2752-5295. doi: [10.1088/2752-5295/add615](https://doi.org/10.1088/2752-5295/add615)

Watt-Meyer, O., Henn, B., McGibbon, J., **Clark, S. K.**, Kwa, A., Perkins, W. A., Wu, E., Harris, L., and Bretherton, C. S. ACE2: Accurately learning subseasonal to decadal atmospheric variability and forced responses. *npj Climate and Atmospheric Science*, 8(1):1–15, May 2025. ISSN 2397-3722. doi: [10.1038/s41612-025-01090-0](https://doi.org/10.1038/s41612-025-01090-0)

Clark, S. K., Watt-Meyer, O., Kwa, A., McGibbon, J., Henn, B., Perkins, W. A., Wu, E., Harris, L. M., and Bretherton, C. S. ACE2-SOM: Coupling an ML Atmospheric Emulator to a Slab Ocean and Learning the Sensitivity of Climate to Changed CO₂. *Journal of Geophysical Research: Machine Learning and Computation*, 2(4):e2024JH000575, 2025. ISSN 2993-5210. doi: [10.1029/2024JH000575](https://doi.org/10.1029/2024JH000575)

2024 Duncan, J. P. C., Wu, E., Golaz, J.-C., Caldwell, P. M., Watt-Meyer, O., **Clark, S. K.**, McGibbon, J., Dresdner, G., Kashinath, K., Bonev, B., Pritchard, M. S., and Bretherton, C. S. Application of the AI2 Climate Emulator to E3SMv2's Global Atmosphere Model, With a Focus on Precipitation Fidelity. *Journal of Geophysical Research: Machine Learning and Computation*, 1(3):e2024JH000136, 2024. ISSN 2993-5210. doi: [10.1029/2024JH000136](https://doi.org/10.1029/2024JH000136)

Guendelman, I., Merlis, T. M., Cheng, K.-Y., Harris, L. M., Bretherton, C. S., Bolot, M., Zhou, L., Kaltenbaugh, A., **Clark, S. K.**, and Fueglistaler, S. The Precipitation Response to Warming and CO₂ Increase: A Comparison of a Global Storm Resolving Model and CMIP6 Models. *Geophysical Research Letters*, 51(7):e2023GL107008, 2024. ISSN 1944-8007. doi: [10.1029/2023GL107008](https://doi.org/10.1029/2023GL107008)

Henn, B., Jauregui, Y. R., **Clark, S. K.**, Brenowitz, N. D., McGibbon, J., Watt-Meyer, O., Pauling, A. G., and Bretherton, C. S. A Machine Learning Parameterization of Clouds in a Coarse-Resolution Climate Model for Unbiased Radiation. *Journal of Advances in Modeling Earth Systems*, 16(3):e2023MS003949, 2024. ISSN 1942-2466. doi: [10.1029/2023MS003949](https://doi.org/10.1029/2023MS003949)

McGibbon, J., **Clark, S. K.**, Henn, B., Kwa, A., Watt-Meyer, O., Perkins, W. A., and Bretherton, C. S. Global Precipitation Correction Across a Range of Climates Using CycleGAN. *Geophysical Research Letters*, 51(4):e2023GL105131, February 2024. ISSN 0094-8276, 1944-8007. doi: [10.1029/2023GL105131](https://doi.org/10.1029/2023GL105131)

Merlis, T. M., Cheng, K.-Y., Guendelman, I., Harris, L., Bretherton, C. S., Bolot, M., Zhou, L., Kaltenbaugh, A., **Clark, S. K.**, Vecchi, G. A., and Fueglistaler, S. Climate sensitivity and relative humidity changes in global storm-resolving model simulations of climate change. *Science Advances*, 10(26):eadn5217, June 2024. doi: [10.1126/sciadv.adn5217](https://doi.org/10.1126/sciadv.adn5217)

- Merlis, T. M., Guendelman, I., Cheng, K.-Y., Harris, L., Chen, Y.-T., Bretherton, C. S., Bolot, M., Zhou, L., Kaltenbaugh, A., **Clark, S. K.**, and Fueglistaler, S. The Vertical Structure of Tropical Temperature Change in Global Storm-Resolving Model Simulations of Climate Change. *Geophysical Research Letters*, 51(23):e2024GL111549, December 2024. ISSN 0094-8276, 1944-8007. doi: [10.1029/2024GL111549](https://doi.org/10.1029/2024GL111549)
- Watt-Meyer, O., Brenowitz, N. D., **Clark, S. K.**, Henn, B., Kwa, A., McGibbon, J., Perkins, W. A., Harris, L., and Bretherton, C. S. Neural Network Parameterization of Subgrid-Scale Physics From a Realistic Geography Global Storm-Resolving Simulation. *Journal of Advances in Modeling Earth Systems*, 16(2):e2023MS003668, 2024. ISSN 1942-2466. doi: [10.1029/2023MS003668](https://doi.org/10.1029/2023MS003668)
- 2023 Bolot, M., Harris, L. M., Cheng, K.-Y., Merlis, T. M., Blossey, P. N., Bretherton, C. S., **Clark, S. K.**, Kaltenbaugh, A., Zhou, L., and Fueglistaler, S. Kilometer-scale global warming simulations and active sensors reveal changes in tropical deep convection. *npj Climate and Atmospheric Science*, 6(1):1–8, December 2023. ISSN 2397-3722. doi: [10.1038/s41612-023-00525-w](https://doi.org/10.1038/s41612-023-00525-w)
- Harris, L., Zhou, L., Kaltenbaugh, A., **Clark, S.**, Cheng, K.-Y., and Bretherton, C. A Global Survey of Rotating Convective Updrafts in the GFDL X-SHIELD 2021 Global Storm Resolving Model. *Journal of Geophysical Research: Atmospheres*, 128(10):e2022JD037823, 2023. ISSN 2169-8996. doi: [10.1029/2022JD037823](https://doi.org/10.1029/2022JD037823)
- Kwa, A., **Clark, S. K.**, Henn, B., Brenowitz, N. D., McGibbon, J., Watt-Meyer, O., Perkins, W. A., Harris, L., and Bretherton, C. S. Machine-Learned Climate Model Corrections From a Global Storm-Resolving Model: Performance Across the Annual Cycle. *Journal of Advances in Modeling Earth Systems*, 15(5):e2022MS003400, 2023. ISSN 1942-2466. doi: [10.1029/2022MS003400](https://doi.org/10.1029/2022MS003400)
- Sanford, C., Kwa, A., Watt-Meyer, O., **Clark, S. K.**, Brenowitz, N., McGibbon, J., and Bretherton, C. Improving the Reliability of ML-Corrected Climate Models With Novelty Detection. *Journal of Advances in Modeling Earth Systems*, 15(11):e2023MS003809, 2023. ISSN 1942-2466. doi: [10.1029/2023MS003809](https://doi.org/10.1029/2023MS003809)
- 2022 **Clark, S. K.**, Brenowitz, N. D., Henn, B., Kwa, A., McGibbon, J., Perkins, W. A., Watt-Meyer, O., Bretherton, C. S., and Harris, L. M. Correcting a 200 km Resolution Climate Model in Multiple Climates by Machine Learning From 25 km Resolution Simulations. *Journal of Advances in Modeling Earth Systems*, 14(9):e2022MS003219, 2022. ISSN 1942-2466. doi: [10.1029/2022MS003219](https://doi.org/10.1029/2022MS003219)
- Cheng, K.-Y., Harris, L., Bretherton, C., Merlis, T. M., Bolot, M., Zhou, L., Kaltenbaugh, A., **Clark, S.**, and Fueglistaler, S. Impact of Warmer Sea Surface Temperature on the Global Pattern of Intense Convection: Insights From a Global Storm Resolving Model. *Geophysical Research Letters*, 49(16):e2022GL099796, 2022. ISSN 1944-8007. doi: [10.1029/2022GL099796](https://doi.org/10.1029/2022GL099796)
- Bretherton, C. S., Henn, B., Kwa, A., Brenowitz, N. D., Watt-Meyer, O., McGibbon, J., Perkins, W. A., **Clark, S. K.**, and Harris, L. Correcting Coarse-Grid Weather and Climate Models by Machine Learning From Global Storm-Resolving Simulations. *Journal of Advances in Modeling Earth Systems*, 14(2):e2021MS002794, 2022. ISSN 1942-2466. doi: [10.1029/2021MS002794](https://doi.org/10.1029/2021MS002794)
- Xiang, B., Harris, L., Delworth, T. L., Wang, B., Chen, G., Chen, J.-H., **Clark, S. K.**, Cooke, W. F., Gao, K., Huff, J. J., Jia, L., Johnson, N. C., Kapnick, S. B., Lu, F., McHugh, C., Sun, Y., Tong, M., Yang, X., Zeng, F., Zhao, M., Zhou, L., and Zhou, X. S2S Prediction in GFDL SPEAR: MJO Diversity and Teleconnections. *Bulletin of the American Meteorological Society*, 103(2):E463–E484, February 2022. ISSN 0003-0007, 1520-0477. doi: [10.1175/BAMS-D-21-0124.1](https://doi.org/10.1175/BAMS-D-21-0124.1)
- 2021 McGibbon, J., Brenowitz, N. D., Cheeseman, M., **Clark, S. K.**, Dahm, J. P. S., Davis, E. C., Elbert, O. D., George, R. C., Harris, L. M., Henn, B., Kwa, A., Perkins, W. A., Watt-Meyer, O., Wicky, T. F., Bretherton, C. S., and Fuhrer, O. Fv3gfs-wrapper: A Python wrapper of the FV3GFS atmospheric model. *Geoscientific Model Development*, 14(7):4401–4409, July 2021. ISSN 1991-959X. doi: [10.5194/gmd-14-4401-2021](https://doi.org/10.5194/gmd-14-4401-2021)

- Watt-Meyer, O., Brenowitz, N. D., **Clark, S. K.**, Henn, B., Kwa, A., McGibbon, J., Perkins, W. A., and Bretherton, C. S. Correcting Weather and Climate Models by Machine Learning Nudged Historical Simulations. *Geophysical Research Letters*, 48(15):e2021GL092555, 2021. ISSN 1944-8007. doi: [10.1029/2021GL092555](https://doi.org/10.1029/2021GL092555)
- 2020 Harris, L., Zhou, L., Lin, S.-J., Chen, J.-H., Chen, X., Gao, K., Morin, M., Rees, S., Sun, Y., Tong, M., Xiang, B., Bender, M., Benson, R., Cheng, K.-Y., **Clark, S.**, Elbert, O. D., Hazelton, A., Huff, J. J., Kaltenbaugh, A., Liang, Z., Marchok, T., Shin, H. H., and Stern, W. GFDL SHiELD: A Unified System for Weather-to-Seasonal Prediction. *Journal of Advances in Modeling Earth Systems*, 12(10): e2020MS002223, 2020. ISSN 1942-2466. doi: [10.1029/2020MS002223](https://doi.org/10.1029/2020MS002223)
- Narinesingh, V., Booth, J. F., **Clark, S. K.**, and Ming, Y. Atmospheric blocking in an aquaplanet and the impact of orography. *Weather and Climate Dynamics*, 1(2):293–311, July 2020. ISSN -. doi: [10.5194/wcd-1-293-2020](https://doi.org/10.5194/wcd-1-293-2020)
- Clark, S. K.**, Ming, Y., and Adames, Á. F. Monsoon Low Pressure System–Like Variability in an Idealized Moist Model. *Journal of Climate*, 33(6):2051–2074, March 2020. ISSN 0894-8755, 1520-0442. doi: [10.1175/JCLI-D-19-0289.1](https://doi.org/10.1175/JCLI-D-19-0289.1)
- 2019 Adames, Á. F., Kim, D., **Clark, S. K.**, Ming, Y., and Inoue, K. Scale Analysis of Moist Thermodynamics in a Simple Model and the Relationship between Moisture Modes and Gravity Waves. *Journal of the Atmospheric Sciences*, 76(12):3863–3881, December 2019. ISSN 0022-4928, 1520-0469. doi: [10.1175/JAS-D-19-0121.1](https://doi.org/10.1175/JAS-D-19-0121.1)
- 2018 **Clark, S. K.**, Ming, Y., Held, I. M., and Philipps, P. J. The Role of the Water Vapor Feedback in the ITCZ Response to Hemispherically Asymmetric Forcings. *Journal of Climate*, 31(9):3659–3678, February 2018. ISSN 0894-8755. doi: [10.1175/JCLI-D-17-0723.1](https://doi.org/10.1175/JCLI-D-17-0723.1)
- 2017 **Clark, S. K.**, Ward, D. S., and Mahowald, N. M. Parameterization-based uncertainty in future lightning flash density. *Geophysical Research Letters*, 44(6):2017GL073017, March 2017. ISSN 1944-8007. doi: [10.1002/2017GL073017](https://doi.org/10.1002/2017GL073017)
- 2015 **Clark, S. K.**, Ward, D. S., and Mahowald, N. M. The sensitivity of global climate to the episodicity of fire aerosol emissions. *Journal of Geophysical Research: Atmospheres*, 120(22):2015JD024068, November 2015. ISSN 2169-8996. doi: [10.1002/2015JD024068](https://doi.org/10.1002/2015JD024068)

Conference proceedings

- 2025 McGibbon, J., Arcomano, T., **Clark, S. K.**, Duncan, J., Henn, B., Kwa, A., Perkins, W. A., Watt-Meyer, O., Wu, E., and Bretherton, C. Emulating climate across scales with conditional spherical fourier neural operators. In *NeurIPS 2025 Workshop on Tackling Climate Change with Machine Learning*, 2025. URL <https://www.climatechange.ai/papers/neurips2025/46>
- Wu, E., Duncan, J., Arcomano, T., **Clark, S. K.**, Henn, B., Kwa, A., McGibbon, J., Perkins, A., Watt-Meyer, O., Bretherton, C., Dheeshjith, S., Subel, A., Zanna, L., Hurlin, W., Gregory, W., and Adcroft, A. Coupled climate simulations with ace and samudra. In *NeurIPS 2025 Workshop on Tackling Climate Change with Machine Learning*, 2025. URL <https://www.climatechange.ai/papers/neurips2025/51>
- 2023 Watt-Meyer, O., Dresdner, G., McGibbon, J., **Clark, S. K.**, Duncan, J., Henn, B., Peters, M., Brenowitz, N. D., Kashinath, K., Pritchard, M., Bonev, B., and Bretherton, C. Ace: A fast, skillful learned global atmospheric model for climate prediction. In *NeurIPS 2023 Workshop on Tackling Climate Change with Machine Learning*, 2023. URL <https://www.climatechange.ai/papers/neurips2023/14>

- 2022 Brenowitz, N. D., Perkins, W. A., Nugent, J. M., Watt-Meyer, O., **Clark, S. K.**, Kwa, A., Henn, B., McGibbon, J., and Bretherton, C. S. Emulating Fast Processes in Climate Models. In *NeurIPS 2022 Workshop on Machine Learning and the Physical Sciences*. NeurIPS, December 2022. URL https://ml4physicalsciences.github.io/2022/files/NeurIPS_ML4PS_2022_63.pdf
- Kwa, A., **Clark, S. K.**, Henn, B., Brenowitz, N. D., McGibbon, J., Perkins, W. A., Watt-Meyer, O., Harris, L., and Bretherton, C. S. Machine-learned climate model corrections from a global storm-resolving model. In *NeurIPS 2022 Workshop on Machine Learning and the Physical Sciences*. NeurIPS, December 2022. URL https://ml4physicalsciences.github.io/2022/files/NeurIPS_ML4PS_2022_113.pdf
- Sanford, C. H., Kwa, A., Watt-Meyer, O., **Clark, S. K.**, Brenowitz, N., McGibbon, J., and Bretherton, C. Improving the predictions of ml-corrected climate models with novelty detection. In *NeurIPS 2022 Workshop on Tackling Climate Change with Machine Learning*, 2022. URL <https://www.climatechange.ai/papers/neurips2022/10>
- 2020 Brenowitz, N. D., Henn, B., **Clark, S.**, Kwa, A., McGibbon, J., Perkins, W. A., Watt-Meyer, O., and Bretherton, C. S. Machine learning climate model dynamics: Offline versus online performance. In *NeurIPS 2020 Workshop on Tackling Climate Change with Machine Learning*, 2020. URL <https://www.climatechange.ai/papers/neurips2020/50>

Presentations

- 2025 **Clark, S. K.**, Arcomano, T., Duncan, James P. C., Henn, B., Kwa, A., McGibbon, J., Perkins, W. A., Wu, E., Watt-Meyer, O., Bretherton, C. S., Harris, L. M. The Ai2 Climate Emulator: a flexible platform for climate simulation, weather forecasting, and downscaling. NOAA Artificial Intelligence Workshop, Virtual, September 2025. Talk.
- Clark, S. K.**, Arcomano, T., Duncan, James P. C., Henn, B., Kwa, A., McGibbon, J., Perkins, W. A., Wu, E., Watt-Meyer, O., Bretherton, C. “Learning the Response to Abrupt CO₂ Changes in the Ai2 Climate Emulator.” Gordon Research Conference on Actionable Machine Learning for Climate Science, Smithfield, RI, June 2025. Talk.
- 2024 **Clark, S. K.**, Watt-Meyer, O., Kwa, A., McGibbon, J., Henn, B., Dresdner G., Perkins, W. A., Harris, L. M., Bretherton, C. S. “Coupling the Ai2 Climate Emulator to a slab ocean and learning the climate sensitivity to changes in CO₂.” Workshop on Large-Scale Deep Learning for the Earth System, Bonn, Germany, August 2024. Talk.
- Bretherton, C. S., Watt-Meyer, O., **Clark, S. K.**, Henn, B., Kwa, A., McGibbon, J., Perkins, W. A., Dresdner, G., Duncan, J. P. C., Rebassoo, F., Bonev, B., Harris, L. M., Caldwell, P. M. “The AI2 Climate Emulator (ACE): Capabilities, Challenges, and Opportunities.” AGU Fall Meeting, December 2024. Talk.
- Clark, S. K., Watt-Meyer, O., Kwa, A., McGibbon, J., Henn, B., Perkins, W. A., Wu, E., Bretherton, C. S., Harris, L. M. “ACE2-SOM: Coupling to a slab ocean and learning the sensitivity of climate to changes in CO₂” AGU Fall Meeting, December 2024. lightning Presentation.
- 2023 **Clark, S. K.**, Brenowitz, N., Henn, B. M., Kwa, A., McGibbon, J., Perkins, W. A., Watt-Meyer, O., Bretherton, C.S., and Harris, Lucas M. “Correcting a 200 km Resolution Climate Model in Multiple Climates by Machine Learning From 25 km Resolution Simulations.” AMS Annual Meeting, Denver, CO, January 2023. Talk.
- 2022 **Clark, S. K.**, Brenowitz, N., Henn, B. M., Kwa, A., McGibbon, J., Perkins, W. A., Watt-Meyer, O., Bretherton, C.S., and Harris, Lucas M. “Correcting Coarse-Grid Weather and Climate Models by Machine Learning From Global Storm-Resolving Simulations.” Physics Dynamics Coupling Workshop, Princeton, NJ, June 2022. Oral presentation.

- 2021 **Clark, S. K.**, Brenowitz, N., Henn, B. M., Kwa, A., McGibbon, J., Perkins, W. A., Watt-Meyer, O., and Bretherton, C.S. "Applying machine learning parameterization through coarse graining to improve the skill in simulating multiple climates in a full complexity GCM." AGU Fall Meeting, December 2021. Virtual Poster.
- Clark, S. K.**, Brenowitz, N., Henn, B. M., Kwa, A., McGibbon, J., Perkins, W. A., Watt-Meyer, O., and Bretherton, C.S. "Applying machine learning parameterization through coarse graining to improve the skill in simulating multiple climates in a full complexity GCM." NOAA Artificial Intelligence Workshop, September 2021. Virtual Talk.
- 2020 **Clark, S. K.**, Brenowitz, N., Bretherton, C. S., Henn, B. M., Kwa, A., McGibbon, J., Perkins, W. A., Watt-Meyer, O., Chen, X., Harris, L., Zhou, L. "Using nudging to investigate biases in a global 3 km resolution simulation with GFDL's X-SHIELD model." AGU Fall Meeting 2020, December 2020. Virtual Poster.
- Clark, S. K.**, Brenowitz, N., Henn, B. M., Kwa, A., McGibbon, J., Perkins, W. A., Watt-Meyer, O., Harris, L., Bretherton, C.S. "Challenges associated with training a machine-learning based moist physics parameterization by coarse-graining in a model with topography." NOAA Artificial Intelligence Workshop, December 2020. Virtual Talk.
- 2018 **Clark, S. K.**, Ming, Y., Adames, Á. F. "An idealized framework for simulating monsoon low pressure systems and their potential sensitivity to the mean state." AGU Fall Meeting 2018, Washington D.C., December 2018. Poster.
- 2017 **Clark, S. K.**, Ming, Y. "Investigating synoptic-scale monsoonal disturbances in an idealized moist model." AGU Fall Meeting 2017, New Orleans, LA, December 2017. Poster.
- Clark, S. K.**, Ming, Y., Held, I. M., and Philipps, P. J. "The role of water vapor in the ITCZ response to hemispherically asymmetric forcings." Dynamics seminar series, Princeton University, Princeton, NJ, November 2017. Oral Presentation.
- 2016 **Clark, S. K.**, Ming, Y., and Held, I. M. "The role of water vapor in the ITCZ response to hemispherically asymmetric forcings." AGU Fall Meeting, San Francisco, CA, December 2016. Poster.
- Hill, S. A., **Clark, S. K.** "The other 'aospy': automated climate data analysis and management." AOSPy Workshop at Columbia University, New York, NY, November 2016. Talk.
- Clark, S. K.**, Ming, Y., and Held, I. M. "The role of water vapor in the ITCZ response to hemispherically asymmetric forcings." WCRP Model Hierarchies Workshop, Princeton, NJ, November 2016. Poster.
- Clark, S. K.**, Ming, Y., and Held, I. M. "The role of water vapor in the ITCZ response to hemispherically asymmetric forcings." Dynamical Core Model Intercomparison Project, Boulder, CO, June 2016. Poster.
- 2015 **Clark, S. K.**, Ming, Y., and Held, I. M. "Climate Impacts of Inter-hemispherically Asymmetric Radiative Forcing." AGU Fall Meeting, San Francisco, CA, December 2015. Poster.
- Clark, S. K.**, Ming, Y., and Held, I. M. "Climate Impacts of Inter-hemispherically Asymmetric Radiative Forcing." Gordon Research Conference, Lewiston, ME, July 2015. Poster.
- 2012 **Clark, S. K.**, Ward, D. S., and Mahowald, N. M. "Climate Model Responses to Increased Episodicity in Prescribed Fire Aerosol Emissions." CESM Workshop, Breckenridge, CO, June 2012. Poster.

Select open source software contributions

xarray, A widely-used Python library providing N-dimensional labeled array data structures 

Contributor and Core Developer

Feb. 2017 - Present

- Led an effort to fully support of non-standard calendar types frequently used in climate science, i.e. serialization, standard and partial-datetime-string indexing, constructing date ranges, groupby operations, resampling, interpolation, plotting, and more.
- Continue to take part in reviewing new contributions, fixing bugs, adding requested features, and answering user/developer questions.

cftime, A Python library providing datetime instances for non-standard calendars 

Contributor

Feb. 2018 - Present

- Enabled exact numerical decoding and encoding of datetimes.
- Proposed strategy that led to speeding up fundamental operations, e.g. datetime construction and timedelta arithmetic, by 200 to 400x.
- Implemented an approach to speed up decoding arrays of datetimes by 200x in particularly problematic circumstances.

nc-time-axis, A Python library providing the ability to plot cftime datetimes in matplotlib 

Contributor

Jan. 2019 - Present

- Enabled plotting `cftime.datetime` objects directly in matplotlib, instead of requiring a wrapped version of a `cftime.datetime` object.
- Added infrastructure for documentation and basic documentation content.

xpartition, A Python package for writing large xarray datasets to zarr stores with independent processes on HPC or in the cloud. 

Primary author

Dec. 2020 - Present

- Used regularly when processing the hundreds of terabytes of output from physics-based climate model simulations we use as ML reference data at Ai2.
- Supports writing both traditional and sharded zarr stores.

faceted, A Python package that makes it easier to create matplotlib figures with precise control over the overall width, plot aspect ratio, between-plot spacing, and colorbar dimensions. 

Primary author

Nov. 2017 - Present

- Reduces boilerplate and automates algebra required to make clean publication-ready plots.

Teaching Experience

Princeton University, Princeton Environmental Institute, Princeton, NJ

Modeling the Earth System (ENV367)

Fall 2017

Assistant in Instruction

- Assisted Professor Laure Resplandy in adapting an existing compact Earth System Model  for use as a teaching tool. Wrote comprehensive web-based documentation for the model.
- Authored lab exercises to help students learn about the features and limitations of the model, and illustrate Earth system modeling concepts.

Cornell University, Department of Applied and Engineering Physics, Ithaca, NY

Mathematical Physics II (AEP 4220)

Spring 2014

Grader

- Held weekly office hours, wrote official solutions, and graded homework and exam problems for a course led by Professor Bruce Kusse.

Reviewing

Peer-reviewed manuscripts for *Journal of Climate*, *Journal of Geophysical Research – Atmospheres*, *Journal of Advances in Modeling Earth Systems*, *Journal of Open Source Software*, *Geoscientific Model Development*, *Nature*, *Nature Climate Change*, *Nature Communications*, *Quarterly Journal of the Royal Meteorological Society*, and GFDL internal manuscript review.

Service

Assistant mentor to NOAA Hollings Scholar Bridgette Befort (2017).

Select Honors and Awards

Arnold Guyot Teaching Award, <i>Princeton University Department of Geosciences</i>	2018
NDSEG Fellowship, <i>American Society for Engineering Education</i>	2016-2019
Dorothy and Fred Chau Award (Excellence in Undergraduate Research), <i>Cornell AEP</i>	May 2014
Rawlings Cornell Presidential Research Scholar, <i>Cornell</i>	2010-2014

Professional Experiences

Participant, <i>Columbia AOSPy Workshop, founding meeting of the Pangeo Data initiative</i> 	Nov. 2016
Organizer, <i>Princeton AOS Workshop on Tropical Dynamics</i>	2016
Participant, <i>Dynamical Core Model Intercomparison Project Workshop</i> 	June 2016

Activities

Varsity Tennis, Cornell University	Sept. 2010 - May 2014
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