Francisco Spaulding-Astudillo

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6+ years' experience extracting insights from climate data and building models to make predictions

TECHNICAL SKILLS

Numerical climate modeling and line-by-line atmospheric radiative transfer w/ ECHAM6 | RFM | FISEBM

Data analysis and visualization w/ Python (numpy, matplotlib, scikit-learn) | MATLAB | Fortran | Climate Data Operators

Model development w/ finite difference method | gradient descent | verification | validation

Written and verbal communication | wrote 4 papers (2 published, 1 in review, 1 in prep) w/ LaTeX and 11 conference presentations

EDUCATION

Ph.D. **University of California, Los Angeles | Geophysics and Space Physics** 03/2021 – now

- Research area: climate (e.g., clouds, precipitation, convection), geophysical fluid dynamics, radiative transfer

M.S. **University of California, Los Angeles | Geophysics and Space Physics** 09/2018 – 03/2021

- Research area: climate (e.g., clouds, precipitation, convection), geophysical fluid dynamics, radiative transfer
- Selected courses: Atmospheric Physics, Electromagnetic Radiation, Incompressible Flow

B.S. **The University of Chicago | Geophysical Sciences** 09/2013 – 06/2017

- Selected courses: Linear Algebra, Calculus, Statistical Methods, Fluid Dynamics, Mathematical Methods of Physics

EXPERIENCE

Graduate Student Researcher | University of California, Los Angeles 09/2018 – now

Project 1: Predicting relaxation-oscillator weather modes with emergent constraints

- Developed a hierarchy of models for statistical weather prediction: CMIP6 model (Fortran), a statistically steady-state analytical model (Python), and a 2-dimensional GFD model for incompressible lid-driven flow (Python)
- Discovered statistical relationships that constrain dominant weather modes due to energetics of atmospheric fluid motion by analyzing ~2 TB of geospatial data, disproving earlier theories

Project 2: Response of the climate system to varying water vapor concentration

- Demonstrated that statistical trends in cloud height, which govern their climate impact, are driven by properties of water vapor (e.g., radiative & thermodynamic) involved in atmospheric energy transfer
- Performed parallel simulations on high-performance computing cluster with CMIP6 model and analyzed ~10 TB geospatial data

Teaching Assistant | University of California, Los Angeles 09/2018 – now

Courses: Solar System & Planets (EPSS9) and Intro to Oceanography (EPSS15)

- Instruct, support, and create formative assessments for ~100 students in STEM courses at the undergraduate level emphasizing front-of-class, student-led derivations

Postbaccalaureate Researcher | University of Chicago 07/2017 – 09/2018

Project: Simulating multi-scale ice flow on the "Snowball Earth"

- Designed a comprehensive model (FISEBM) for long-term ice age simulations with asynchronous temporal-coupling, subgrid-scale parameterizations, and spherical PDE discretization of ice stress tensor, momentum, and diffusive heat transport
- FISEBM is now being used for original research by my collaborators at Ben-Gurion University of the Negev

FELLOWSHIPS & AWARDS

- 4-yr paid Center for Diverse Leadership in Science Fellow; 2021 NASA InsightSeer; 2021 UCLA EPSS Outreach Award