



Atmospheric & Oceanic Sciences

Join the exciting department of research, exploration, & innovation

UCLA

College | Physical Sciences
**Atmospheric &
Oceanic Sciences**

The UCLA logo is a blue rectangle with the letters "UCLA" in white, bold, sans-serif font.

College | Physical Sciences
**Atmospheric &
Oceanic Sciences**

Explore Research Opportunities in AOS

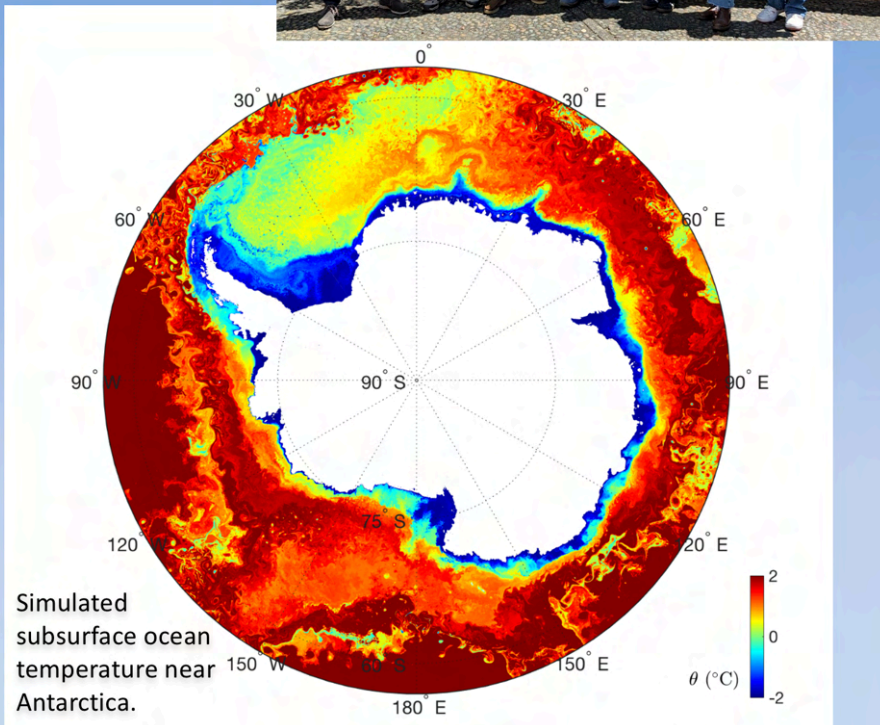
Located in the
Mathematical Science Building

Prof. Andrew Stewart

Ocean Dynamics Group

<https://dept.atmos.ucla.edu/stewart>

- Ocean turbulent dynamics and modeling
- Ocean interactions with sea ice and melting of land-based glaciers
- Changes in global ocean circulation pathways under climate shifts



Dr. Jeroen Molemaker

UCLA MARINE OPERATIONS

- Participate in oceanographic research
- <https://dept.atmos.ucla.edu/marineops/>
- facebook: @uclazodiac
- Contact: Dr. Jeroen Molemaker, Geology 3636,
nmolem@atmos.ucla.edu



Prof. Daniele Bianchi

UCLA Ocean Biogeochemistry and Ecosystem Group

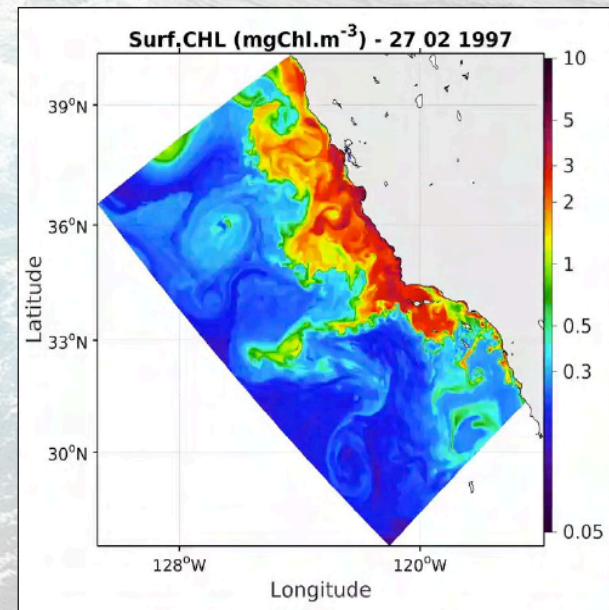


Group Research Interests:

- California Current Ecosystem
- Fish and Fisheries
- Ocean's Carbon, Oxygen and Nutrient Cycles
- Mesopelagic or "Twilight" Zone Ecosystem

Research projects involve analysis of **observational datasets** and output from **numerical model simulations**

Contact: dbianchi@atmos.ucla.edu,
or drop by MS-7949



land ecosystems and carbon-water cycles



ecosystem measurements in the tropical rainforest of Costa Rica



studies of California's native vegetation

contact: Prof. Ulli Seibt
ulli@atmos.ucla.edu

Prof. Jochen Stutz

Atmospheric Chemistry and Spectroscopy Group

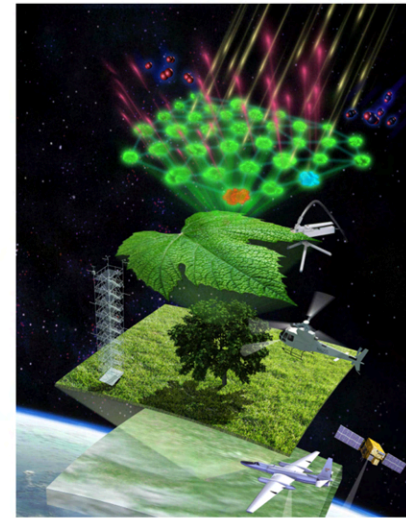
Optical Trace Gas Measurements



Air Pollution Chemistry



Remote Sensing of Plants



Prof. Jochen Stutz

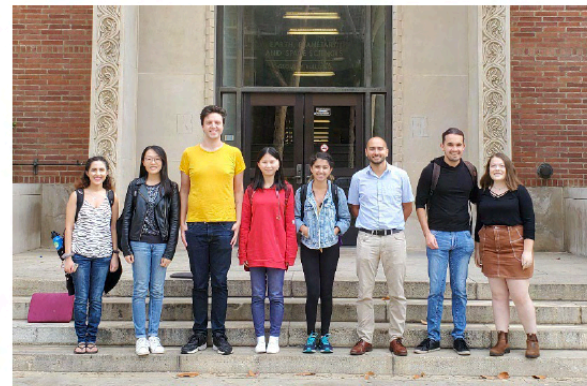
Email: jochen@atmos.ucla.edu

Website: <https://tinyurl.com/stutz-group>

Regional to local modeling of air quality and aerosol-climate interactions

Topics of research:

- Air quality forecasting and applications to field campaigns (NASA, NOAA), currently focusing on smoke from wild fires
- Satellite data and data assimilation techniques in the context of atmospheric composition
- Modeling of aerosols interactions with clouds and solar radiation to reduce uncertainties in climate projections



Contact:

Prof. Pablo Saide, MS 7234

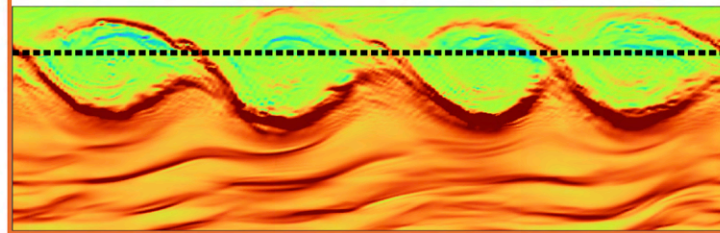
Email: saide@atmos.ucla.edu

Website: <https://dept.atmos.ucla.edu/saide>

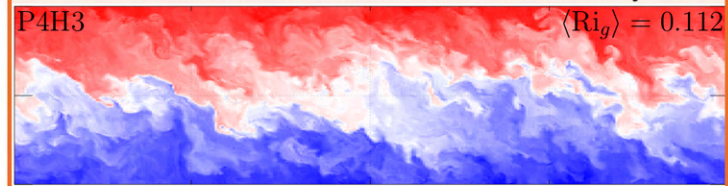
Geophysical Boundary Layer & Turbulence Research Group

- ❑ Theory & numerical simulations of turbulent flows in the ocean and the atmosphere
- ❑ **Atmospheric applications:** winds over forest on complex topography, dust transport, arctic boundary layers
- ❑ **Ocean applications:** turbulence in coastal oceans, transport of oil & microplastics, hydrodynamics of kelp farms
- ❑ Lots and lots of theory, mathematics and programming!
- ❑ Contact: Prof. Marcelo Chamecki (chamecki@ucla.edu)

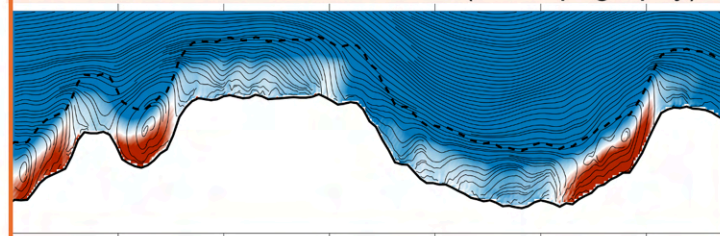
Kelvin-Helmholtz instability under a kelp farm



Stratified turbulence in the Saharan Air Layer



Wind flow in the Amazon forest (real topography)



Geospace Research Group

Research Interests:

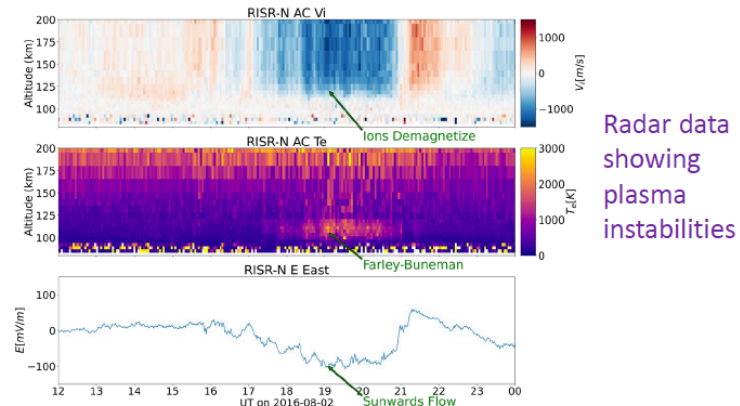
- Ionospheric structure and dynamics
- Magnetosphere-ionosphere-atmosphere coupling
- Space weather modeling
- Radar and radio propagation

Types of Research Projects:

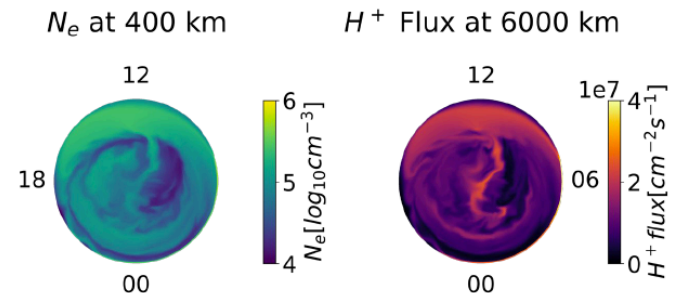
- Analysis of ionospheric **radar data**
- Analysis of outputs from **space weather models**
- Analysis of other ground-based or space-based data sets

For More Information:

- Contact: Roger Varney rvarney@atmos.ucla.edu
- Drop by MS-7979
- Visit www.rogervarney.com



Radar data showing plasma instabilities

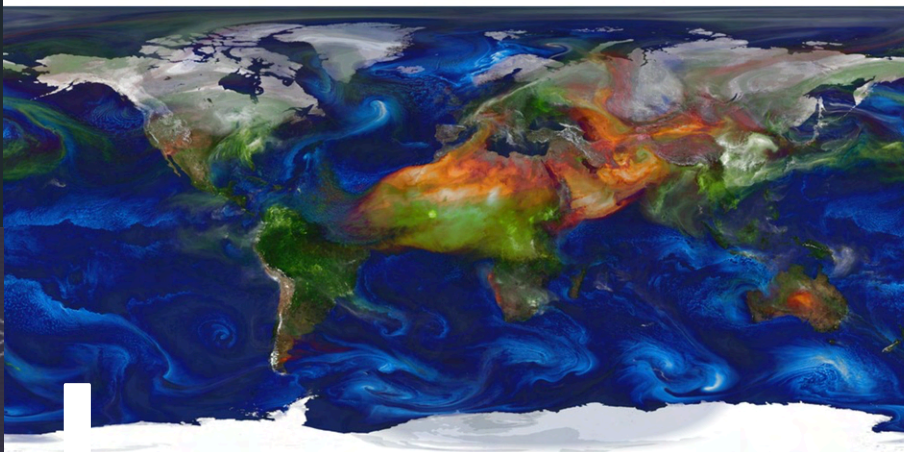
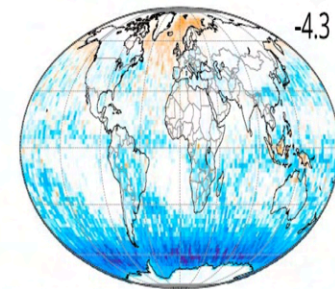
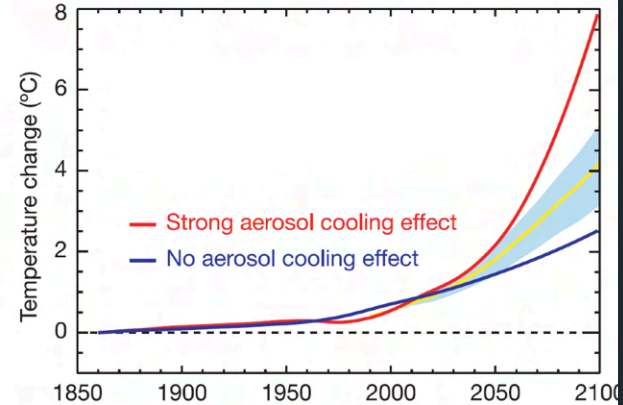


High-resolution ionospheric model

Prof. Jasper Kok

Aerosol-Climate Interactions group (my group)

- Quantifying **impacts of aerosols and clouds on climate** to:
 - Better **predict future climate changes**
 - Inform whether societally should temporarily cool planet using aerosols if/when we exceed 2° C warming (**climate intervention**)
- Undergraduate projects involve:
 - Physics & math
 - Programming
 - Analysis of data from measurements, satellites, and climate models
 - More info on <http://jasperkok.com>



Prof. Janine A. Baijnath-Rodino

On the Intersection of Climate and Meteorology: Local, Regional, & Global Perspectives on Severe Weather & Extreme Conditions



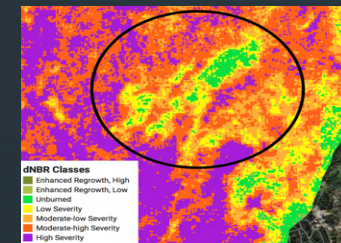
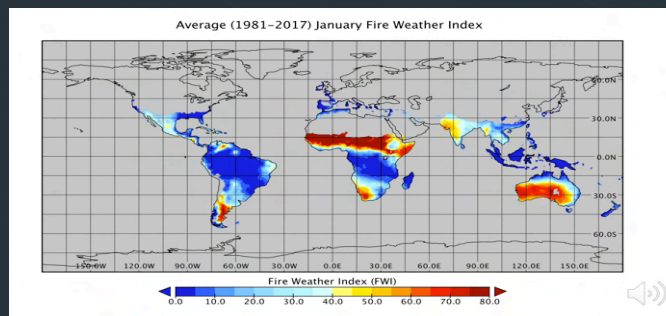
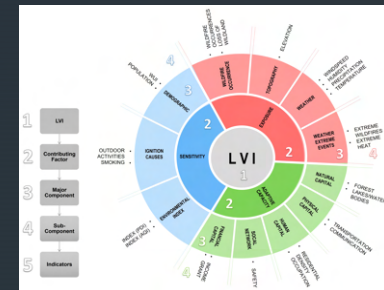
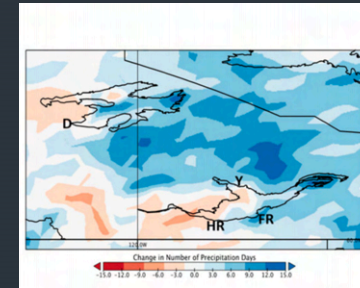
Dr. Janine A. Baijnath-Rodino
 Director of Meteorology &
 Adjunct Assistant Professor
 Office: MS - 7236
janinebr@g.ucla.edu



SCAN ME

Website:
<https://janineannb.wixsite.com/jabr>

1. Identifying the roles of surface-atmospheric hydrometeorological processes in extreme weather
2. Quantifying risk and livelihood vulnerability from natural hazards
3. Determining effective solutions and mitigation strategies for wildland fires
4. Science Communication



Prof. Gang Chen

Atmospheric and Climate Dynamics Group

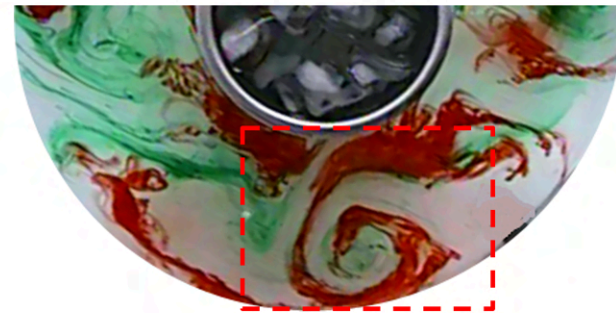
Lead: Prof Gang Chen

Email: gchenpu@ucla.edu

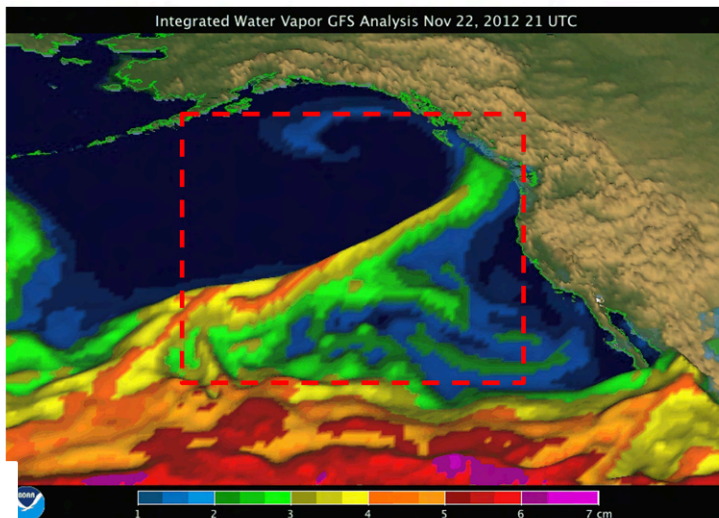
Office: Math Sciences 7149

Project: weather and climate extremes

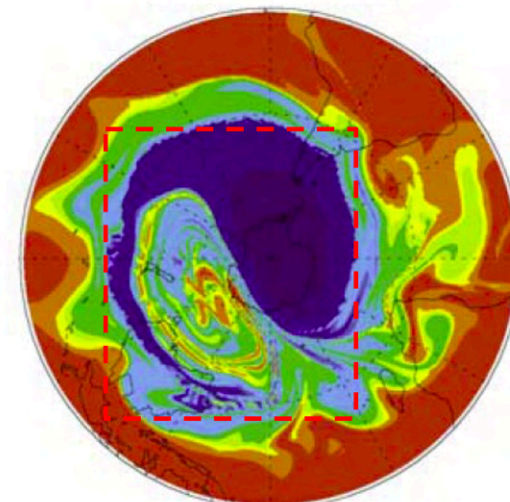
Rotating tank



Atmospheric rivers



Polar vortex



CLIMATE VARIABILITY, CLIMATE CHANGE

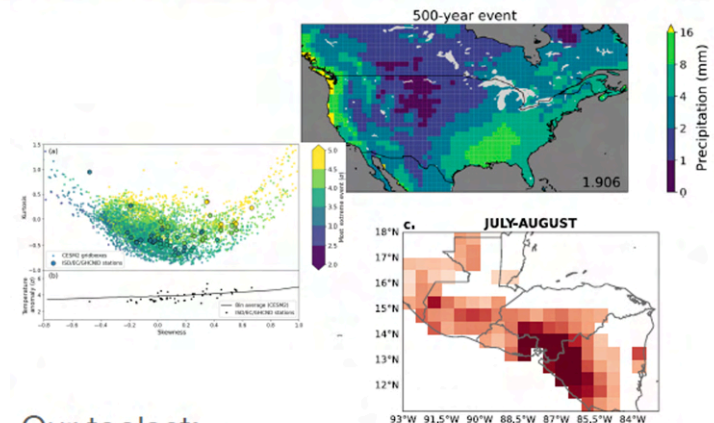
THE MCKINNON GROUP

STATISTICS, ATMOSPHERIC AND OCEANIC SCIENCES, INSTITUTE OF THE ENVIRONMENT

UNIVERSITY OF CALIFORNIA, LOS ANGELES

- What is the regional structure of climate change? And can we reduce uncertainty in future projections?
- How does climate manifest for temperature, precipitation, and humidity extremes?
- How can we separate internal variability from human-caused climate change in the observations?
- How do land/atmosphere interactions influence the near-surface climate over land, and the converse?

kmckinnon@ucla.edu
Math Sci 8967 (one floor up!)
<https://karenamckinnon.github.io/>



Our toolset:

- Code (typically Python)
- Climate models
- Physics, math, and conceptual models
- Data across scales, from in situ to satellite

Prof. Yue Dong

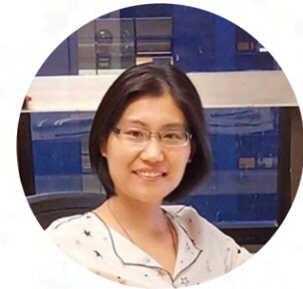
Large-scale coupled climate dynamics Group

Prof. Yue Dong

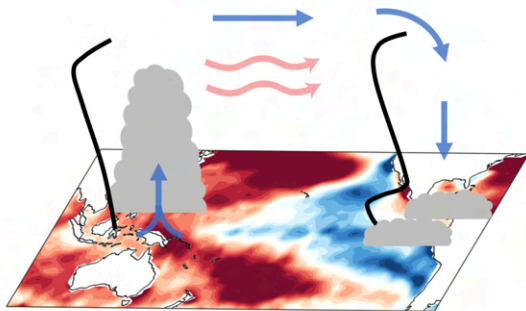
Email: ydong@atmos.ucla.edu

<https://sites.google.com/view/yuedong-atmos>

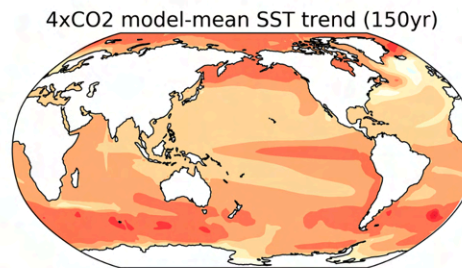
We use **climate models** and **observations** to build **theories** for understanding **how the climate system works** and **how it changes**



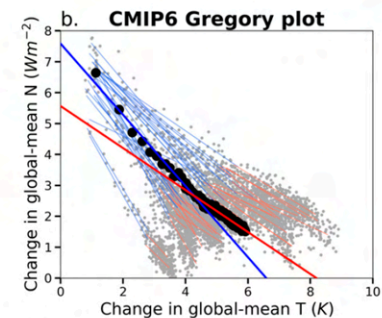
How the **atmosphere** is coupled with **oceans & cryosphere**



How the **tropical climate** interacts with the **polar climate**



How the coupled dynamics modulate **climate feedbacks & climate sensitivity**

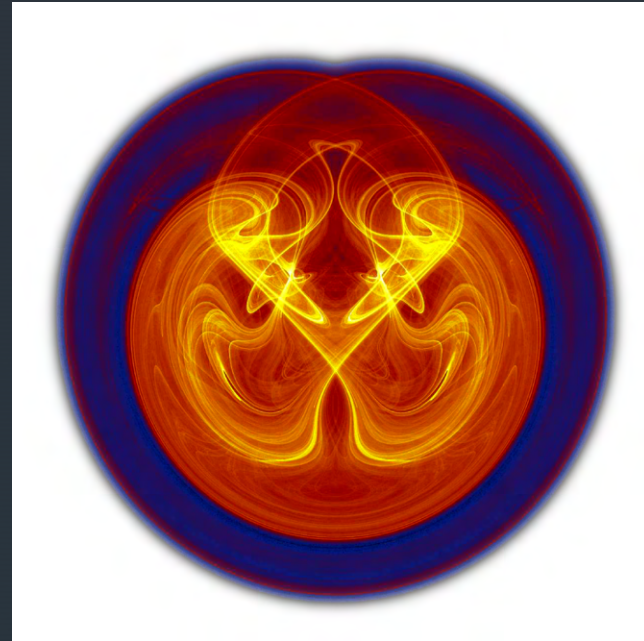


Prof. Michael Ghil

Theoretical Climate Dynamics Group



LORA: a snapshot of the randomly driven Lorenz (1963) convection model's "random attractor"



Key Questions:

- How do time-dependent forcings, anthropogenic & natural, affect the functioning of the climate system?
- How does this functioning affect socio-economic processes?

Current Research Interests: Atmospheric & Oceanic Sciences, Boolean Delay Equations on Networks, Celestial Mechanics, Climate Dynamics, Data Assimilation, Dynamical & Complex Systems Theory, Estimation Theory, Extreme Events & Prediction, Geophysical Fluid Dynamics, Macroeconomics, Numerical & Statistical Methods, Remote Sensing & Applications, Solid Earth Dynamics

Contact

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Website: <https://dept.atmos.ucla.edu/tcd/people/michael-ghil/>,

https://en.wikipedia.org/wiki/Michael_Ghil

Prof. James C. McWilliams
Slichter Professor of Earth Sciences
jcm@atmos.ucla.edu

Geophysical fluid dynamics

Turbulence

Oceanic circulation and biogeochemistry

Climate variability

Computational simulation

Prof. Jacob Bortnik

Understanding the physics of space weather using data, numerical modeling, lab experiments and machine learning techniques



Prof. Jacob Bortnik
Professor
Department Chair
Faculty director of the
UCLA SPACE Institute

Drop by: MS 7228

Email:

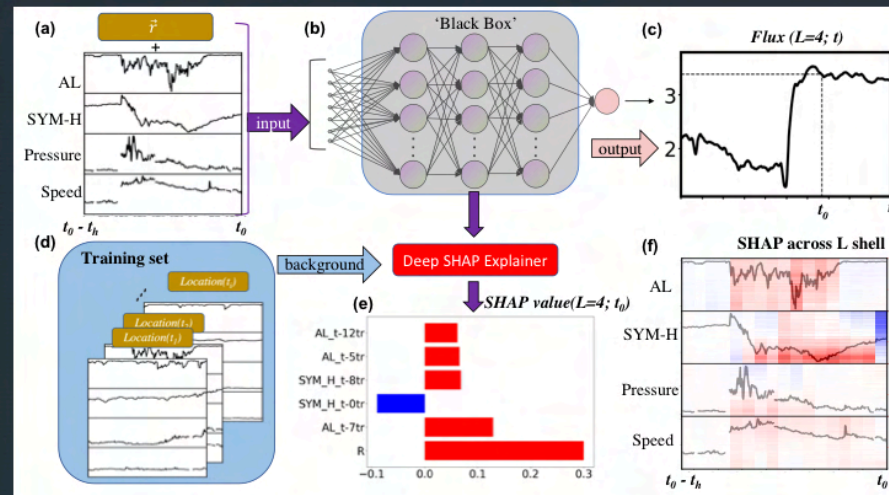
jbortnik@atmos.ucla.edu

Web:

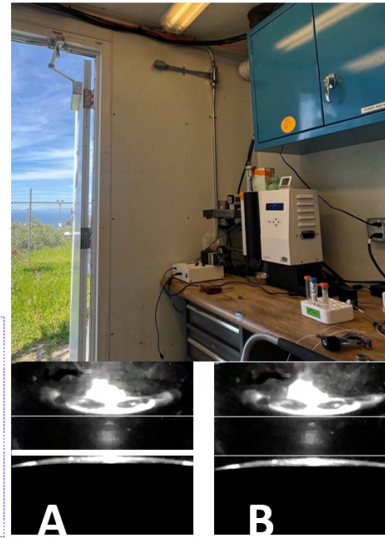
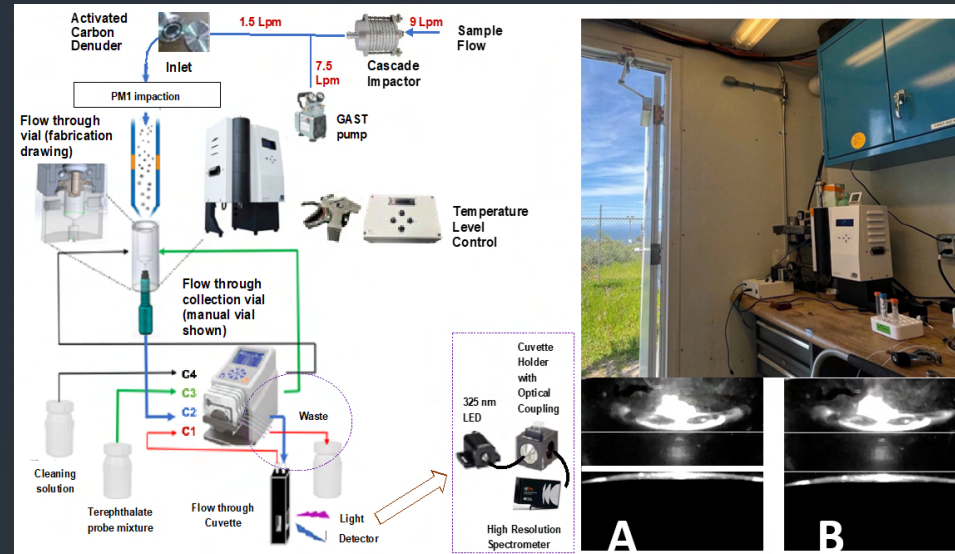
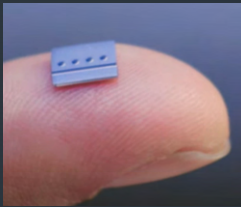
<https://atmos.ucla.edu/space/>

We aim to:

1. To understand and predict the complex physical processes that control the space environment, where spacecraft and astronauts often face hazardous radiation conditions (aka. Space weather)
2. We use a variety of 'traditional' approaches (often in combination), including analyzing data from current and past spacecraft missions, we run fundamental plasma physics experiments at UCLA's Large Plasma Device, and we perform large-scale computational simulations.
3. We use and explore novel approach such as Machine Learning and Artificial Intelligence to predict, probe, and understand physical systems, often inventing new approaches along the way to aid in insight discovery.



Prof. Suzanne Paulson



- Cloud Water Chemistry
- What is it about airborne particles that makes people sick?
- Air Quality in Urban Micro-Environments; sources, Environmental Justice, Air Quality in Africa
- Cutting Edge Aerosol Sensor Development



