

Argel Ramírez Reyes

ATMOSPHERIC MODELLING AND HIGH PERFORMANCE COMPUTING ENTHUSIAST - ATMOSPHERIC SCIENCE PHD CANDIDATE AT UC DAVIS

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Summary

Current graduate student researcher focusing on the physics of hurricanes through simple modeling. I like fluid dynamics and computer simulations with a tendency to think hard about performance. I am a Julia language enthusiast with a formal education in physics, high performance computing and atmospheric and climate dynamics. My favorite text editor is emacs.

Work Experience

Atmospheric Science Graduate Group, UC Davis

California, USA

GRADUATE STUDENT RESEARCHER

Sep. 2017 - Current

- Designed and conduct research on the genesis of tropical cyclones.
- Modify source code, compile, setup and run simulations using the Fortran model SAM (system for atmospheric modeling) on high performance computers with haswell and knl architectures.
- Design and implemented data-analysis software using the Julia language to analyze 80 TB of SAM.
- Implemented a convective parameterization on top of a shallow water model for the Oceananigans.jl package. This convective parameterization operates on CPU and CUDA-capable GPU architectures.
- Communicated the our research by writing and publishing peer-reviewed literature (1 published, 1 submitted and 1 in preparation).
- Communicated the advances of research by public presentation of work in 9 scientific conferences (4 poster presentations and 5 oral presentations).
- Published software in 3 reusable packages for the Julia language.

Atmospheric Science Graduate Group, UC Davis

California, USA

TEACHING ASSISTANT

Sep. 2017 - Current

- Lead discussion sessions, answered questions and graded homework and tests for around 200 undergraduate students for subjects including extreme weather, atmospheric thermodynamics, advanced atmospheric dynamics and hydroclimate.

Maison de la simulation, Commissariat à l'énergie atomique

Saclay, France

MASTER STUDENT INTERN

Mar. 2017 - Sep. 2017

- Started development of a hydrodynamics-radiation solver with adaptive mesh refinement in C++ using the p4est library following academic literature.
- Wrote detailed report on implementation and formulation that became a masters thesis.

Ocean-Atmosphere interaction group at Center for Atmospheric Sciences (UNAM)

Mexico City, Mexico

RESEARCH ASSISTANT

Jan. 2016 - Sep. 2016

- Analyzed meteorological simulation data to explain pollution transport between the Mexico City valley and neighboring valleys
- Design and wrote julia code for data analysis of netcdf output

Awards

2022 **Fellow**, Competitive fellowship for continuing graduate students at UC Davis

California, USA

2017 **Fellow**, Awarded CONACYT - UCMexus fellowship for doctoral studies

Mexico City, MX and
California, USA

Presentation

Atmospheric and Oceanic Fluid Dynamics

Breckenridge, CO

TALK

Jun 2022

The role and timescale of the moisture-entrainment-convection feedback in Spontaneous TC genesis

35th Conference on Hurricanes and Tropical Meteorology

Remote

TALK

March 2022

The role and timescale of the moisture-entrainment-convection feedback in Spontaneous TC genesis

AGU Fall Meeting

New Orleans, LA

POSTER

Dec 2021

The role and timescale of the moisture-entrainment-convection feedback in Spontaneous TC genesis

34th Conference on Hurricanes and Tropical Meteorology

TALK Remote presentation

Spontaneous Cyclogenesis without radiative and surface-flux feedbacks May 2021

AGU Fall Meeting

POSTER Remote presentation

The impact of the Moisture-Entrainment-Convection feedback on Spontaneous TC genesis Dec 2020

AGU Fall Meeting

TALK San Francisco, CA

Spontaneous Cyclogenesis without radiative and surface-flux feedbacks Dec 2019

CalGFD

TALK Caltech, Pasadena, CA

Spontaneous Cyclogenesis without radiative and surface-flux feedbacks Sep 2019

2nd ICTP Summer School on Theory, Mechanisms and Hierarchical Modelling of Climate Dynamics: Convective Organization and Climate Sensitivity

POSTER ICTP, Trieste, Italy

Spontaneous Cyclogenesis without radiative and surface-flux feedbacks Jul 2019

Atmospheric and Oceanic Fluid Dynamics meeting

POSTER Portland, ME

Spontaneous Cyclogenesis without radiative and surface-flux feedbacks May 2019

Committees

Winter
2022 **Organizing committee member**, Atmospheric Science Seminar - Winter Series

UC Davis

Education

University of California at Davis

PH.D. IN ATMOSPHERIC SCIENCE (IN PROGRESS) Davis, CA, USA

Sep 2017 - late 2022 (expected)

- Supervisor: **Dr. Da Yang** @ Lawrence Berkeley National Laboratory
- Research area: Tropical Atmosphere Convection, Dynamics and Climate, Numerical Modeling of the Atmosphere
- Dissertation topic: **Looking for the minimal recipe for the genesis of Tropical Cyclones**
- Tools: Fortran and Julia for modelling, Julia for data analysis, git for version control
- Recipient of the CONACYT - UCMexus Fellowship for Graduate Studies

Université de Lille 1 - Sciences et Technologies

M.S IN HIGH PERFORMANCE COMPUTING AND SIMULATION, SPECIALIZED IN SCIENTIFIC COMPUTING Villeneuve d'Ascq, France

Sep 2016 - Sep 2017

- Supervisor: **Dr. Pascal Tremblin**
- Masters Project: Development of a 2D Hydrodynamics-Radiative Transfer Model with Adaptive Mesh Refinement using the P4est Library

UNAM (Universidad Nacional Autónoma de México)

B.S. IN PHYSICS Mexico City, Mexico

Mar 2011 - Aug 2016

- Graduation Project: Minimum Action Principle and Noether's Theorem using Central Fractional Derivatives