Quentin Nicolas

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Research interests: Climate dynamics, Geophysical fluid dynamics

Education

University of California, Berkeley **August 2019 - present**
Ph.D. candidate, Earth and Planetary Science *Berkeley, CA, USA*
Advisor: William R. Boos

Ecole Polytechnique **August 2016 - July 2019**
Engineer's degree (MS equivalent) in Applied Mathematics *Palaiseau, France*
Coursework : Applied Mathematics, Mechanics, Computer Science and Theoretical Physics. GPA: 3.97.

Lycée Sainte-Geneviève **August 2014 - July 2016**
Preparatory Program *Versailles, France*
A two-year post-secondary intensive curriculum in mathematics and physics leading to nationwide competitive entrance examinations to the Grandes Ecoles for scientific studies. GPA: 3.99

Research experience

University of California, Berkeley **August 2019 - present**
Graduate student researcher *Berkeley, CA, USA*
– Theory and simulation of orographic precipitation in Earth's tropics (with Prof. William Boos). Using physical models, cloud-resolving simulations (WRF), and diverse sets of satellite-based observations and reanalyses.
– Theoretical study of the excitation of magnetohydrodynamic waves atop Earth's core (with Prof. Bruce Buffett).

Woods Hole Oceanographic Institution **June - August 2023**
Summer fellow *Woods Hole, MA, USA*
– Simple models of superrotation in planetary atmospheres (with Prof. Geoffrey K. Vallis).

Inria Paris **March - July 2019**
Master thesis *Paris, France*
– Mathematical modeling of the human liver function and hemodynamics. With Prof. Irene E. Vignon-Clementel, in collaboration with surgeons from Hôpital Paul Brousse, AP-HP, Villejuif, France

Teaching experience

University of California, Berkeley **August - December 2022**
Graduate student instructor *Berkeley, CA, USA*
ME106, Fluid Mechanics. Taught discussion sections for 140 students.

University of California, Berkeley **August - December 2020**
Graduate student instructor *Berkeley, CA, USA*
GEOG40, Introduction to Earth system science. Remotely taught discussion sections for 30 students.

Lycée Sainte-Geneviève **September 2017 - June 2018**
Oral examiner *Versailles, France*
Conducted weekly oral examinations in mathematics for undergraduate students.

Awards and honors

Best student author award. Geophysical Journal International. **2023**

Geophysical Fluid Dynamics Fellow. Woods Hole Oceanographic Institution summer program. **2023**

2nd place student oral presentation. AMS 20th conference on Mountain Meteorology. **2022**

Outstanding Student Presentation Award. AGU Fall meeting 2021. **2022**

H2H8 Graduate Research Grant. Awarded resources: $10,000. **2021**

Peer-reviewed publications

Q. Nicolas, and W. R. Boos (2024). Understanding the Spatiotemporal Variability of Tropical Orographic Rainfall Using Convective Plume Buoyancy. *Journal of Climate 37*, 1737–1757.

Q. Nicolas, and B. Buffett (2023). Excitation of high-latitude MAC waves in Earth's core. *Geophysical Journal International 233*, 1961–1973.

Q. Nicolas, and W. R. Boos (2022). A Theory for the Response of Tropical Moist Convection to Mechanical Orographic Forcing. *Journal of the Atmospheric Sciences 79*, 1761–1779.

N. Ramesh, **Q. Nicolas**, and W. R. Boos (2021). The Globally Coherent Pattern of Autumn Monsoon Precipitation. *Journal of Climate 34*, 5687–5705.

N. Golse, F. Joly, P. Combari, M. Lewin, **Q. Nicolas**, et al. (2021). Predicting the risk of post-hepatectomy portal hypertension using a digital twin: A clinical proof of concept. *Journal of Hepatology 74*, 661–669.

N. Golse, F. Joly, **Q. Nicolas**, et al. (2020). Rapid modeling: a surgical proof-of-concept explained by hemodynamics modeling. *Computer Methods in Biomechanics and Biomedical Engineering 23*, S130–S132.

D. Dousse, E. Vibert, **Q. Nicolas**, et al. (2020). Indocyanine Green Fluorescence Imaging to Predict Graft Survival After Orthotopic Liver Transplantation: A Pilot Study. *Liver Transplantation 26*, 1263–1274.

N. Golse, F. Joly, **Q. Nicolas**, et al. (2020). Partial Orthotopic Liver Transplantation in Combination With Two-stage Hepatectomy : a proof-of-concept explained by mathematical modelling. *Clinical Biomechanics 73*, 195–200.

Publications in preparation

Q. Nicolas and G. K. Vallis. Equatorial Superrotation in Shallow, Slowly Rotating and Tidally-Locked Planetary Atmospheres. Anticipated submission to *Monthly Notices of the Royal Astronomical Society, 2024*

Q. Nicolas and W. R. Boos. Sensitivity of tropical orographic precipitation to wind speed and implications for projected rainfall changes in South Asia. Anticipated submission to *npj Climate and Atmospheric Science, 2024*

Conference presentations and invited seminars

Sorbonne Université, LMD seminar — **January 2024**
A quasiequilibrium view of tropical orographic precipitation (invited) — *Paris, France*

Ecole normale supérieure, LMD seminar — **December 2023**
A quasiequilibrium view of tropical orographic precipitation (invited) — *Paris, France*

AGU Fall meeting 2023 — **December 2023**
Convectively Coupled mountain waves and the sensitivity of orographic precipitation to warming — *San Francisco, CA, USA*

AGU Fall meeting 2022 — **December 2022**
Chicago, IL, USA
- *Understanding the spatio-temporal variability of tropical orographic rainfall using convective plume buoyancy*
- *Excitation of high-latitude MAC waves in Earth's core*
- *Orographic precipitation in the tropics and its sensitivity to climate change (invited)*

AMS 20th conference on Mountain Meteorology — **June 2022**
A Theory for the response of tropical moist convection to mechanical orographic forcing — *Park City, UT, USA*

AMS 23rd Conference on Atmospheric and Oceanic Fluid Dynamics — **June 2022**
A Theory for the response of tropical moist convection to mechanical orographic forcing — *remote*

AGU Fall meeting 2021 — **December 2021**
A Theory for the response of tropical moist convection to mechanical orographic forcing — *remote*

Outreach activities

Presenter & convener, UC Berkeley Earth Sciences day — **March 2023**
Introducing Earth Sciences to undergraduates with limited exposure to physical sciences, or who are limited from engaging in outdoor activities. — *Berkeley, CA, USA*

Presenter, PubScience **September 2023**
Communicating climate science in local pubs to the East bay community. *Berkeley, CA, USA*

Professional Experience

AREVA NP - OL3 Nuclear Power Plant **June-August 2018**
Commissioning engineer intern *Olkiluoto, Finland*
Conducted tests on the Instrumentation & Control systems of the plant.

French Navy **October 2016 - April 2017**
Officer cadet *Reunion island & Indian ocean*
7-month leadership training on a French frigate (Floréal). Awarded the National Defense Bronze medal and the French Commemorative medal.

Other

Programming languages: Python, C/C++, some experience in Fortran, Matlab, and Java.
Programming tools: Atmospheric & oceanic circulation models (WRF, SAM, MITgcm), various data analysis packages (e.g. pandas, xarray), parallel computing tools (MPI, CUDA, OpenMP, dask).
Experienced with Unix-based operating systems.
Languages spoken: French (native), English (fluent), Spanish (intermediate)