

Navid C. Constantinou


ARC Centre of Excellence for Climate Extremes
Research School of Earth Sciences
Australian National University, Australia

✉ navid.constantinou@anu.edu.au
w www.navidconstantinou.com
🌐 [navidcy](#) 📧 [navidcy](#)
📞 0000-0002-8149-4094
📄 [arXiv/a/constantinou_n_1](#)

Interests

Geophysical fluid dynamics, physical oceanography, atmospheric dynamics, climate dynamics, fluid mechanics.

Education

- Oct. 2010 – Feb. 2015 **Ph.D. in Physics**
National & Kapodistrian University of Athens, Greece
SUPERVISOR : Petros J. Ioannou
THESIS : Formation of large-scale structures by turbulence in rotating planets [\[arXiv\]](#) 
- Sep. 2008 – Jun. 2010 **M.Sc. in Physics** (summa cum laude)
Astrophysics, Astronomy and Mechanics
National & Kapodistrian University of Athens, Greece
- Sep. 2003 – Jun. 2008 **B.Sc. in Physics** (summa cum laude, 9.16/10)
National & Kapodistrian University of Athens, Greece
Exchange through Socrates-Erasmus program during spring semester 2006 at the
Rheinische Friedrich-Wilhelms Universität, Bonn, Germany
- Jul. 2001 – Aug. 2003 **Cyprus National Guard**
Military service as Second Lieutenant in Armored Forces, Cyprus

Experience



- May. 2018 – **Research Fellow**, part of the ARC Centre of Excellence for Climate Extremes
Research School of Earth Sciences, Australian National University (with Andy Hogg)
- Sep. 2015 – Apr. 2018 **Postdoctoral Researcher (NOAA Climate & Global Change Postdoctoral Fellow)**
Scripps Institution of Oceanography, University of California San Diego, USA (with William R. Young)
- Jun. 2015 – Aug. 2015 **Visiting Researcher**
Cyprus Oceanography Center, University of Cyprus


Grants & Awards



- 2015-2017 *NOAA Climate & Global Change Postdoctoral Fellowship* (150,000 USD)
- 2009-2014 *Alexander S. Onassis Foundation*
Scholarship for the 2nd year of M.Sc. and for 4 years of Ph.D. studies (47,700 USD)
- 2009-2012 *A. G. Leventis Foundation*
Scholarship for the 2nd year of M.Sc. and the first 2 years of Ph.D. studies (16,000 USD)
- 2003-2006 *Department of Physics, National & Kapodistrian University of Athens, Greece*
1st student for academic years 2003-04 and 2004-05
Honorary Scholarship for academic year 2005-06
- 2001 *International Physics Olympiad, June 2001*
Participation with the National team of Cyprus



Publications



In press/published



Bakas, N. A., N. C. **Constantinou**, and P. J. Ioannou (2019). Statistical state dynamics of weak jets in barotropic beta-plane turbulence. *J. Atmos. Sci.* (in press, doi:[10.1175/JAS-D-18-0148.1](https://doi.org/10.1175/JAS-D-18-0148.1)).  



Constantinou, N. C. and J. B. Parker (2018). Magnetic suppression of zonal flows on a beta-plane. *Astrophys. J.*, 863, 46.   (featured in the [ANU](#) and [LLNL](#) press news, and [The Conversation](#))



Constantinou, N. C. (2018). A barotropic model of eddy saturation. *J. Phys. Oceanogr.*, 48(2), 397-411.  



Constantinou, N. C. and W. R. Young (2017). Beta-plane turbulence above monoscale topography. *J. Fluid Mech.*, 827, 415-447.  



Farrell, B. F., P. J. Ioannou, J. Jiménez, N. C. **Constantinou**, A. Lozano-Durán, and M.-A. Nikolaidis (2016). A statistical state dynamics-based study of the structure and mechanism of large-scale motions in plane Poiseuille flow. *J. Fluid Mech.*, 809, 290-315.  

Constantinou, N. C., B. F. Farrell, and P. J. Ioannou (2016). Statistical state dynamics of jet-wave coexistence in barotropic beta-plane turbulence. *J. Atmos. Sci.*, 73 (5), 2229-2253.  



Bakas, N. A., N. C. **Constantinou**, and P. J. Ioannou (2015). S3T stability of the homogeneous state of barotropic beta-plane turbulence. *J. Atmos. Sci.*, 72 (5), 1689-1712.  



Constantinou, N. C., A. Lozano-Durán, M.-A. Nikolaidis, B. F. Farrell, P. J. Ioannou, and J. Jiménez (2014). Turbulence in the highly restricted dynamics of a closure at second order: comparison with DNS. *J. Phys.: Conf. Ser.*, 506, 012004.  

Constantinou, N. C., B. F. Farrell, and P. J. Ioannou (2014). Emergence and equilibration of jets in beta-plane turbulence: applications of Stochastic Structural Stability Theory. *J. Atmos. Sci.*, 71 (5), 1818-1842.  


Constantinou, N. C. and P. J. Ioannou (2011). Optimal excitation of two dimensional Holmboe instabilities. *Phys. Fluids*, 23, 074102.  

Conference Proceedings

Constantinou, N. C., P. J. Ioannou, and N.A. Bakas (2016). Structure and stability of low amplitude jet equilibria in barotropic turbulence. In Karacostas, T., Bais, A. and Nastos, T. P. (eds.) *Perspectives on Atmospheric Sciences*, 369-375, Springer International Publishing.  

Bakas, N. A., N. C. **Constantinou**, and P. J. Ioannou (2016). On the dynamics underlying the emergence of coherent structures in barotropic turbulence. In Karacostas, T., Bais, A. and Nastos, T. P. (eds.) *Perspectives on Atmospheric Sciences*, 361-367, Springer International Publishing.  


Other publications

Lozano-Durán, A., M. Karp, and N. C. **Constantinou** (2018) Wall turbulence with constrained energy extraction from the mean flow, *Center for Turbulence Research – Annual Research Briefs*. 

Constantinou, N. C. (2018) Jupiter's magnetic fields may stop its wind bands from going deep into the gas giant, *The Conversation*, 10th August 2018 [\[URL\]](#)

Conferences

Barotropic versus baroclinic eddy saturation. *AGU Fall Meeting 2018*, Washington DC, USA, 10-14 Dec. 2018. (poster) 

Magnetic suppression of zonal flows on a beta plane. *AGU Fall Meeting 2018*, Washington DC, USA, 10-14 Dec. 2018. (poster) 

Statistical state dynamics reveals mechanism for organization of coherent structures in turbulent flows. *Euro-mech Colloquium 598: Coherent structures in wall-bounded turbulence*, Imperial College London, London, UK,

29-31 Aug. 2018. (invited talk) [↓](#)

Eddy saturation in a barotropic model. *21st Conference on Atmospheric and Oceanic Fluid Dynamics*, Portland, USA, 25-30 Jun. 2017. (talk) [↓](#)

A statistical state dynamics based theory for jet–wave coexistence in beta-plane turbulence. *21st Conference on Atmospheric and Oceanic Fluid Dynamics*, Portland, USA, 25-30 Jun. 2017. (poster) [↓](#)

Understanding self-organization in turbulent flows by studying the statistical state dynamics, *Conference on “Recurrence, self-organization, and the dynamics of turbulence”*, KITP, UC Santa Barbara, USA, 9-13 Jan. 2017. (invited talk) [↓](#)

Topographic beta-plane turbulence and form stress. *AGU Fall Meeting 2016*, San Francisco, USA, 12-16 Dec. 2016. (poster) [↓](#)

Structure and mechanism of turbulence under dynamical restriction in plane Poiseuille flow. *69th APS Division of Fluid Dynamics Meeting*, Portland, USA, 20-22 Nov. 2016. (talk) [↓](#)

Statistical state dynamics of jet/wave coexistence in beta-plane turbulence. *APS March Meeting 2016*, Baltimore, USA, 14-18 Mar., 2016. (talk) [↓](#)

Emergence and equilibration of zonal winds in turbulent planetary atmospheres. 12th International Conference on Meteorology, Climatology and Atmospheric Physics, COMECAP 2014 [\[URL\]](#), Heraklion, Crete, Greece, 28-31 May 2014. (poster) [↓](#)

Emergence and equilibration of jets in planetary turbulence. EGU 2013 General Assembly [\[URL\]](#), Vienna, Austria, 8-12 Apr. 2013. (talk) [↓](#)

Emergence and equilibration of jets in planetary turbulence. 8th Panhellenic Meeting “Fluid Flow Phenomena” (ROI 2012) [\[URL\]](#), Volos, Greece, 16-17 November 2012. (talk) [↓](#)

Seminars

Eddy saturation in a barotropic model. LDEO OCP Seminar [\[URL\]](#), Lamont-Doherty Earth Observatory, Columbia University, Palisades, USA, 27 Oct. 2017. [↓](#)

Eddy saturation in a barotropic model. CEAFM Seminar [\[URL\]](#), Department of Earth & Planetary Sciences, The Johns Hopkins University, Baltimore, USA, 13 Oct. 2017. [↓](#)

Topographic beta-plane turbulence and form stress. Geophysical Fluid Dynamics Summer Program, WHOI [\[URL\]](#), Woods Hole, USA, 19 Jul. 2016. [↓](#)

Topographic beta-plane turbulence and form stress. Mathematics of Turbulence Reunion Conference, IPAM, UCLA [\[URL\]](#), Lake Arrowhead, 7 Jun. 2016. [↓](#)

Statistical state dynamics of planetary turbulence. CEAFM Seminar [\[URL\]](#), Whiting School of Engineering, The Johns Hopkins University, Baltimore, 18 Mar. 2016. [↓](#)

A theory for large-scale structure formation in atmospheric/oceanic turbulence: Is jet formation a phase transition phenomenon? CASPO Seminar, Scripps Institution of Oceanography, UC San Diego [\[URL\]](#), La Jolla, 10 Feb. 2016. [↓](#)

Formation of large-scale structures by turbulence in planetary atmospheres. Physics Department, University of Cyprus [\[URL\]](#), Nicosia, 5 May 2015. [↓](#)

Emergence of large-scale structure in planetary turbulence as an instability of the homogeneous turbulent state. IPAM, UCLA [\[URL\]](#), Los Angeles, 21 Oct. 2014. [↓](#)

Emergence and equilibration of zonal winds in turbulent planetary atmospheres. Cyprus Oceanography Center, University of Cyprus [\[URL\]](#), Nicosia, 7 Jan. 2014. [↓](#)

Verification of the predictions of SSST in nonlinear simulations. 2nd Meeting of “Zonal Jets and Eddies” team, International Space Science Institute (ISSI) [\[URL\]](#), Bern 2-5 Apr. 2013. [↓](#)

Workshops

- 2018 **ARC Centre of Excellence for Climate Extremes Annual Workshop**
November 19 - November 21, Wollongong, NSW, Australia [\[URL\]](#)
- 2017 **Vorticity in the Universe: From superfluids to weather and climate, to the universe**
Aspen Center for Physics
August 27 - September 17 2017, Aspen, CO, USA [\[URL\]](#)
- 2017 **Les Houches Summer School on Fundamental Aspects of Turbulent Flows in Climate Dynamics**
Les Houches Physics School
July 31 - August 25 2017, Les Houches, France [\[URL\]](#)
- 2014 **Mathematics of Turbulence**
Institute of Pure & Applied Mathematics, UCLA
September 8 - December 12 2014, Los Angeles, USA [\[URL\]](#)
- 2013 **Geoturb: Numerical modeling and theoretical challenges in atmosphere and ocean turbulence**
Ecole normale supérieure de Lyon
2-4 October 2013, Lyon, France. [\[URL\]](#)
- 2013 **First Multiflow Summer Workshop**
Universidad Politécnica de Madrid
10 June - 12 July 2013, Madrid, Spain. [\[URL\]](#)
- 2011 **International Graduate School on Stability, Transition to Turbulence and Flow Control**
organized by Advanced Instability Methods (AIM) Network
22-27 August 2011, Cambridge, UK. [\[URL\]](#)
- 2009 **Climate Variability & Climate Change: Estimating and reducing uncertainties**
8-17 June 2009, Visegrád, Hungary. [\[URL\]](#)

Programming skills

 Julia, Python, Matlab, git, markdown

Software

Core developer for “FourierFlows.jl”: Julia package for solving PDEs on doubly-periodic domains using Fourier-based pseudospectral methods; doi:[10.5281/zenodo.1161724](https://doi.org/10.5281/zenodo.1161724)

Teaching experience

- 2018 Course Coordinator for **Instabilities in fluids** (Honours/Masters) [lecture notes and project reports available at [github](#)]
Research School of Earth Sciences, Australian National University
- 2018 Visiting lecturer for **Fluid Mechanics** (Undergraduate) [lecture notes available at [github](#)]
Department of Physics and Physical Oceanography, University of North Carolina Wilmington, USA
- 2016 Teaching assistant for **Applied Mathematics III** (Graduate)
Scripps Institution of Oceanography, University of California San Diego, USA
- 2010-2014 Teaching assistant for **Nonlinear dynamical systems** (3rd year Undergraduate)
Physics Department, National & Kapodistrian University of Athens, Greece

Other scientific activities

Reviewer : Journal of Fluid Mechanics, Journal of Physical Oceanography, Physics of Plasmas, Physics Letters A, Scientific Reports.

Member : American Geophysical Union, American Meteorological Society, American Physical Society (also member of Topical Group on the Physics of Climate).

References

Petros J. Ioannou (Ph.D. advisor)
Department of Physics
National & Kapodistrian University of Athens,
Greece
Zografos, 157 84, Greece
☎ +30 210 7276910
✉ pjioannou@phys.uoa.gr
w <http://users.uoa.gr/~pjioannou>

Andy McC. Hogg (postdoc supervisor)
Research School of Earth Sciences
Australian National University
Canberra, ACT 2601, Australia
☎ +61 2 61259962
✉ andy.hogg@anu.edu.au
w <http://rses.anu.edu.au/people/andy-hogg>

William R. Young (postdoc supervisor)
Scripps Institution of Oceanography
University of California San Diego
La Jolla, CA 92037-0213, USA
☎ +1 (858) 534-1380
✉ wryoung@ucsd.edu
w <http://pordlabs.ucsd.edu/wryoung/>

Brian F. Farrell
Department of Earth and Planetary Sciences
Harvard University
Cambridge, MA 02138, USA
☎ +1 (617) 495-2998
✉ farrell@seas.harvard.edu
w <http://brian-f-farrell.fas.harvard.edu>