Navid C. Constantinou

ARC DECRA Research Fellow
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Interests

Geophysical fluid dynamics, physical oceanography, atmospheric dynamics, climate, machine learning, fluid mechanics, story telling (both science-related or not)

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 w/ Honors** (summa cum laude, 9.66/10)
Astrophysics, Astronomy and Mechanics
National & Kapodistrian University of Athens, Greece

Sep. 2003 – Jun. 2008 **B.Sc. in Physics w/ Honors** (summa cum laude, class of 2008 valedictorian, 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 (obligatory) as Second Lieutenant in Armored Forces, Cyprus

Appointments

June 2021 – **ARC Discovery Early Career Researcher Award (DECRA) Fellow**
Research School of Earth Sciences, Australian National University, Australia

May 2018 – May 2021 **Research Fellow**, part of the ARC Centre of Excellence for Climate Extremes
Research School of Earth Sciences, Australian National University, Australia (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, Cyprus

Grants & Awards

2021-2024 *ARC Discovery Early Researcher Career Award 2021* (ARC: 300,000 USD + ANU: 100,000 USD)

2019 *Best paper among Early Career Researchers within ARC Centre of Excellence for Climate Extremes*

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)

2003-2008 *Department of Physics, National & Kapodistrian University of Athens, Greece*
Valedictorian for class 2008
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

Published / In Press

21. Hogg, A. McC., Penduff, T., Close, S. E., Dewar, W. K., **Constantinou, N. C.**, and Martínez-Moreno, J (2022) Circumpolar variations in the chaotic nature of Southern Ocean eddy dynamics. *J. Geophys. Res.-Oceans*, **127**, e2022JC018440.

2022 20. Wagner, T. J. W., Eisenman, I., Ceroli, A. M., and **Constantinou, N. C.** How winds and ocean currents influence the drift of floating objects. *J. Phys. Oceanogr.*, **52(5)**, 907-916.

19. **Constantinou, N. C.** and Hogg, A. McC. (2021) Intrinsic oceanic decadal variability of upper-ocean heat content. *J. Climate*, **34 (15)**, 6175-6189. [datasets and notebooks] (featured in the CLEX press news)

18. Martínez-Moreno, J., Hogg, A. McC., England, M. H., **Constantinou, N. C.**, Kiss, A. E., and Morrison, A. K. (2021) Global changes in oceanic mesoscale currents over the satellite altimetry record. *Nat. Clim. Chang.*, **11**, 397-403. (featured in the CLEX press news; also read about it in The Conversation)
Selection of Press Coverage: The Guardian, The Sydney Morning Herald, Cosmos Magazine.

17. **Constantinou, N. C.**, Wagner, G. L., Siegelman, L., Pearson, B. C., and Palóczy, A. (2021) GeophysicalFlows.jl: Solvers for geophysical fluid dynamics problems in periodic domains on CPUs & GPUs. *J. Open Source Softw.*, **6 (60)**, 3053. (code repository; package documentation)

2021 16. Lozano-Durán, A., **Constantinou, N. C.**, Nikolaidis, M.-A., and Karp, M. (2021). Cause-and-effect of linear mechanisms in wall turbulence. *J. Fluid Mech.*, **914**, A8.

15. Lozano-Durán, A., Nikolaidis, M.-A., **Constantinou, N. C.**, and Karp, M. (2020). Alternative physics to understand wall turbulence: Navier–Stokes equations with modified linear dynamics. *J. Phys.: Conf. Ser.*, **1522**, 012003.

2020 14. Rocha, C. B., **Constantinou, N. C.**, Llewellyn Smith, S. G., and Young, W. R. (2020) The Nusselt numbers of horizontal convection. *J. Fluid Mech.*, **894**, A24.

13. **Constantinou, N. C.** and Hogg, A. McC. (2019). Eddy saturation of the Southern Ocean: a baroclinic versus barotropic perspective. *Geophys. Res. Lett.*, **46**, 12202–12212. [datasets and notebooks] (Best Early Career Researcher paper within CLEx for year 2019.)

12. Martínez-Moreno, J., Hogg, A. McC., Kiss, A. E., **Constantinou, N. C.**, and Morrison, A. K. (2019). Kinetic energy of eddy-like features from sea surface altimetry. *J. Adv. Model. Earth Sy.*, **11 (10)**, 3090-3105. (Featured in the CLEx press news.)

11. Parker, J. B. and **Constantinou, N. C.** (2019). Magnetic eddy viscosity of mean shear flows in two-dimensional magnetohydrodynamics. *Phys. Rev. Fluids*, **4**, 083701. (Featured in the ANU and LLNL press news.)

2019 10. Bakas, N. A., **Constantinou, N. C.**, and Ioannou, P. J. (2019). Statistical state dynamics of weak jets in barotropic beta-plane turbulence. *J. Atmos. Sci.*, **76 (3)**, 919-945. (Featured in the CLEx press news.)

9. **Constantinou, N. C.** and Parker, J. B. (2018). Magnetic suppression of zonal flows on a beta-plane. *Astrophys. J.*, **863**, 46. (Featured in the ANU and LLNL press news; also read about it in The Conversation.)

2018 8. **Constantinou, N. C.** (2018). A barotropic model of eddy saturation. *J. Phys. Oceanogr.*, **48(2)**, 397-411.

2017 7. **Constantinou, N. C.** and Young, W. R. (2017). Beta-plane turbulence above monoscale topography. *J. Fluid Mech.*, **827**, 415-447.

6. Farrell, B. F., Ioannou, P. J., Jiménez, J., **Constantinou, N. C.**, Lozano-Durán, A., and Nikolaidis, M.-A. (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.

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

up to 2015 4. Bakas, N. A., **Constantinou, N. C.**, and Ioannou, P. J. (2015). S3T stability of the homogeneous state of barotropic beta-plane turbulence. *J. Atmos. Sci.*, **72 (5)**, 1689-1712.

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

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

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

Chapters in Books (refereed)

2. **Constantinou, N. C.**, Ioannou, P. J., and Bakas, N. A. (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.

2016 1. Bakas, N. A., **Constantinou, N. C.**, and Ioannou, P. J. (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.

Conference Proceedings (refereed)

3. Ioannou, P. J., Nikolaidis, M.-A., and **Constantinou, N. C.** (2014) Simplified turbulence in wall-bounded flows. *9th Panhellenic Meeting "Fluid Flow Phenomena" (ROH 2014)*, Athens, 12-13 Dec., 2014 (in greek).

2. Bakas, N. A., Ioannou P. J., and **Constantinou, N. C.** (2014). Emergence of non-zonal coherent structures in barotropic turbulence. In Kanakidou, M., Mihalopoulos, N. and Nastos, P. (eds.) *Proceedings of the 12th International Conference on Meteorology, Climatology & Atmospheric Physics (COMECAP)*, Heraklion, Crete, 28-31 May, Vol. 1, 107-111, ISBN: 978-960-524-430-9.

2014 1. **Constantinou, N. C.** and Ioannou, P. J. (2014). Emergence and equilibration of zonal winds in turbulent planetary atmospheres. In Kanakidou, M., Mihalopoulos, N. and Nastos, P. (eds.) *Proceedings of the 12th International Conference on Meteorology, Climatology & Atmospheric Physics (COMECAP)*, Heraklion, Crete, 28-31 May, Vol. 1, 210-214, ISBN: 978-960-524-430-9.

Other publications

5. **Constantinou, N. C.** (2021). How machine learning is helping us fine-tune climate models to reach unprecedented detail. *The Conversation*, 18th August 2021. [URL]

2021 4. **Constantinou, N. C.**, Martínez-Moreno, J., Hogg, A. McC., England, M. H., Kiss, A. E., and Morrison, A. K. (2021). Satellites reveal ocean currents are getting stronger, with potentially significant implications for climate change. *The Conversation*, 23rd April 2021. [URL]

2019 3. Lozano-Durán, A., Nikolaidis, M.-A., **Constantinou, N. C.**, and Karp, M. (2019). Wall turbulence without modal instability of the streaks. (arXiv:1909.05490)

2. Lozano-Durán, A., Karp, M., and **Constantinou, N. C.** (2018). Wall turbulence with constrained energy extraction from the mean flow. *Center for Turbulence Research – Annual Research Briefs 2018*, 209-220.

2018 1. **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

Open-source, reproducible workflow in physical oceanography and geophysical fluid dynamics. *Ocean Sciences Meeting 2022*, Virtual Conference, USA, 27 Feb.-3 Mar 2021. (**invited talk**)

2022 A data-driven approach for developing and calibrating a parameterization for mesoscale eddy fluxes. *Ocean Sciences Meeting 2022*, Virtual Conference, USA, 27 Feb.-3 Mar 2021. (talk)

2021 A data-driven approach for developing and calibrating a parameterization of the ocean mesoscale eddy fluxes *Conference on "Machine Learning for Climate"*, KITP, UC Santa Barbara, USA, 1-4 Nov. 2021. (**invited talk**) [VIDEO]

Cause-and-effect of linear mechanisms in wall turbulence. *73rd APS Division of Fluid Dynamics Meeting*, Chicago, IL, USA, 22-24 Nov. 2020. (virtual talk) [VIDEO]

2020 Eddy saturation of the Southern Ocean: a baroclinic versus barotropic perspective. *Ocean Sciences Meeting 2020*, San Diego, CA, USA, 16-21 Feb. 2020. (poster)

Demystifying the Southern Ocean's response to wind variability. *ARC Centre of Excellence for Climate Extremes Annual Workshop 2019* [URL], Hobart, Tasmania, Australia, 19-21 Nov. 2019. (**invited talk**)

Barotropic versus baroclinic eddy saturation: implications to Southern Ocean dynamics. *22nd Conference on Atmospheric and Oceanic Fluid Dynamics*, Portland ME, USA, 24-28 Jun. 2019. (talk)

2019 Magnetic eddy viscosity of mean shear flows in 2D magnetohydrodynamics: possible application to gas giants' interiors. *22nd Conference on Atmospheric and Oceanic Fluid Dynamics*, Portland ME, USA, 24-28 Jun. 2019. (poster)

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)

2019 Statistical state dynamics reveals mechanism for organization of coherent structures in turbulent flows. *Euromech Colloquium 598: Coherent structures in wall-bounded turbulence*, Imperial College London, London, UK, 29-31 Aug. 2018. (**invited keynote talk**)

Eddy saturation in a barotropic model. *21st Conference on Atmospheric and Oceanic Fluid Dynamics*, Portland OR, 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 OR, USA, 25-30 Jun. 2017. (poster)

2017 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)

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

up to 2014 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

2022 "From little things big things grow": how mesoscale eddies affect the global ocean circulation and climate, Scripps Institution of Oceanography, UC San Diego [URL], La Jolla, CA, USA, 12 May 2022. (**invited talk**)

2021 From small swirls up to the global ocean circulation: how ocean eddies affect the Earth's climate, Research School of Earth Sciences [URL], Australian National University, Canberra, Australia, 25 Mar. 2021. (**invited talk**) [VIDEO]

2020 Cause-and-effect of linear mechanisms in wall turbulence. Shear Flow Instability, Transition and Turbulence Seminar Series, Monash University [URL], (via Zoom), 7 Oct. 2020.

What's underneath Jupiter's and Saturn's stripes? FEARS Meeting, Research School of Astronomy and Astrophysics [URL], Australian National University, Canberra, Australia, 29 Oct. 2019.

What is hiding underneath the stripes of Jupiter and Saturn? Department of Physics Colloquium, Department of Physics [URL], National and Kapodistrian University of Athens [URL], Athens, Greece, 16 Oct. 2019.

Barotropic versus baroclinic eddy saturation: implications to Southern Ocean dynamics. Geophysical Fluid Dynamics Summer Program, Woods Hole Oceanographic Institution [URL], Woods Hole, USA, 9 Jul. 2019.

Barotropic versus baroclinic eddy saturation: implications to Southern Ocean dynamics. Geophysical Fluid Dynamics Summer Program, Woods Hole Oceanographic Institution [URL], Woods Hole, USA, 9 Jul. 2019.

A barotropic process-model for eddy saturation. WHOI Physical Oceanography Seminar Series, Woods Hole Oceanographic Institution [URL], Woods Hole, USA, 16 Apr. 2019.

How does the Antarctic Circumpolar Current respond to the increasing winds over the Southern Ocean? Barotropic versus baroclinic eddy saturation. Physics & Physical Oceanography Department Seminar Series, University of North Carolina Wilmington [URL], Wilmington NC, USA, 11 Apr. 2019.

How does the Antarctic Circumpolar Current respond to the increasing winds over the Southern Ocean?: Barotropic versus Baroclinic Eddy Saturation. Fluids Seminar Math Department [URL], Monash University [URL], Melbourne, Australia, 12 Feb. 2019.

2019 Statistical state dynamics: a new framework for understanding turbulent flows. Fluid Mechanics Research Group Seminar [URL], University of Melbourne [URL], Melbourne, Australia, 8 Feb. 2019.

Magnetic suppression of zonal flows on a beta plane. SpinLab Group Seminar [URL], University of California Los Angeles [URL], Los Angeles, CA, USA, 11 Jan. 2019.

2018 Barotropic versus baroclinic eddy saturation. Oceans and Climate Group Seminar [URL], Geophysical Fluid Dynamics Laboratory [URL], Princeton, NJ, USA, 12 Dec. 2018.

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

Eddy saturation in a barotropic model. ClimaTea Seminar [URL], Harvard University, Cambridge, MA, USA, 26 Oct. 2017.

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, Woods Hole Oceanographic Institution [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.

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.

up to 2015 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 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

2021 **Machine Learning and the Physics of Climate**
Kavli Institute for Theoretical Physics, UC Santa Barbara
November 1 - December 17 2021, Santa Barbara, CA, USA [URL]

2021 **Layering in Atmospheres, Oceans, and Plasmas**
Kavli Institute for Theoretical Physics, UC Santa Barbara
January 11 - March 12 2021, Santa Barbara (Virtual), CA, USA [URL]

2019 **Advanced Ocean Modelling School**
University of Tasmania
April 28 - May 3, Lake Pedder, Tasmania, 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]

Teaching

Jun. 2021 **Atmosphere and Ocean Dynamics Winter School 2021**
[Postponed due to COVID-19 lockdowns in East Australia]
(main lecturer along w/ Martin Singh and Annie Foppert)
Australian National University
[organized by ARC Centre of Excellence for Climate Extremes; more information online]

2021 – **Computational Geosciences** (Undergraduate/Honors EMSC4033; Masters EMSC8033)
(main lecturer and co-convener along w/ Louis Moresi)

[course website at github]
Research School of Earth Sciences, Australian National University, Australia

Jun. 2020 **Atmosphere and Ocean Dynamics Winter School 2020**
[School changed form due to COVID-19; 3 introductory lectures via Zoom, full-blown lectures postponed for 2021]
(main lecturer along w/ Martin Singh and Annie Foppert)
Institute for Marine and Antarctic Studies & University of Tasmania
[organized by ARC Centre of Excellence for Climate Extremes; more information online]

2020 Course Coordinator for **Basics of Dynamical Systems and Bifurcation Theory** (Honors/Masters/Graduate)
[3 lectures by Henk Dijkstra; 3 workshops by myself; lecture & workshop slides/notes available at github]
Research School of Earth Sciences, Australian National University, Australia

2018 Course Coordinator for **Instabilities in Fluids** (Honors/Masters)
[lecture notes and students' project reports available at github]
Research School of Earth Sciences, Australian National University, Australia

2018 Visiting lecturer for **Fluid Mechanics** (Undergraduate) [lecture notes available at github]
Department of Physics and Physical Oceanography, University of North Carolina Wilmington, USA

2017 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

Students

Ph.D.

Feb. 2021 – Ellie Ong (University of New South Wales; co-supervisor).
Project: "**Investigation into local drivers of change at the Antarctic Continental Margin**."

Oct. 2020 – Dhruv Bhagtani (Australian National University; co-supervisor).
Project: "**The interplay between wind stress and surface buoyancy in driving large-scale oceanic gyres**."

Masters/Honors

Feb. 2022 – Elise Palethorpe (Australian National University).
Project: "**Implementing a multi-grid pressure solver in CliMA's ocean model and use data-driven methods to accelerate the pressure solver's performance**."

Undergratuate

Feb. 2022 – Oliver Balfour (3rd year, Australian National University).
Project: "**Predicting cyclone genesis, trajectory, and intensity with machine learning**."

Feb. 2022 – Jack Miller (3rd year, Australian National University).
Project: "**Predicting cyclone genesis, trajectory, and intensity with machine learning**."

Alumni

Jul. 2020 – Nov. 2020 Elise Palethorpe (2nd year undergraduate student, Australian National University).
Project: "**Numerical methods for Partial Differential Equations**."
Aim: Learn basics of finite difference numerical schemes for solving hyperbolic and also study and implement high-order accurate weighted essentially non-oscillatory (WENO) schemes.

Nov. 2019 – Feb. 2020 Fabian Antonio Circelli (3rd year undergraduate student, Australian National University).
Project: "**Fourier-based Pseudospectral Methods for Solving Partial Differential Equations**."
Aim: Learn basics of pseudospectral techniques for solving PDEs and implement GPU functionality in FourierFlows.jl Julia package.

Programming skills

julia, Python, git

Open-Source Software

A small selection of contributions includes:

Lead developer for "FourierFlows.jl": Julia ecosystem for solving partial differential equations on periodic domains with Fourier-based pseudospectral methods; doi:10.5281/zenodo.1161724

Lead developer for "GeophysicalFlows.jl": Julia modules for solving problems in Geophysical Fluid Dynamics on periodic domains using Fourier-based pseudospectral methods; doi:10.5281/zenodo.1463809

Lead contributor for "Oceananigans.jl": A fast and friendly incompressible fluid flow solver in Julia that can be run in 1-3 dimensions on CPUs and GPUs; doi:10.21105/joss.02018

Lead contributor for "ParameterEstimocean.jl": Parameter estimation of turbulence closures for ocean models using Ensemble Kalman Inversion.; doi:10.5281/zenodo.5762810

Contributor for "xrft": Python package for taking the discrete Fourier transform (DFT) on xarray and dask arrays; doi:10.5281/zenodo.1402635

For more details visit my GitHub profile: navidcy

Outreach

I regularly contribute articles to The Conversation and also often appear in radio shows talking about science and been invited to give public audience lectures.

A selection of outreach events is found at my website: www.navidconstantinou.com/outreach/

Mobility

Studied and worked in academic institutions in **Greece**, **Cyprus**, **U.S.A.**, and **Australia**.

Other Scientific Activities

Reviewer: Journal of Fluid Mechanics, Journal of Physical Oceanography, Physics of Plasmas, Physics Letters A, Scientific Reports, Geophysical Research Letters, Fluids, Journal of Advances in Modeling Earth Systems, Mathematics and Computers in Simulation, Australian Research Council.

Hobbies

surfing, biking, horse riding, dancing, story telling, and story listening

References

Petros J. Ioannou (Ph.D. advisor)
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References for Teaching/Supervision

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