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Research interests

My research in geophysical and environmental fluid dynamics mainly focusses on the turbulent ocean dynamics arising from the interplay between the atmosphere and the ocean surface and it involves the usage of numerical models and observations. Of particular interest to me is the role of the mesoscale dynamics in controlling the ocean hydrodynamics and how to improve its representation in numerical ocean models. During my MSc and research assistant positions I worked on the coupling of Eulerian ocean and waves numerical models as well as the development and improvement of Lagrangian passive and active tracer models. My current Ph.D. research involves the numerical modelling of shelf seas. My goal is to improve the capability of current Ocean General Circulation models to adequately simulate the shelf seas dynamics. During my PhD research I developed a new vertical coordinate system for numerical ocean modelling and I applied it to study the hydrodynamics of the Black Sea and the Dead Sea.

Education

Degree:	**Ph.D. in Physical Oceanography**
Period:	**2015 — 2019**
University:	University of Plymouth, Plymouth, United Kingdom
Thesis Title:	*Advanced methods for numerical modelling of regional seas*
Supervisors:	**1st**: Prof. Georgy Shapiro (DoS, University of Plymouth) **2nd**: Prof. Tal Ezer (Old Dominion University) **3rd**: Dr. Fred Wobus (University of Plymouth)

Degree:	**M.Sc. in Environmental Sciences**
Period:	**2011 — 2014**
Rank:	110/110, with distinction (*magna cum laude*)
University:	University of Bologna, Bologna, Italy
Thesis Title:	*Study of a wind-wave numerical model and its integration with an ocean and an oil-spill numerical models*
Supervisors:	**1st**: Prof. Nadia Pinardi (DoS, University of Bologna) **2nd**: Dr. Michela De Dominicis (Instituto Nazionale di Geofisica e Vulcanologia)

Degree:	**B.Sc. in Marine Biology and Physical Oceanography**
Period:	**2007 — 2011**
Rank:	100/110
University:	Politecnico delle Marche, Ancona, Italy
Thesis Title:	*Implementation of an ocean numerical model to study the dispersion dynamics, in the marine environment, of a cooled and chlorinated seawater discharge coming from a LNG-FSRU terminal*
Supervisors	**1st**: Dr. Aniello Russo (DoS, Politecnico delle Marche)

Professional Experience

Research Title: Period:	**Shelf Seas Scientist** **Aug 2019 - present**
Employer:	UK Met Office Ocean Forecasting Research & Development Group, Exeter, United Kingdom
Main activities and responsibilities:	**Ocean Modelling - R&D**

Research Title: Period:	**Post-Doctoral Researcher** **Jun 2019 - Jul 2019**
Employer:	University of Plymouth Plymouth Ocean Forecasting Centre, Plymouth, United Kingdom
Main activities and responsibilities:	**Ocean Modelling - R&D**

Research Title: Period:	**Ph.D. Researcher** **Oct 2015 - May 2019**
Employer:	University of Plymouth Coastal Processes Research Group and Plymouth Ocean Forecasting Centre, Plymouth, United Kingdom
Main activities and responsibilities:	• **Scientific responsible** of **EMODnet - Black Sea Checkpoint** challenge Coast `http://emodnet-blacksea.eu/`) (challenge leader is Prof. Georgy Shapiro, University of Plymouth). • **Teaching assistant** for ∗ Shelf Seas and Estuaries (B.Sc.) (*Module Leader: Prof. G.I.Shapiro*) ∗ Introduction to Ocean Modelling (B.Sc.) (*Module Leader: Prof. G.I. Shapiro*) ∗ Modelling Marine Processes (M.Sc.) (*Module teacher: Prof. G. I. Shapiro*)

Research Title: Period:	**Senior Ocean Modeller** **Sep 2017 - Mar 2018**
Employer:	University of Plymouth Plymouth Ocean Forecasting Centre, Plymouth, United Kingdom
Main activities and responsibilities:	• **Ocean Modeller** for **Institutional Links STREAM 2016 Grant** - *Physical mechanisms which control water budget and sea level in the Dead Sea.* Partners of the project are ∗ University of Plymouth (Prof. Georgy Shapiro is P.I.) ∗ University of Jordan (Prof. Riyad Manasrah) ∗ Israel Oceanographic and Limnological Research National Institute (Dr. Isaac Gertman).

	The aim of the project is to test the hypothesis that the observed step-like structures in the Dead Sea have a significant effect on the rate of evaporation and hence the drop of the sea level. A numerical study is performed and the NEMO ocean model is modified and adapted to simulate the Dead Sea hydrodynamics.
Research Title: Period:	**Research Assistant** **2014 - 2015**
Employer:	Istituto Nazionale di Geofisica Vulcanologia - INGV *National Institute of Geophysics and Volcanology*, *National Group of Operational Oceanography* GNOO Bologna, Italy
Main activities and responsibilities:	• Member of the **NEMO** Ocean General Circulation Model **System Team** (**NEMO WAVE WORKING group**) • **Research and development** of the **MEDSLIK-II oil spill model** (open source model, `http://medslikii.bo.ingv.it/`) • **Development** of the web infrastructure for the integration of MEDSLIK-II in the **MEDESS 4MS** european project (Mediterranean Decision Support System for Marine Safety, `http://www.medess4ms.eu/`) • **Researcher on board** of **MEDESS4MS oceanographic cruises** (Serious Games) at Palma de Mallorca and Elba islands: numerical models and multi-platform observations (satellite, drifters) have been used to evaluate the forecast skills of the MEDESS4MS system during oil pollution episodes. • **Oil spill modeller** for **EMODnet - MedSea Checkpoint** - Human Activities sub-portal `http://www.emodnet-mediterranean.eu/`) • **Research and development** of the **SURF** (Structured Unstructured Relocatable model for Forecasting) wind-wave module in collaboration with the SiNCEM (Laboratorio di Simulazioni Numeriche del Clima e degli Ecosistemi Marini - Laboratory of Numerical Simulations of Climate and Marine Ecosystems) research group of the Alma Mater Studiorum University of Bologna within the TESSA project.

Publications

- **Bruciaferri, D.**, Shapiro, G., Stanichny, S., Zatsepin, A., Ezer, T., Wobus, F., Francis, X., Hilton, D. *The development of a 3D computational mesh to improve the representation of dynamic processes: the Black Sea test case* (*submitted to Ocean Modelling*).

- **Bruciaferri, D.**, Shapiro, G.I. and Wobus, F. (2018) *A multi-envelope vertical coordinate system for numerical ocean modelling.* Ocean Dynamics, Volume 68(10), Pages 1239-1258, `https://link.springer.com/article/10.1007%2Fs10236-018-1189-x`.

- M. De Dominicis, **D. Bruciaferri**, R. Gerin, N. Pinardi, P.M. Poulain, P. Garreau, G. Zodiatis, L. Perivoliotis, L. Fazioli, R. Sorgente, C. Manganiello, *A multi-model assessment of the impact of currents, waves and wind in modelling surface drifters and oil spill*, Deep Sea Research Part II: Topical Studies in Oceanography, Volume 133, November 2016, Pages 21-38, ISSN 0967-0645, `http://dx.doi.org/10.1016/j.dsr2.2016.04.002`.

- F. Trotta, E. Fenu, N. Pinardi, **D. Bruciaferri**, L. Giacomelli, I. Federico, G. Coppini, *A Structured and Unstructured grid Relocatable ocean platform for Forecasting (SURF)*, Deep Sea Research Part II: Topical Studies in Oceanography, Volume 133, November 2016, Pages 54-75, ISSN 0967-0645, `http://dx.doi.org/10.1016/j.dsr2.2016.05.004`.

- G. Zodiatis, M. De Dominicis, L. Perivoliotis, H. Radhakrishnan, E. Georgoudis, M. Sotillo, R.W. Lardner, G. Krokos, **D. Bruciaferri**, E. Clementi, A. Guarnieri, A. Ribotti, A. Drago, E. Bourma, E. Padorno, P. Daniel, G. Gonzalez, C. Chazot, V. Gouriou, X. Kremer, S. Sofianos, J. Tintore, P. Garreau, N. Pinardi, G. Coppini, R. Lecci, A. Pisano, R. Sorgente, L. Fazioli, D. Soloviev, S. Stylianou, A. Nikolaidis, X. Panayidou, A. Karaolia, A. Gauci, A. Marcati, L. Caiazzo, M. Mancini, *The Mediterranean Decision Support System for Marine Safety dedicated to oil slicks predictions*, Deep Sea Research Part II: Topical Studies in Oceanography, Volume 133, November 2016, Pages 4-20, ISSN 0967-0645, `http://dx.doi.org/10.1016/j.dsr2.2016.07.014`.

Conferences

- **D. Bruciaferri**, G. Shapiro, S. Stanichny, A. Zatsepin, T. Ezer, F. Wobus, X. Francis and D. Hilton. *A new numerical model for the Black Sea circulation.* Geophysical Research Abstracts. Vol. 21, EGU2019-5933, 2019, April 2019 (*Oral*).

- **D. Bruciaferri**, G. Shapiro, S. Stanichny, A. Zatsepin, T. Ezer, F. Wobus, X. Francis and D. Hilton. *A numerical model of the Black Sea circulation using a structured multi-envelope mesh with variable resolution.* Met Office seminars, 5^{th} March 2019, Exeter (UK) (*Oral*).

- **D. Bruciaferri**, G. Shapiro, S. Stanichny, A. Zatsepin, T. Ezer, F. Wobus, X. Francis and D. Hilton. *An advanced numerical model of the Black Sea.* PlyMSEF conference, Plymouth Marine Laboratoty, 5^{th} February 2019, Plymouth (UK) (*Oral*).

- G. I. Shapiro, R. Manasrah, I. Gertman and **D. Bruciaferri**. *The effect of different types of water column structure on the sea level in the Dead Sea.* Geophysical Research Abstracts. Vol. 20, EGU2018-19780, April 2018 (*Poster*).

- **D. Bruciaferri**, G. I. Shapiro and F. Wobus. *An Advanced Vertical Coordinate System to Improve the Representation of the Oceanic Transport in Regional Non-Isopycnal Ocean Models.* Abstract 310863 presented at 2018 Ocean Sciences Meeting, Portland, OR, 12-16 February 2018 (*Oral*).

- **D. Bruciaferri**, G. I. Shapiro and F. Wobus, *The development of an advanced vertical discretisation scheme for a regional ocean model.* Geophysical Research Abstracts. Vol. 19, EGU2017-7276, April 2017 (*Poster*).

- **D. Bruciaferri**, G. I. Shapiro, F. Wobus, *A coupled ocean-wave modeling system to investigate the role of the wave-induced turbulence on the Cold Intermediate Water formation in the Black Sea - The scientific approach*, NPOP conference, Bristol (UK), April 2016 (*Poster*).
- M. De Dominicis, N. Pinardi, **D. Bruciaferri**, S. Liubartseva, *Numerical modelling for real-time forecasting of marine oil pollution and hazard assessment*, EGU assembly 2015.

Technical Reports

- B. B. Romain, P. A. Bouttier, C. Bricaud, **D. Bruciaferri**, J. Chanut, S. A. Ciliberti, E. Clementi, A. Coward, D. Delrosso, C. Ethé, S. Flavoni, T. Graham, J. Harle, D. Iovino, D. Lea, C. Lévy, T. Lovato, G. Madec, N. Martin, S. Masson, P. Mathiot, S. Mocavero, G. Nurser, E. O'Dea, J. Paul, C. Rousset, D. Storkey, A. Storto, 2016, *Main achievements for NEMO evolution during MyOcean period*, Mercator Ocean Journal, 54
- **D. Bruciaferri** and the MEDSLIK-II System Team, 2016. MEDSLIK-II, *Lagrangian marine surface oil spill model, User Manual, Version 1.02.* `http://medslikii.bo.ingv.it/`.

Grant

- **BSc thesis bursary** offered by Ancona district and ECOTECH SYSTEMS (ETS srl) **02/2010 - 11/2011**
- **PlyMSEF Grant-In-Aid** offered by Plymouth Marine Science and Education Foundation (PlyMSEF) **02/2019**

Specialised Education

PG Course:	**Fluid Dynamics Summer School**
Period:	**September 2016**
Institute:	University of Cambridge Cambridge, United Kingdom Department of Applied Mathematics and Theoretical Physics (DAMTP)
Lecturers:	P. Bates, S. Bittlestone, C. Caulfield, J.M. Chomaz, S. Dalziel, P. Haynes, H. Johnson, P. Linden, M. McIntyre, C. Muller, J. Neufeld, S. Ortiz, R. Plougonven, E. Shuckburgh, A. Stegner, J. Taylor, A. Woods, T. Woollings, G. Worster, V. Zeitlin

PG Course:	**Ifremer Waves Spring School**
Period:	**June 2016**
Institute:	Institut Universitaire Européen de la Mer (IUEM) Brest, France
Lecturers:	Dr. Fabrice Ardhuin, Dr. Aron Roland

PG Course:	**Introduction to OpenMP and MPI**
Period:	**December 2015**
Institute:	ARCHER at University of Portsmouth, Portsmouth, United Kingdom

PG Course:	**NCEP/UMD Waves Summer School**
Period:	**June 2015**
Institute:	University of Maryland, Washington D.C., USA Department of Atmospheric and Oceanic Science
Lecturers:	Dr. Jose-Henrique Alves, Dr. Arun Chawla, Dr. Andrè van der Westhuysen

PG Course:	**Advanced Numerical Methods for Hyperbolic Equations and Applications Winter School**
Period:	**February 2015**
Institute:	University of Trento, Trento, Italy Department of Civil and Environmental Engineering, Laboratory of Applied Mathematics
Lecturers:	Prof. Dr. Eleuterio Toro and Prof. Dr.-Ing. Michael Dumbser

PG Course:	**Introduction to Fortran90**
Period:	**October 2014**
Institute:	CINECA computing centre, Casalecchio di Reno (Bologna), Italy

PG Course:	**Introduction to Python**
Period:	**September 2014**
Institute:	CINECA computing centre, Casalecchio di Reno (Bologna), Italy

PG Course:	**Introduction to HPC Scientific Programming: tools and techniques**
Period:	**November 2013**
Institute:	CINECA computing centre, Casalecchio di Reno (Bologna), Italy

Personal skills

- Languages: Italian (mother tongue), English and Spanish
- Computer skills:
  - **Operating systems**: Unix and Windows based
  - **Programming Lannguages**: Fortran77 and 90-95-2003, Python, Matlab, Latex
  - **Scripting Languages**: Bash and Shell
- Numerical Models:
  - **Hydrodynamic models**: NEMO, MITgcm
  - **Spectral Wave models**: WW3, SWAN
  - **Lagrangian models**: MEDSLIK-II, OpenDrift
- Open Water PADI license, 01/07/2009

References

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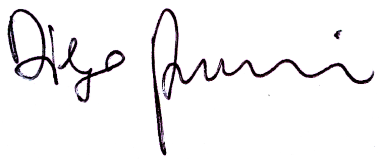

Diego Bruciaferri October 27, 2019