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RESEARCH INTERESTS

My research in geophysical and environmental fluid dynamics mainly focusses on the turbulent multi-scales dynamics of the ocean arising from the interplay between the atmosphere and the sea surface. I am particularly interested in understanding the mechanisms underpinning meso- and sub-mesoscale dynamics and how to improve their representation in numerical ocean models. My research involves using and contributing to develop numerical models able to realistically simulate the physical processes of the oceans as well as analysing observations. During my M.Sc. 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 Ph.D. research focused on the numerical modelling of shelf seas, leading to the development of a new vertical coordinate system for numerical ocean modelling which I applied to study the hydrodynamics of the Black Sea and the Dead Sea.

EDUCATION

DEGREE:	Ph.D. in Physical Oceanography
PERIOD:	2015 — 2020
UNIVERSITY:	UNIVERSITY OF PLYMOUTH, Plymouth, United Kingdom
THESIS TITLE:	<i>Advanced methods for numerical modelling of regional seas</i>
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 (<i>magna cum laude</i>)
UNIVERSITY:	UNIVERSITY OF BOLOGNA, Bologna, Italy
THESIS TITLE:	<i>Study of a wind-wave numerical model and its integration with an ocean and an oil-spill numerical models</i>
SUPERVISORS:	1st: Prof. Nadia Pinardi (DoS, University of Bologna) 2nd: Dr. Michela De Dominicis (Istituto 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:	<i>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</i>
SUPERVISORS	1st: Dr. Aniello Russo (DoS, Politecnico delle Marche)

PROFESSIONAL EXPERIENCE

RESEARCH TITLE:	Scientist
PERIOD:	Aug 2019 - present
EMPLOYER:	UK MET OFFICE OCEAN FORECASTING RESEARCH & DEVELOPMENT GROUP, Exeter, United Kingdom
MAIN ACTIVITIES AND RESPONSIBILITIES:	Ocean Modelling - R&D <ul style="list-style-type: none">• Development of a high resolution ($\approx 1.8\text{ km}$) ocean model of the Gulf area;• Member of the Joint Marine Modelling Program (JMMP) sub-group working on new vertical coordinate system for Atlantic Margin Model (AMM) configurations;• Development, analysis and assessment of the ocean-wave coupled forecasting system of the North West European shelf at 1.5 km of resolution;• Member of NEMO-Kernel sub-group working on generalised vertical coordinate system.
RESEARCH TITLE:	Post-Doctoral Researcher
PERIOD:	Jun 2019 - Jul 2019
EMPLOYER:	UNIVERSITY OF PLYMOUTH PLYMOUTH OCEAN FORECASTING CENTRE, Plymouth, United Kingdom
MAIN ACTIVITIES AND RESPONSIBILITIES:	Ocean Modelling - R&D <ul style="list-style-type: none">• Development of a high resolution ($\approx 500\text{ m}$) ocean model of the Arabian Gulf and implementation and testing of several types of lateral boundary conditions.
RESEARCH TITLE:	Ph.D. Researcher
PERIOD:	Oct 2015 - May 2019
EMPLOYER:	UNIVERSITY OF PLYMOUTH COASTAL PROCESSES RESEARCH GROUP and PLYMOUTH OCEAN FORECASTING CENTRE, Plymouth, United Kingdom
MAIN ACTIVITIES AND RESPONSIBILITIES:	<ul style="list-style-type: none">• 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<ul style="list-style-type: none">* 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:	Senior Ocean Modeller
PERIOD:	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 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.
- 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.**, Tonani, M., Lewis, H. W., Siddorn, J., Saulter, A., Castillo, J. M., Valiente, N. G., Conley, D., Sykes, P., Ascione, I., McConnell, N. *The impact of ocean-wave coupling on the upper ocean circulation during storm events. Submitted to Journal of Geophysical Research-Oceans, pre-print doi:10.1002/essoar.10506457.1.*
- Valiente, N. G., Saulter, A., Edwards, J. M., Lewis, H. W., Castillo, J. M., **Bruciaferri, D.**, Bunney, C., Siddorn, J. *The impact of wave model source terms and coupling strategies to rapidly developing waves across the North-west European Shelf during extreme events. Submitted to Journal of Marine Science and Engineering.*
- **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*, Ocean Modelling, 146 (2020), 101534, doi:10.1016/j.ocemod.2019.101534
- **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, doi:10.1007/s10236-018-1189-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, doi: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, doi: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. Caiazza, 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, doi:10.1016/j.dsr2.2016.07.014

CONFERENCES

- **D. Bruciaferri**, J. Harle, A. Wise, E. O'Dea and J. Polton. *The impact of the vertical discretization scheme on the accuracy of a model of the European north-west shelf*. Geophysical Research Abstracts, EGU21-4152, April 2021 (*Oral*).
- **D. Bruciaferri**, M. Tonani, H. W. Lewis, J. Siddorn, R. R. King, P. Sykes, J. M. Castillo, A. Saulter, N. McConnell, I. Ascione, and E. O'Dea. *Modelling the upper ocean dynamics of the north-west European shelf during storm events with the UK Met Office ocean-wave prediction system*. Geophysical Research Abstracts. Vol. 22, EGU2020-4960, May 2020 (*Oral*).
- **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, 5th 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 Laboratory, 5th 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*.

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:	Foundation Meteorology
PERIOD:	March-April 2020
INSTITUTE:	MET OFFICE COLLEGE - MET OFFICE Exeter, United Kingdom
LECTURERS:	T. Howard, W. Tennant, D. Miles, B. Johnson
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:	F. Ardhuin, A. 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:	NCEP and UNIVERSITY OF MARYLAND, Washington D.C., USA Department of Atmospheric and Oceanic Science
LECTURERS:	J.-H. Alves, A. Chawla, A. van der Westhuisen
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:	E. Toro and M. 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 Languages:** 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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