

# STEFANIA ESPA

## Curriculum Vitae

Place: Rome  
Date: 05/10/2021

### Part I – General Information

Full Name	Stefania Espa
Date of Birth	1 [REDACTED]
Place of Birth	Roma
Citizenship	Italian
Permanent Address	[REDACTED]
Mobile Phone Number	[REDACTED]
E-mail	<a href="mailto:stefania.espa@uniroma1.it">stefania.espa@uniroma1.it</a> ; [REDACTED]
Spoken Languages	Italiano (Mother tongue), English (advanced), French (basic)

### Part II – Education

Type	Year	Institution	Notes (Degree, Experience,...)
PhD	1996-99	Sapienza University of Rome	PhD in Environmental Engineering, Dissertation title: 'Transport Mixing and Diffusion in a Confined Convective Flow' (in English)
University graduation	1996	Sapienza University of Rome	Degree in Environmental Engineering, Laurea with 110/110 cum Lode. Title: 'Stochastic models for solute transport in saturated porous media' (in Italian)
Licensure 01	1997	Albo degli Ingegneri provincia di Rm	Successfully completed examination for professional practice

### Training Experience

2014 – Course : 'GIS open source QGIS', Sapienza University of Rome, Italy  
 2004 – Course : 'MODFLOW-2000, MODPATH, MT3D & WinPEST: Theory and applications', Sapienza University of Rome, Italy  
 2003 – International Summer School : 'Transport, reaction and propagation in fluids', International Centre for Theoretical Physics (ICTP), Trieste, Italy  
 2001 – Course : 'C++', CINECA, Bologna, Italy  
 2001 – International Summer School : 'Theories of turbulence', International Centre for Mechanical Sciences (CISM), Udine, Italy  
 2001 – International Summer School : 'Chaos in geophysical flows', L'Aquila, Italy  
 1998 – International Summer School : 'Geophysical and environmental fluid mechanics', Cambridge University, UK  
 1998 – International Summer School : 'Environmental fluid mechanics', International Centre for Mechanical Sciences (CISM), Udine, Italy  
 1995 – Course: 'Geo-statistics for environmental applications', Sapienza University of Rome, Italy

## Part III – Appointments

### IIIA – Academic Appointments

Start	End	Institution	Position
2021			Successfully completed national scientific qualification for full professor
2015		DICEA (Department of Civil and Environmental Engineering), Sapienza University of Rome	Associate Professor in Hydraulics (from 1/11/2015, Abilitazione conseguita nel 2013)
2013			Successfully completed national scientific qualification for associate professor
2006	2015	DICEA (Department of Civil and Environmental Engineering), Sapienza University of Rome	Researcher (Assistant Professor) in Hydraulics (Conferma a decorrere dal 1/11/2009 con DR 9950 del 2/8/2010)
2004	2006	DITS (Department of Hydraulics, Transportations and Roads), Sapienza University of Rome	Postdoctoral Investigator. Research contract on: ‘Analysis and characterization of turbulence and quasi-geostrophic turbulence’
1/6/2004	31/12/2004	DETEC, University of Naples Federico II	Research Contract on : ‘Environment monitoring’
2002	2004	DITS (Department of Hydraulics, Transportations and Roads), Sapienza University of Rome	Postdoctoral Investigator. Research contract on: ‘Experimental study of 2D turbulence’

### IIIB – Other Appointments

2023	Present	DICEA, Sapienza University of Rome	Member of the Committee for the Quality assessment of the Department
2016	Present	DICEA, Sapienza University of Rome	Member of the Research Committee of the Department
2014	Present	Civil and Industrial Engineering Faculty, Sapienza University of Rome (Rieti)	Member of the Committee for the Quality Assessment of the Master’s degree
2014	2016	Sapienza University of Rome	Member of the University Research Committee (nomina del Senato Accademico con delibera n.75/14)
2009	Present	Civil and Industrial Engineering Faculty, Sapienza University of Rome (Rieti)	Member of the Research Center for the Conservation and Development of the Environment, Rieti (CRITEVAT)
2007	Present	Civil and Industrial Engineering Faculty, Sapienza University of Rome (branch of Rieti)	Member (in 2010 Coordinator) of the Teaching Committee (Commissione Didattica)
2006	Present	DICEA, Sapienza University of Rome	Member of the PhD Committee in Hydraulics Engineering

## Part IV – Teaching experience

Year	Institution	Lecture/Course
2020-23	Civil and Industrial Engineering Faculty, Sapienza University of Rome (branch of Rieti)	Environmental Hydraulics (Master International degree in Environmental and Sustainable Building Engineering, 6 cfu, in English)
2018-23	Civil and Industrial Engineering Faculty, Sapienza University of Rome (branch of Rieti)	Hydraulics (Bachelor International degree in Sustainable Building Engineering, 9 cfu, in English)
2019-23	Civil and Industrial Engineering Faculty, Sapienza University of Rome	Advanced Fluid Mechanics (Master International degree in Atmospheric Science and Technology, 3 cfu in English)

2016-17	Civil and Industrial Engineering Faculty, Sapienza University of Rome (branch of Rieti)	Advanced Hydraulics (Master degree in Engineering of Territory and of the Constructions, 6 cfu)
2015-17	Civil and Industrial Engineering Faculty, Sapienza University of Rome (branch of Rieti)	Fluid Mechanics (Master degree in Engineering of Territory and of the Constructions, 6 cfu)
2015-16	Civil and Industrial Engineering Faculty, Sapienza University of Rome (branch of Rieti)	Climatology (Master degree in Engineering of Territory and of the Constructions, 6 cfu)
2014-17	Civil and Industrial Engineering Faculty, Sapienza University of Rome(branch of Rieti)	Hydraulics (Bachelor degree in Engineering of Territory and of the Constructions, 9 cfu)
2012-13	Civil and Industrial Engineering Faculty, Sapienza University of Rome (branch of Rieti)	Environmental Hydraulics (Bachelor degree in Engineering of Territory and of the Constructions, 6 cfu)
2007-20	Civil and Industrial Engineering Faculty, Sapienza University of Rome (branch of Rieti)	Hydraulics of natural systems (Bachelor degree in Environmental Engineering, 6 cfu)
2007-08	Civil and Industrial Engineering Faculty, Sapienza University of Rome	Geophysics Laboratory (Master degree in Physics)
2002-07	Civil and Industrial Engineering Faculty, Sapienza University of Rome (branch of Rieti)	Hydraulics of natural systems (Bachelor degree in Environmental Engineering, 6 cfu, contract)
2001-02	Civil and Industrial Engineering Faculty, Sapienza University of Rome (branch of Rieti)	Fluid Mechanics (Bachelor degree in Environmental Engineering, 6 cfu, contract)
2000-01	Civil and Industrial Engineering Faculty, Sapienza University of Rome (branch of Rieti)	Urban Hydraulics (Bachelor degree in Construction Engineering, 6 cfu, contract)

## Part V - Society memberships, Awards and Honors

Year	Title
2011-present	Member of the Italian Hydraulics Group (GII)
2010, 2014-16, 2018-23	EUROMECH membership
2011	Member of the International Association of Hydraulic Engineering and Research (IAHR)
2008	Member of European Geophysical Union (EGU)

## Part VI - Funding Information [grants as PI-principal investigator or I-investigator]

Year	Title	Program	Grant value
2021-22	JUMP-ToP (To other Planets)	SapiExcellence: an initiative promoted by Sapienza University to attract the best and most promising researchers (1 year grant, supporting salary and research activity). Role: PI for the hosting Institution	50000E
2019-23	Fluid dynamics of hearts at risk of failure: towards methods for the prediction of disease progression	Programme supported by the Italian Ministry of University and Research (PRIN). Role: I for the Research Unit	660000E (for the Research programme), 131414E (for the Research Unit)
2018-20	JUMP- The JUpiter Modeling Platform	MARIE SKŁODOWSKA-CURIE ACTIONS Individual Fellowships-European Union's horizon 2020 research and innovation programme H2020-MSCA-IF-2016: (grant agreement N°	168277E

		797012). Role: PI for the hosting Institution	
2014	Waves, Turbulence and Diffusion in beta-plumes	Programme supported by the European High-Performance Infrastructures in Turbulence (EuHit). Role: I for the Research Unit	7000E (for the Research programme)
2014-17	Hemodynamics of the aortic valve/artery functional unit with pathology-related morphological modifications	Programme supported by the Italian Ministry of University and Research (PRIN). Role: I for the Research Unit	146472E (for the Research programme), E 34236 (for the Research Unit)
2011	Zonal jets and eddies–planetary science and satellite oceanography at the crossroads	Research program supported by the International Space Science Institute (ISSI), Bern. Role: I for the Italian (Sapienza University) team	The programme was aimed at support an interdisciplinary collaboration among different international teams by financing 3 meetings in Berna and the publication of a book edited by Cambridge University Press (ZONAL JETS Phenomenology, Genesis, Physics', 2019, <a href="https://www.cambridge.org/core/books/zonal-jets/82763ED4E81E4906C95CC6B248A42F02">https://www.cambridge.org/core/books/zonal-jets/82763ED4E81E4906C95CC6B248A42F02</a> )
2010-11	Interacting Buoyant Coastal Currents	FP7-PEOPLE-2009-IIF Interacting Buoyant Coastal Currents. Role: PI** for the Host Institution	The obtained funding (114876E) included a one year salary for the hosted Researcher and a financing support for the research activities to be held in the host Institution
2011-13	Experimental and numerical study of the cardiac flow	Programme supported by the Italian Ministry of University and Research (PRIN). Role: PI (from 2012)	118689E (for the Research programme), 37753E (for the Research Unit)
2004	Standard and anomalous diffusion	Young Researchers programme supported by Italian Ministry of University and Research (MURST Young Researchers)	6197.48E
2017	Experimental and numerical investigation of blood flow in the aorta (prot. RM11816436229621	University Research. Role: Coordinator	10000E
2016	Jets, Waves and Diffusion in Rotating Turbulent Flows (prot. RM11615503471374)	University Research. Role: Coordinator	12000E
2012	Laboratory investigation of the flow downstream a prosthetic aortic valve (prot. C26A12A72T)	University Research. Role: Coordinator	5000E
2011	Zonal jets in large scale circulations of oceans and planetary atmospheres (prot. C26A11XWP4)	University Research. Role: Coordinator	5000E+Research contract (22818E)
2009	Zonal jets and transport in large scale flows (prot. C26F09RTFZ)	University Research. Role: Coordinator	10000E
2008	Experimental study of a bubble plume in a stratified fluid (prot. C26F08PMHC)	University Research. Role: Coordinator	10000E
2007	Rotation and stratification in the dynamics of large scale flows (prot. C26V07SWT4)	University Research to support visiting Professors (hosted researcher: prof. G. Carnevale, Scripps Institution of Oceanography, San Diego). Role: Coordinator	7232E

### Participation in Research Programs:

-Supported by the Italian Ministry of University and Research (MIUR):

2001 – Program : FIRB, title: ‘Biomedical Fluid Mechanics: diastolic inflow in the left ventricle of the heart and technical synergy for analysis of the vitreous body within the eyeball’ (Universities: Roma La Sapienza, Cagliari, Firenze, Genova, Trieste)  
 1999 – Program : PRIN, title : ‘Analysis of coherent structures relevant to environmental fluid dynamics’(Universities: Sapienza Università di Roma, Cagliari, Napoli Federico II, Torino, Politecnico di Torino, Trento)

-Supported by Sapienza University of Rome (University Research):

2017 – ‘Water-channel estimation of Eulerian and Lagrangian time scales of the turbulence in idealized two-dimensional urban canopies’  
 2010 – ‘Development of a high speed stereo acquisition system’  
 2009 – ‘Experimental study of the effect of prosthetic valves on the left ventricular flow’  
 2008 – ‘Organization and evolution of multiple zonal jets in rotating flows’  
 2007 – ‘Transport and mixing in atmospheric flows’  
 2006 – ‘Experimental study of the flow in the left ventricle’  
 2005 – ‘2D turbulence in geophysical flows’  
 2004 – ‘Pollutant dispersion in the atmospheric boundary layers in presence of spatial heterogeneity’

-Supported by the European Community

2000-2003 – Program : EUROPIV2, title: ‘A joint program to improve PIV performances for industry and research’  
 2002 – Program : PIVNET2, title: ‘A European collaboration on development, quality assessment, and standardization of particle image velocimetry for industrial applications’.

## Part VII – Research Activities

Keywords	Brief Description
Image analysis, flow measurements	Flow characterization and investigation by laboratory experiments, image analysis techniques to measure the flow field in Eulerian and Lagrangian frameworks, design and realization of experimental apparatus to simulate and study fluid flows
Turbulence and diffusion in rotating flows	Turbulence-eddies-waves interaction, flow anisotropization in flows affected by a latitudinal variation of the Coriolis parameter, spectral laws, zonal jets onset and evolution, anisotropic diffusion, effect of anisotropy on atmospheric and oceanic dynamics
Biomedical flows, in-vitro models	Experimental investigation of the blood circulation in human body in healthy and pathological conditions, flow in the left ventricle, effect prosthetic valves on the ventricular flow, flow in the aorta and in the coronaries, effect of bifurcations and stenosis, epidural anaesthetic infusion
2D and quasi-2D flows: direct and inverse cascades, scaling laws	Forced and decaying two dimensional turbulence in shallow fluid layers, stratified and rotating environments, quasi-geostrophic turbulence
Passive tracers transport and diffusion, mixing, low-dimensional chaos	Transport, mixing and Lagrangian chaos; standard and anomalous diffusion, quantifying diffusion using a Lagrangian approach
CO <sub>2</sub> emission, field and laboratory studies	Bubble plumes in stratified environment; analogues of sub-seabed CO <sub>2</sub> leakages
Coherent structures, complex laminar and turbulent flows	Vortex structure identification based on the velocity gradient tensor, flow topology analysis, Eulerian and Lagrangian coherent structure eduction and evolution in complex flows (PhD dissertation)

### Advising activities

PhD Advisor for:

-2008-11: 'Quasi-2D turbulence and zonal jets in rotating flows with a -effect' (in English), PhD candidate: G. Di Nitto, PhD in Hydraulics and Environmental Engineering (XXIV ciclo). Co-Tutor: B. Galperin (USF, USA).

-2005-09: 'Dinamica dei getti zionali nella turbolenza quasi-2D in un sistema rotante', PhD candidate: M. Mariani, PhD in Hydraulics and Environmental Engineering (XXI ciclo). Co-Tutors: Prof. A. Sutura (Sapienza University of Rome), G. Carnevale (SCRIPPS Institution of Oceanography, USA).

-2003-07: 'Studio Sperimentale dell'evoluzione di flussi turbolenti 3D e 2D. Transizione 2D-3D', PhD candidate: G. Avallone, PhD in Hydraulics and Environmental Engineering (XXI ciclo).

PhD Co-Advisor for:

-2005-2009: 'Field study by means of diving techniques and lab simulation of a submarine natural analogue for the effects of potential CO<sub>2</sub> leakages from a sub-seabed carbon di-oxide storage site (in English)', PhD candidate: G. Caramanna, PhD in Earth Sciences (XXI ciclo).

-2005-09: 'Flusso ventricolare in presenza di valvole artificiali', PhD candidate: Stefania Fortini, PhD in Hydraulics and Environmental Engineering (XXI ciclo).

### Evaluation Committees

2021: Member of the final evaluation committee for the award of the Ph.D. degree in Electrical, Electronics and Communications Engineering (Ciclo XXXIII), Politecnico di Torino, Ph.D. candidate: Lorenzo Carosso

2021: Member of the evaluation committee for the award of the Ph.D. degree in Civil, Chemical and Environmental Engineering (Ciclo XXXIII) Curriculum: Fluid Dynamics and Environmental Engineering of University of Genova, Ph.D. candidate: Irene Nepita

2020: Member of the board of Examiners for the award of the Ph.D. degree in Civil and Environmental Engineering of Politecnico di Torino, Ph.D. candidate: Giulia Cardillo

2008: Member of the evaluation committee of the EU Doctorate 'Implementation and development of advanced algorithms of LCF-PIV in Stereoscopic PIV systems and its applications to flow of industrial interest' defended at Universidad Carlos III di Madrid, PhD candidate : S.Nauri

### Referee for international ISI Journals

Journal of Fluid Mechanics, Journal of Geophysical Research, Journal of Turbulence, Europhysics letters, Geophysical and Astrophysical Fluid Dynamics, European Journal of Mechanics –B Fluids, Experiments in Fluids, Measurements, Science and Technology, Physics of Fluids, Stochastic Environmental Research and Risk assessment, Journal of Visualization, Diagnostic, Bioengineering, Applied Sciences, International Journal of Environmental Research and Public Health, The Global Environmental Engineering, Journal of Marine Science, Symmetry, Mathematics, Frontiers in Marine Sciences, Bio cybernetics and Biomedical Engineering.

### Part VIII – Summary of Scientific Achievements

Product type	Number	Data Base	Start	End
Papers [international]	38	Scopus	1999	2023
Papers [national]	14	Iris	1999	2020
Books* [scientific]	8	Iris	1999	2020

#### \*Chapters in books

Total Citations	364
Average Citations per Product	10
Hirsch (H) index	12
Normalized H index*	0.48**

\*H index divided by the academic seniority

Calculated using the following expression [(actual year-year of the first publication on Scopus)+1]

## Part IX– Selected Publications

- 1-La Forgia, G., Cavaliere, D., Espa, S., Falcini, F., Lacorata, G. Numerical and experimental analysis of Lagrangian dispersion in two-dimensional chaotic flows. *Scientific Reports*, 2022, 12(1), 7461. DOI: 10.1038/s41598-022-11350-1
- 2-Cabanes, S., Espa, S., Galperin, B., Young, R.M.B., Read, P.L. Revealing the Intensity of Turbulent Energy Transfer in Planetary Atmospheres (2020) *Geophysical Research Letters*, 47 (23), DOI: 10.1029/2020GL088685, press releases: <https://www.uniroma1.it/it/notizia/lanima-irrequieta-dei-pianeti>; <https://www.usf.edu/scientists-discover-new-way-to-measure-turbulence-of-large-planets-and-exoplanets.aspx>; from this paper and JUMP project an article on special feature on ‘Another small step: A new age of solar system exploration’ has published: <https://cordis.europa.eu/article/id/430330-a-new-spin-on-jupiter-s-stormy-weather>, in the top 5% of all research outputs scored by Altmetric (publons).
- 3-Espa, S., Cabanes, S., King, G.P., Di Nitto, G., Galperin, B., Eddy-wave duality in a rotating flow (2020) *Physics of Fluids*, 32 (7), art. no. 076604, doi: 10.1063/5.0006206.
- 4-Susin, F.M., Espa, S., Toninato, R., Fortini, S., Querzoli, G., Integrated strategy for in vitro characterization of a bileaflet mechanical aortic valve (2017) *BioMedical Engineering Online*, 16 (1), art. no. 29, DOI: 10.1186/s12938-017-0314-2.
- 5-Galperin, B., Hoemann, J., Espa, S., Di Nitto, G., Lacorata, G., Anisotropic macroturbulence and diffusion associated with a westward zonal jet: From laboratory to planetary atmospheres and oceans (2016) *Physical Review E*, 94 (6), art. no. 063102, DOI: 10.1103/PhysRevE.94.063102.
- 6-Querzoli, G., Fortini, S., Espa, S., Melchionna, S., A laboratory model of the aortic root flow including the coronary arteries (2016) *Experiments in Fluids*, 57 (8), art. no. 134, DOI: 10.1007/s00348-016-2221-x.
- 7-Fortini, S., Espa, S., Querzoli, G., Cenedese, A. Turbulence investigation in a laboratory model of the ascending aorta (2015) *Journal of Turbulence*, 16 (3), pp. 208-224, DOI: 10.1080/14685248.2014.982248.
- 8-Querzoli, G., Fortini, S., Espa, S., Costantini, M., Sorgini, F., Fluid dynamics of aortic root dilation in Marfan syndrome (2014) *Journal of Biomechanics*, 47 (12), pp. 3120-3128, DOI: 10.1016/j.jbiomech.2014.06.025.
- 9-Galperin, B., Hoemann, J., Espa, S., Di Nitto, G., Anisotropic turbulence and Rossby waves in an easterly jet: An experimental study (2014) *Geophysical Research Letters*, 41 (17), pp. 6237-6243, DOI: 10.1002/2014GL060767.
- 10-Espa, S., Lacorata, G., Di Nitto, G., Anisotropic Lagrangian dispersion in rotating flows with a  $\beta$  effect (2014) *Journal of Physical Oceanography*, 44 (2), pp. 632-643, DOI: 10.1175/JPO-D-13-045.1.
- 11-Fortini, S., Querzoli, G., Espa, S., Cenedese, A. Three-dimensional structure of the flow inside the left ventricle of the human heart (2013) *Experiments in Fluids*, 54 (11), art. no. 1609, DOI: 10.1007/s00348-013-1609-0.
- 12-Di Nitto, G., Espa, S., Cenedese, A., Simulating zonation in geophysical flows by laboratory experiments (2013) *Physics of Fluids*, 25 (8), art. no. 086602, DOI: 10.1063/1.4817540.
- 13-Espa, S., Badas, M.G., Fortini, S., Querzoli, G., Cenedese, A., A Lagrangian investigation of the flow inside the left ventricle (2012) *European Journal of Mechanics, B/Fluids*, 35, pp. 9-19, DOI: 10.1016/j.euromechflu.2012.01.015..
- 14-Espa, S., Cenedese, A., Mariani, M., Carnevale, G.F., Quasi-two-dimensional flow on the polar  $\beta$ -plane: Laboratory experiments (2009) *Journal of Marine Systems*, 77 (4), pp. 502-510, DOI: 10.1016/j.jmarsys.2008.10.015.

15-Boffetta, G., Cenedese, A., Espa, S., Musacchio, S., Effects of friction on 2D turbulence: An experimental study of the direct cascade (2005) *Europhysics Letters*, 71 (4), pp. 590-596, DOI: 10.1209/epl/i2005-10111-6.

16- Boffetta, G., Cencini, M., Espa, S., Querzoli, G., Chaotic advection and relative dispersion in an experimental convective flow (2000) *Physics of Fluids*, 12 (12), pp. 3160-3167, DOI: 10.1063/1.1320836.

#### **Indexed publications not included in the previous list**

Espe, S., Moroni, M., Boniforti, M.A., In-vitro simulation of the blood flow in an axisymmetric abdominal aortic aneurysm (2019) *Applied Sciences (Switzerland)*, 9 (21), art. no. 4560, doi: 10.3390/app9214560, IF: 2.679, citations: 0

Espe, S., Lacorata, G., Anisotropic dispersion in rotating fluids: A laboratory model of large scale flows (2019) 2018 IEEE International Workshop on Metrology for the Sea; Learning to Measure Sea Health Parameters, MetroSea 2018 - Proceedings, art. no. 8657880, pp. 60-64. Doi: 10.1109/MetroSea.2018.8657880, conference paper, citations: 0

Galperin, B., Sukoriansky, S., Espe, S., Lacorata, G., Dikovskaya, N., Hoemann, J., Turbulence, diffusion and mixing barriers, book chapter in 'Flows with zonal jets (2019) *Zonal Jets: Phenomenology, Genesis, and Physics*' edited by Cambridge University Press, pp. 450-460, ISBN: 978-110735822-5, 978-110704388-6, DOI: 10.1017/9781107358225

Espe, S., Nitto, G.D., Galperin, B., Hoemann, J., Zonal jets in the laboratory: Experiments with electromagnetically forced flows (2019) book chapter in: 'Zonal Jets: Phenomenology, Genesis, and Physics' edited by Cambridge University Press, pp. 167-178. ISBN: 978-110735822-5, 978-110704388-6, DOI: 10.1017/9781107358225.009

Espe, S., Avallone, G., Cenedese, A., Decaying grid turbulence experiments in a stratified fluid: flow measurements and statistics (2018) *Stochastic Environmental Research and Risk Assessment*, 32 (8), pp. 2325-2336. DOI: 10.1007/s00477-018-1544-y. IF: 3.379, Cited 1 time.

Amato, A., Fortini, S., Watteaux, R., Diano, M., Espe, S., Esposito, S., Ferrante, M.I., Peters, F., Iudicone, D., Ribera D'Alcalà, M., TURBOGEN: Computer-controlled vertically oscillating grid system for small-scale turbulence studies on plankton (2016) *Review of Scientific Instruments*, 87 (3), art. no. 035119, DOI: 10.1063/1.4944813. IF: 1.523, Cited 4 times.

Badas, M.G., Espe, S., Fortini, S., Querzoli, G. 3D Finite Time Lyapunov Exponents in a left ventricle laboratory model (2015) *EPJ Web of Conferences*, 92, art. no. 02004, DOI: 10.1051/epjconf/20159202004. Cited 5 times.

Espe, S., Fortini, S., Querzoli, G., Cenedese, A., Flow field evolution in a laboratory model of the left ventricle (2013) *Journal of Visualization*, 16 (4), pp. 323-330, DOI: 10.1007/s12650-013-0179-9. IF: 1.331, Cited 2 times.

Badas, M.G., Espe, S., Fortini, S., Querzoli, G., Three-dimensional Lagrangian Coherent structures in the left ventricle model (2013) *International Symposium on Turbulence and Shear Flow Phenomena, TSFP 2013*, 2, . Cited 1 time.

Espe, S., Bordini, I., Frisius, T., Fraedrich, K., Cenedese, A., Sutera, A., Zonal jets and cyclone-anticyclone asymmetry in decaying rotating turbulence: Laboratory experiments and numerical simulations (2012) *Geophysical and Astrophysical Fluid Dynamics*, 106 (6), pp. 557-573, DOI: 10.1080/03091929.2011.637301. IF: 1.451, Cited 10 times.

Vukićević, M., Fortini, S., Querzoli, G., Espe, S., Pedrizzetti, G., Experimental study of an asymmetric heart valve prototype (2012) *European Journal of Mechanics, B/Fluids*, 35, pp. 54-60, DOI: 10.1016/j.euromechflu.2012.01.014. IF: 2.183, Cited 16 times.



Lacorata, G., Espa, S., On the influence of a  $\beta$ -effect on Lagrangian diffusion (2012) *Geophysical Research Letters*, 39 (11), art. no. L11605, DOI: 10.1029/2012GL051841. IF: 4.72, Cited 10 times.

Espe, S., Di Nitto, G., Cenedese, A., Laboratory study of forced rotating shallow water turbulence (2011) *Journal of Physics: Conference Series*, 318 (SECTION 8), art. no. 082020, DOI: 10.1088/1742-6596/318/8/082020. Cited 4 times.

Caramanna, G., Espe, S., Bouché, V., Study of the environmental effects of submarine CO<sub>2</sub>-rich emissions by means of scientific diving techniques (Panarea Island - Italy) (2010) *Underwater Technology*, 29 (2), pp. 79-85, DOI: 10.3723/ut.29.079. Cited 9 times.

Espe, S., Di Nitto, G., Cenedese, A., The emergence of zonal jets in forced rotating shallow water turbulence: A laboratory study (2010) *EPL*, 92 (3), art. no. 34006, DOI: 10.1209/0295-5075/92/34006. IF: 1.947, Cited 11 times.

Espe, S., Caramanna, G., Bouché, V., Field study and laboratory experiments of bubble plumes in shallow seas as analogues of sub-seabed CO<sub>2</sub> leakages (2010) *Applied Geochemistry*, 25 (5), pp. 696-704, DOI: 10.1016/j.apgeochem.2010.02.002. IF: 3.524. Cited 18 times.

Espe, S., Carnevale, G.F., Cenedese, A., Mariani, M., Quasi-two-dimensional decaying turbulence subject to the  $\beta$  effect (2008) *Journal of Turbulence*, 9, pp. 1-18, DOI: 10.1080/14685240802464417. IF: 1.403, Cited 15 times.

Carnevale, G.F., Cenedese, A., Espe, S., Mariani, M., Laboratory model of two-dimensional polar beta-plane turbulence (2007) *ERCOFTAC Series*, 11, pp. 285-297, DOI: 10.1007/978-1-4020-6218-6\_23. Cited 2 times.

Carnevale, G., Cenedese, A., Espe, S., Mariani, M., Two dimensional polar beta plane turbulence (2007) *Advances in Turbulence XI - Proceedings of the 11th EUROMECH European Turbulence Conference*, pp. 673-675, DOI: 10.1007/978-3-540-72604-3\_213.

Espe, S., Cenedese, A., Anomalous diffusion and lévy flights in a two-dimensional time periodic flow (2005) *Journal of Visualization*, 8 (3), pp. 253-260, DOI: 10.1007/BF03181503. IF: 1.331. Cited 1 time.

Espe, S., Querzoli, G., Cenedese, A., Dispersion of passive tracers in a confined convective flow (2001) *European Journal of Mechanics, B/Fluids*, 20 (4), pp. 525-540, DOI: 10.1016/S0997-7546(01)01125-6. IF: 2.183, Cited 0 times.

Boffetta, G., Cencini, M., Espe, S., Querzoli, G., Experimental evidence of chaotic advection in a convective flow (1999) *Europhysics Letters*, 48 (6), pp. 629-633, DOI: 10.1209/epl/i1999-00530-3. IF: 1.947. Cited 12 times.

The Authors' contribution in the listed papers is equal.

### **Part X– Invited talk and Conferences**

-Co-author of the invited lecture: “New laboratory device to explore planetary atmospheres at polar latitudes”, workshop: The Dynamics of Rotating Fluids with the UK Fluids Network-Special session on Polar Vortices, 17-18 September 2020, University of Oxford, UK.

- Co-author of the invited lecture: “Turbulence and zonal jets in rotating flows with a  $\beta$ -effect”, workshop ISSI Meeting Zonal Jets and Eddies - Planetary Science and Satellite Oceanography at the Crossroads, 5-9 March 2012, Bern, Switzerland.

- Co-author of the invited lecture: “Laboratory study of forced rotating shallow water turbulence”, workshop ISSI Meeting Zonal Jets and Eddies - Planetary Science and Satellite Oceanography at the Crossroads, 5-9 March 2012, Bern, Switzerland.

-Invited Lecturer, Summer School: ‘Mediterranean Sea: Models, Observations and Experiments’, 22-26 September 2014, Castro Marina, Italy. Talk: "Zonal jets, waves, turbulence and beta-effect: an experimental outlook".

- Invited speaker: ISSI Meeting Zonal Jets and Eddies - Planetary Science and Satellite Oceanography at the Crossroads, 2-5 April 2013, Bern, Switzerland. Talk: "Zonal jets in laboratory flows".
- Invited speaker: Euromech Colloquium 517 Interfaces and Inhomogeneous Turbulence, 28-30 June 2010 London, UK. Talk: "Zonal jets in forced rotating turbulence".
- Invited speaker: Workshop Two-Dimensional Turbulence, 18-23 March 2007, Leiden, The Netherlands. Talk: "Decaying rotating turbulence".
- Invited Lecturer: Workshop New directions in two-dimensional turbulence, 28 August-9 September 2006, CNLS-Los Alamos, USA. Talk: "Direct and inverse cascade in electromagnetically forced shallow fluids".
- Co-author of the invited lecture: "Dinamica della Turbolenza 2D nello studio delle grandi masse fluide". XXIX Convegno di Idraulica e Costruzioni Idrauliche 2006. Editoriale Bios ISBN:9788877403827.

#### Attended conferences (oral presentation)

- The Dynamics of Rotating Fluids with the UK Fluids Network-Special session on Polar Vortices, 17-18 September 2020, University of Oxford, UK
- WITGAF 2019 : Waves, Instabilities and Turbulence in Geophysical and Astrophysical Flows, 8-19 Jul 2019 Cargèse, France
- 17th European Turbulence Conference, 3-6 September 2019, Torino, Italy. Chair of the Session 'ROTATING FLOWS'
- Metrology on the Sea 2018, 8-10 October 2018, Bari, Italy
- 16th European Turbulence Conference ETC, 21-24 August 2017, Stockholm, Sweden
- XXXV Convegno di Idraulica e Costruzioni Idrauliche, 14-16 Settembre 2016, Bologna, Italia, Chair of the session: 'Biomeccanica dei fluidi'
- XXXIV Convegno nazionale di Idraulica e Costruzioni Idrauliche, 8-10 Settembre 2014, Bari, Italia
- VII International Symposium on Stratified Flows ISSF2011, 22-25 Agosto 2011, Roma, Italy
- 5th International Conference of Vortex Flows and Vortex Models ICVFM, 7-12 Novembre 2010, Caserta, Italy
- XXXII Convegno di Idraulica e Costruzioni Idrauliche, 13-17 Settembre 2010, Palermo, Italia
- 7th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics, 19-21 July 2010, Antalya, Turkey
- 15th International Symposia on Applications of Laser Techniques to Fluid Mechanics 5-8 July 2010, Lisbon, Portugal
- 1th European IAHR Conference, 4-6 May 2010, Edinburgh, Scotland
- Euromech Colloquium 519 Mixing and dispersion in flows dominated by rotation and buoyancy, 20-23 June 2010, Limburg, The Netherlands
- Convegno CINFAI: Environment including global change, 5-9 ottobre 2009, Palermo, Italy
- Lagrangian Analysis and Prediction of Coastal Ocean Dynamics LAPCOD, 7-11 September 2009, La Londe-les-Maures Toulon, France
- 2nd International Symposium on Shallow Flows, 10-12 December 2008, HKUST, Hong Kong
- XXXI Convegno di Idraulica e Costruzioni Idrauliche, 10-12 Settembre 2008, Perugia, Italia
- EGU General Assembly 2008, 13-18 April 2008, Wien, Österreich
- 11th European Turbulence Conference ETC XI, 25- 8 June 2007, Porto, Portugal
- 7th International Symposium on Particle Image Velocimetry, 11-14 September 2007, Roma, Italy
- Convegno CINFAI: Fisica della Terra Fluida e Problematiche Affini, 11-15 giugno 2007, Ischia, Italia
- Euromech 477 Particle Laden Flow: from geophysical to Kolmogorov scales, 21-23 June 2006, Twente, The Netherlands
- XXX Convegno di Idraulica e Costruzioni Idrauliche, 10-14 Settembre 2006, Roma, Italia
- 6th International Symposium on Particle Image Velocimetry, 21-23 September 2005, Pasadena, USA
- XXIX Convegno di Idraulica e Costruzioni Idrauliche, 7-10 Settembre 2004, Trento, Italia
- 12th International Symposium Application of laser techniques to fluid mechanics, 6-11 July 2004, Lisbon, Portugal
- V European Fluid mechanics Conference, 24-28 August 2003, Toulouse, France
- XXVIII Convegno di Idraulica e Costruzioni Idrauliche, 16-19 Settembre 2002, Potenza, Italia
- 11th International Symposium Application of laser techniques to fluid mechanics, 9-12 July 2002, Lisbon, Portugal
- 2000 Lagrangian Analysis and Predictability of Coastal and Ocean Dynamics Meeting LAPCOD, 2-6 October 2000, Ischia, Italy

-XXVII Convegno di Idraulica e Costruzioni Idrauliche, 12-15 Settembre 2000, Genova, Italia  
-10th International Symposium Application of laser techniques to fluid mechanics, 10-13 July 2000, Lisbon, Portugal  
-International Conference on Statistical Mechanics and Strongly Correlated Systems 2nd Giovanni Paladin memorial, 27-29 September, 1999, Roma, Italy  
-8th International Conference Laser Anemometry Advanced and Applications, 6-8 September 1999, Roma, Italy  
-Euromech 396 with Ercoftac and TAO Workshops: Vortical Structures in Rotating and Stratified Fluids, 22-25 June 1999, Cortona, Italy  
-XXVI Convegno di Idraulica e Costruzioni Idrauliche, 9-12 Settembre 1998, Catania, Italia  
-Third International Workshop on Vortex Flows and Related Numerical Methods, August 24-27, 1998 Toulouse, France

Roma 5/10/2021

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