



ALESSANDRO BONGARZONE

Tel: +33 6 64 49 18 70

Personal e-mail: bongarzone.alessandro@gmail.com

Professional e-mail: alessandro.bongarzone@onera.fr

LinkedIn: [linkedin.com/in/alessandro-bongarzone](https://www.linkedin.com/in/alessandro-bongarzone)

Webpage: alessandro-bongarzone.github.io

Born August 20, 1994, in Narni (TR), Italy

CURRENT EMPLOYMENT

Post-doctoral researcher

ONERA The French Aerospace Lab
Department of Aerodynamics, Aeroelasticity & Acoustics (DAAA)
Project title: *Mean resolvent analysis of strongly compressible jet flows*
Supervisors: Dr. Colin Leclercq, Dr. Cédric Content & Prof. Denis Sipp

Dec 2023 – Present
Meudon, Île-de-France, France

EDUCATION

Doctoral School of Mechanical Engineering

École Polytechnique Fédérale de Lausanne (EPFL)
Dissertation title:

Self-sustained dynamics and forced resonant oscillations in flows: cross-junction jets and sloshing liquids

Supervisor: Prof. François Gallaire

Jun 2019 – Sep 2023
Lausanne, Switzerland

Master's Degree in Aerospace Engineering

University of Pisa

Thesis title: *Sloshing waves and Faraday instability: contact line behaviour and static meniscus*

Supervisor: Prof. Simone Camarri

Final Mark: 110/110 cum laude

Sep 2016 – Apr 2019
Pisa, Italy

- Research Internship at École Polytechnique Fédérale de Lausanne (EPFL)
Seven months project on *Sloshing wave dynamics and Faraday instability*
at Laboratory of Fluid Mechanics and Instabilities (LFMI).
Tutored by Prof. François Gallaire and Dr. Lorenzo Siconolfi

Sep. 2018 - Mar. 2019
Lausanne, Switzerland

Bachelor's Degree in Aerospace Engineering

University of Pisa

Thesis title: *Flow through a constant area duct with friction: Fanno flow*

Supervisor: Prof. Maria Vittoria Salvetti

Sep 2013 – Oct 2016
Pisa, Italy

Scientific High School Diploma

I.I.S.S. Gandhi of Narni

Sep 2008 – Jul 2013
Narni, Italy

LICENSES AND CERTIFICATES

Deep Learning Specializations (Coursera)

<https://www.coursera.org/account/accomplishments/specialization/certificate/WXQVWVWAF325>

- Sequence Models
- Convolutional Neural Networks
- Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization
- Structuring Machine Learning Projects
- Neural Networks and Deep Learning

Feb 2022
online

Machine Learning (Coursera)

<https://www.coursera.org/account/accomplishments/certificate/8CDGUXB5BKTS>

Jan 2022
online

European Computer Driving Licence (ECDL), AICA

issued by I.I.S.S. Gandhi of Narni (AAD-01). SKILLS CARD: IT-2245990

March 2010
Narni, Italy

ADDITIONAL SCHOOLS AND TRAININGS

Security, Safety and Facilities Operations, Occupational Health & Safety, COSEC École Polytechnique Fédérale de Lausanne (EPFL)	2020-2023 Lausanne, Switzerland
Python for Data Science and Machine Learning (Learning & Development) École Polytechnique Fédérale de Lausanne (EPFL)	21-23, Sep 2022 online
Python Fundamentals (Learning & Development) École Polytechnique Fédérale de Lausanne (EPFL)	21-23, Feb 2022 online
Model Order Reduction Summer School (MORSS 2020) Organized by École Polytechnique Fédérale de Lausanne (EPFL) and Eidgenössische Technische Hochschule (ETH)	7-10, Sep 2020 online
International Summer School <i>Complex Motion in Fluids</i> Technical University of Denmark (DTU)	18-24, Aug 2019 Kysthusene Gilleleje, Denmark

AWARDS

Gallery of Fluid Motion Award V0036: "Swinging Jets", DOI: https://doi.org/10.1103/APS.DFD.2019.GFM.V0036 72 th Annual Meeting of the APS Division of Fluid Dynamics (DFD)	Nov 2021 Seattle, WA, USA
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SERVICE

Journal referee for: Journal of Fluid Mechanics
Physical Review Fluids
Proceedings of The Royal Society A

SKILLS

Languages: Italian (native), English (fluent), French (intermediate)
Programming: Python, Matlab, Simulink, Mathematica, Fortran (basic)
Softwares: Nek5000, FreeFem++, COMSOL, ANSYS-Fluent, OpenFOAM (basic), Gmsh, Paraview, ImageJ
Document Creation: Microsoft Office Suite (Excel, Word, PowerPoint), Adobe Creative Suite (Illustrator, Photoshop), LaTeX

SCIENTIFIC PUBLICATIONS

Peer-reviewed journal articles

- BONGARZONE, A. & GALLAIRE, F. (2023) Stick-slip to stick transition induced by contact angle hysteresis in U-shaped tubes: a projection method. *Phys. Rev. Fluids* **9**, 034401 DOI: <https://doi.org/10.1103/PhysRevFluids.9.034401>
- BONGARZONE, A., JOURON, B., VIOLA, F. & GALLAIRE, F. (2023) A revised gap-averaged Floquet analysis for Faraday waves in Hele-Shaw cells. *J. Fluid Mech.* **977**, DOI: <https://doi.org/10.1017/jfm.2023.986>
- MARCOTTE, A., GALLAIRE, F. & BONGARZONE, A. (2023) Swirling against the forcing: evidence of stable counter-directed sloshing waves in orbital-shaken reservoirs. *Phys. Rev. Fluids* **8**, 084802 DOI: <https://doi.org/10.1103/PhysRevFluids.8.084802>
- CARUSO LOMBARDI, F., BONGARZONE, A., ZAMPOGNA, G. A., GALLAIRE, F., CAMARRI, S. & LEDDA P. G. (2023) Von Kármán vortex street past a permeable circular cylinder: Two-dimensional flow and dynamic-mode-decomposition-based secondary stability analysis. *Phys. Rev. Fluids* **8**, 083901 DOI: <https://doi.org/10.1103/PhysRevFluids.8.083901>
- MARCOTTE, A., GALLAIRE, F. & BONGARZONE, A. (2023) Super-harmonically resonant swirling waves in longitudinally forced circular cylinders. *J. Fluid Mech.* **966**, DOI: <https://doi.org/10.1017/jfm.2023.438>

- BONGARZONE, A., VIOLA, F., CAMARRI, S. & GALLAIRE, F. 2022 Sub-harmonic parametric instability in nearly-brimful circular cylinders: a weakly nonlinear analysis. *J. Fluid Mech.* **947**, DOI: <https://doi.org/10.1017/jfm.2022.600>
- BONGARZONE, A., GUIDO, M. & GALLAIRE F. 2022 An amplitude equation modeling the double-crest swirling in orbital shaken cylindrical containers. *J. Fluid Mech.* **943**, DOI: <https://doi.org/10.1017/jfm.2022.440>
- BONGARZONE, A., VIOLA, F. & GALLAIRE, F. 2021 Relaxation of capillary-gravity waves due to contact line nonlinearity: A projection method. *Chaos* **31** (12), 123124, DOI: <https://doi.org/10.1063/5.0055898>
- BONGARZONE, A., BERTSCH, A., RENAUD, P. & GALLAIRE, F. 2021 Impinging planar jets: hysteretic behaviour and origin of the self-sustained oscillations. *J. Fluid Mech.* **913**, DOI: <https://doi.org/10.1017/jfm.2021.51>
- BERTSCH, A., BONGARZONE, A., YIM, E., RENAUD, P. & GALLAIRE, F. 2020 Swinging jets. *Phys. Rev. Fluids* **5** (11), 110505, DOI: <https://doi.org/10.1103/PhysRevFluids.5.110505>
- BERTSCH, A., BONGARZONE, A., DUCHAMP, M., RENAUD, P. & GALLAIRE, F. 2020 Feedback-free microfluidic oscillator with impinging jets. *Phys. Rev. Fluids* **5** (5), 054202, DOI: <https://doi.org/10.1103/PhysRevFluids.5.054202>

In preparation

- Bongarzone, A., Fullana, T., Marcotte, A. & Gallaire, F. (2023) Lagrangian vs Eulerian view on the mean drift and streaming flows in viscous orbital sloshing. In preparation for submission to *J. Fluid Mech.*

CONFERENCES CONTRIBUTIONS

Modelling the wave-induced mean flow in orbital sloshing (abstract submitted) 1 st European Fluid Dynamics Conference (EFDC1) (speaker: T. Fullana, EPFL)	Sep 2024 Aachen, Germany
A revised gap-averaged model of Faraday waves in Hele-Shaw cells 15 th SIG 33-ERCOFTAC Workshop	Jun 2023 Alghero, Italy
Symmetry-breaking swirling waves in longitudinally forced cylindrical containers 75 th Annual Meeting of the APS Division of Fluid Dynamics (DFD)	Nov 2022 Indianapolis, IN, USA
Stick-slip to stick transition induced by contact angle hysteresis in U-shaped tubes: a projection method 14 th European Fluid Mechanics Conference (EFMC14)	Sep 2022 Athens, Greece
Amplitude equation model for prediction of super-harmonic double-crest wave dynamics in orbital shaken cylindrical containers 74 th Annual Meeting of the APS Division of Fluid Dynamics (DFD)	Nov 2021 Phoenix, AZ, USA
The role of a capillary meniscus on the Faraday instability 25 th International Congress of Theoretical and Applied Mechanics (ICTAM) (speaker: F. Gallaire)	Aug 2021 Milano, Italy
Impinging planar jets: hysteretic behaviour and origin of the self-sustained oscillations 73 th Annual Meeting of the APS Division of Fluid Dynamics (DFD) (online)	Nov 2020 Chicago, IL, USA
Nonlinear damping of sloshing motion caused by a piece-wise linear contact line model 73 th Annual Meeting of the APS Division of Fluid Dynamics (DFD) (online) (speaker: F. Gallaire)	Nov 2020 Chicago, IL, USA

Swinging jets (contribution V0036 to the Gallery of Fluid Motion contest)72th Annual Meeting of the APS Division of Fluid Dynamics (DFD)Nov 2019
Seattle, WA, USA**Faraday instability: effect of the static meniscus (poster presentation)**9th International Summer School *Complex Motion in Fluids*Aug 2019
Kysthusene Gilleleje, Denmark**INFORMAL TALKS AND SEMINARS**

Super-harmonically resonant swirling waves in longitudinally forced cylindersAt Complex Fluids Group – Princeton University – hosted by Prof. H.A. Stone
At Brun Lab – Princeton University – hosted by Prof. P.-T. Brun
At Deike Lab – Princeton University – hosted by Prof. L. DeikeNov 2022
Princeton, NJ, USA**Faraday waves**

At Gran Sasso Science Institute (GSSI)

May 2022
L'Aquila, Italy**TEACHING AND STUDENTS SUPERVISION**

Teaching Assistant

- * *Hydrodynamics* Master course in Mechanical Engineering at EPFL
35 total hours Spring 2022
- * *Numerical Flow Simulations* Master course in Mechanical Engineering at EPFL
130 total hours (softwares used: ANSYS – Workbench, Fluent, SpaceClaim) Fall 2020, 2021, 2022
- * *Numerical Methods in Biomechanics* Master course in Mechanical Engineering at EPFL
45 total hours (softwares used: COMSOL Multiphysics) Spring 2020, 2021

Master Thesis Supervisor

- * Tutored one visiting student from University of Pisa at EPFL
Title of the project: *Three- dimensional instability of the von Karman vortex street past a porous cylinder*
85 total hours Sep 2021 – Mar 2022
- * Tutored one student at EPFL
Title of the project: *Modeling hysteresis in orbital sloshing*
120 total hours Spring 2021
- * Tutored one visiting Master student from École Polytechnique at EPFL
Title of the project: *Stability of fluidic oscillators*
20 total hours Spring 2021

Semester Project Supervisor

- * Tutored one Master student at EPFL
Title of the project: *Faraday waves in an annular Hele-Shaw cell*
50 total hours Spring 2023
- * Tutored one Master student at EPFL
Title of the project: *Capillary-gravity waves: effect of a circular corral*
35 total hours Spring 2022
- * Tutored one Master student at EPFL
Title of the project: *Effect of a variable slip-length wall-condition on the damping of two-dimensional sloshing waves*
30 total hours Spring 2019

Paris, March 19, 2024

