



ALESSANDRO BONGARZONE

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

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

EDUCATION

Doctoral School of Mechanical Engineering

École Polytechnique Fédérale de Lausanne (EPFL)

Estimated completion date: Sep 2023

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

Supervisor: Prof. François Gallaire

Jun 2019 – Current
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

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

Final Mark: 108/110

Sep 2013 – Oct 2016
Pisa, Italy

Scientific High School Diploma

I.I.S.S. Gandhi of Narni

Final Mark: 86/100

Sep 2008 – Jul 2013
Narni, Italy

LICENSES AND CERTIFICATES

Deep Learning Specializations (Coursera)

<https://www.coursera.org/account/accomplishments/specialization/certificate/WXQVWVW AF325>

Feb 2022
online

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

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

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	Nov 2021 Seattle, WA, USA
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)	

SCIENTIFIC PUBLICATIONS

Peer-reviewed journal articles

- 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. 2022b 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. 2022a 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. 2020b 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. 2020a Feedback-free microfluidic oscillator with impinging jets. *Phys. Rev. Fluids* **5** (5), 054202, DOI: <https://doi.org/10.1103/PhysRevFluids.5.054202>

Submitted papers

- Bongarzone, A., Jouron, B., Viola, F., Gallaire, F. (2023c) A revised gap-averaged Floquet analysis for Faraday waves in Hele-Shaw cells. Under review in *J. Fluid Mech.* DOI: <https://doi.org/10.48550/arXiv.2306.11501>
- Marcotte, A., Gallaire, F. Bongarzone, A. (2023b) Swirling against the forcing: evidence of stable counter-directed sloshing waves in orbital-shaken reservoirs. Accepted in *Phys. Rev. Fluids* DOI: <https://doi.org/10.48550/arXiv.2302.14579>

- Caruso Lombardi, F., Bongarzone, A., Zampogna, G. A., Gallaire, F., Camarri, S. Ledda P. G. (2023a) Three dimensional instability of the von Karman vortex street past a permeable circular cylinder: two-dimensional flow and DMD-based secondary stability analysis. Accepted in *Phys. Rev. Fluids*.

Papers under preparation

- Bongarzone, A. Gallaire, F. (2023) Stick-slip to stick transition induced by contact angle hysteresis in U-shaped tubes: a projection method. In preparation for submission to *Phys. Rev. Fluids*.

CONFERENCES CONTRIBUTED

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) 72 th Annual Meeting of the APS Division of Fluid Dynamics (DFD)	Nov 2019 Seattle, WA, USA
Faraday instability: effect of the static meniscus (poster presentation) 9 th International Summer School <i>Complex Motion in Fluids</i>	Aug 2019 Kysthusene Gilleleje, Denmark

INFORMAL TALKS AND SEMINARS

Super-harmonically resonant swirling waves in longitudinally forced cylinders At 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. Deike	Nov 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 Sep 2021 – Mar 2022
Title of the project: *Three- dimensional instability of the von Karman vortex street past a porous cylinder*
85 total hours
- Tutored one student at EPFL Spring 2021
Title of the project: *Modeling hysteresis in orbital sloshing*
120 total hours

Semester Project Supervisor

- Tutored one Master student at EPFL Spring 2023
Title of the project: *Faraday waves in an annular Hele-Shaw cell*
50 total hours
- Tutored one Master student at EPFL Spring 2022
Title of the project: *Capillary-gravity waves: effect of a circular corral*
35 total hours
- Tutored one visiting Master student from École Polytechnique at EPFL Spring 2021
Title of the project: *Stability of fluidic oscillators*
20 total hours
- Tutored one Master student at EPFL Spring 2019
Title of the project: *Effect of a variable slip-length wall-condition on the damping of two-dimensional sloshing waves*
30 total hours

SERVICE

Journal referee for: Journal of Fluid Mechanics

SKILLS

Languages: Italian (native), English (fluent), French (intermediate)

Programming: Matlab, Simulink, Mathematica, Python (NumPy, SciPy, Matplotlib, Pandas, TensorFlow, Jupyter)

Softwares: COMSOL, Nek5000, FreeFem++, ANSYS-Fluent, Paraview

Theoretical: finite elements, spectral and pseudospectral elements, finite differences, finite volumes, linear stability and asymptotic techniques (weakly-nonlinear multiple-scales analysis), reduced order models and decomposition techniques (POD, DMD)

Document Creation: Microsoft Office Suite (Excel, Word, PowerPoint), Adobe Creative Suite (Illustrator, Photoshop), LaTeX, Overleaf

Lausanne, August 8, 2023
Alessandro Bongarzone

