Beatrice BATTISTI

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Education

Politecnico di Torino & Université de Bordeaux Nov 2020 – Apr 2024
Doctor of Philosophy, Applied Mathematics and Mechanical Engineering *Cotutelle programme, with high honours*
Supervisors: Dr. Michel Bergmann, Prof. Giovanni Bracco
Defense: 22nd April 2024

Université Claude Bernard - Lyon 1 & Ecole Centrale de Lyon Sep 2017 – Oct 2018
Master of Science, Fluid Mechanics and Energy

Ecole Centrale de Lyon Sep 2016 – Oct 2018
Master of Science, General Engineering *Double Degree*
Major in Aeronautics

Politecnico di Torino Sep 2015 – Oct 2018
Master of Science, Aerospace Engineering and Astronautics *Double Degree, with high honours*
Major in Aerodynamics

Politecnico di Torino Sep 2012 – Sep 2015
Bachelor of Science, Aerospace Engineering *with high honours*

Research Interests

I am interested in developing numerical schemes for partial differential equations to describe the physics of environmental phenomena. My focus is on the numerical modeling of multi-phase flows and the implementation of model order reduction methods for non-linear problems.

Current Position

CNRS iMPT, Université Savoie Mont Blanc Sep 2025 – present
Post-doctoral Fellow *Supervisors: Walter Boscheri, Alain Burgisser*
ERUPTA: Efficientand Reliable numerical methods to Unravel Processes in magma Transport at Active volcanoes

Professional and Research Experience

CNRS, Université Savoie Mont Blanc (LAMA) Chambéry, France
Post-doctoral fellowship - Supervisor: Walter Boscheri *Sept 2024 – Aug 2025*

- Numerical simulation and analysis of multiphase flows applied to volcanic phenomena

After PhD

Before PhD

Politecnico di Torino Turin, Italy
Pre-Doctoral program *Apr 2020 – Oct 2020*

- Wave energy converter array development

Politecnico di Torino Turin, Italy
Research scholarship *Jan 2020 – Apr 2020*

- Development of a CFD in-house code - Application to the wave energy

IKOS Consulting, at ALSTOM La Rochelle, France
Engineering full-time job *Mar 2019 – Dec 2019*

- Numerical simulation of train dynamics in extreme conditions - Application to trams and to trains for the "TGV 2020" project

INRIA Bordeaux - Sud-Ouest Bordeaux, France
Internship *Apr 2018 – Sep 2018*

- Numerical simulation of undulating bores in open channels and study of the influence of the sloping banks on the flow dynamics

Naval Group Ollioules, France
Internship *Apr 2017 – Aug 2017*

- Hydrodynamics of the towed "V-Wing" systems and dimensioning of the drop cable

Research Stays

Optimad Srl Turin, Italy
Secondment, ARIA (Accurate ROMs for Industrial Applications) project *Winter 2023 – 3 months*

- Body-less approach for the numerical modeling of wave energy converters

Ghent University Ghent, Belgium
WECANet Short Term Scientific Mission (STSM) *Fall 2022 – 3 weeks*

- Numerical modeling of the far-field effects of a PeWEC farm

CIRM Luminy, France
Research project in the context of the summer school CEMRACS 2021 *Summer 2021 – 5 weeks*

- Model Order Reduction of one-dimensional non-linear transport PDEs in porous media

Research Mobility Grants

- WECANet COST Action Short-Term Scientific Mission (STSM) Fellowship, Ghent University - Numerical modeling of WEC farms. *4,000€.* Fall 2022.
- CEMRACS Summer School Fellowship, CIRM - Reduced-order modeling of transport PDEs in porous media. *Full support.* Summer 2021.

Organization of Scientific Meetings

Université Savoie Mont Blanc Chambéry, France
Co-organizer of the Girls and Maths day *Upcoming - May 2026*

- with Laure Bastide, Georges Comte and Céline Labart (LAMA Equality Committee)

LAMA - Université Savoie Mont Blanc Yenne, France
Organizer of the PhD and Postdoc days in Mathematics of USMB *October 2025*

Université Savoie Mont Blanc Chambéry, France
Co-organizer of the 3C conference *May 2025*

- 3C: Challenges in Computational methods for Complex environmental applications
- with Laure Bastide, Walter Boscheri and Arnaud Duran

LAMA - Université Savoie Mont Blanc Chambéry, France
Co-organizer of the PhD and Postdoc day in Mathematics of USMB *November 2024*

- with Cassandre Lebot

Publications

Referred Publications in International Journals

- Battisti B., Boscheri W. (2025). *A linearly implicit shock capturing scheme for compressible two-phase flows at all Mach numbers.* Journal of Computational Physics (JCP), 539:114227. https://doi.org/10.1016/j.jcp.2025.114227
- Battisti B., Bracco G., Bergmann M. (2024). *A multi-fidelity model for wave energy converters.* International Journal for Numerical Methods in Fluids (IJNMF), 97:427-445. https://doi.org/10.1002/fld.5354
- Battisti B., Giorgi G., Verao Fernandez G. (2024). *Balancing power production and coastal protection: A bi-objective analysis of Wave Energy Converters.* Renewable Energy, 220:119702. https://doi.org/10.1016/j.renene.2023.119702

- Cervelli G., Battisti B., Mattiazzo G. (2022). *On the influence of multidirectional irregular waves on the PeWEC device.* Frontiers in Energy Research, 20:908529. https://doi.org/10.3389/fenrg.2022.908529

Conference Proceedings Publications

- Boscheri W., Battisti B., *A penalized IMEX finite volume scheme for the isentropic Euler system at all Mach numbers.* Proceedings of the HYP 2024 conference, accepted, 2025. https://hal.science/hal-05001272v1
- Battisti B., Giorgi G., Verao Fernandez G. (2024). *Enhancing synergy for power generation and coastal protection through wave energy converters.* Innovations in Renewable Energies Offshore - RENEW, Lisbon.
- Battisti B., Giorgi G., Verao Fernandez G., Troch P. (2023). *Multi-query analysis of a PeWEC farm.* Proceedings of the European Wave and Tidal Energy Conference - EWTEC, vol. 15, Bilbao.
- Battisti B., Blickhan T., Enchery G., Ehrlacher V., Lombardi D., Mula O. (2023). *Wasserstein model reduction approach for parametrized flow problems in porous media.* ESAIM: Proceedings and Surveys, vol. 73, p. 28-47, Luminy.
- Battisti B., Bracco G., Bergmann M. (2022). *Multi-fidelity modeling of wave energy converter farms.* Trends in Renewable Energies Offshore - RENEW, p. 351-357, Lisbon.
- Niosi F., Battisti B., Sirigu S.A. (2022). *Influence of hydrodynamic interactions on the productivity of PeWEC wave energy converter array.* International Conference on Electrical, Computer, Communications and Mechatronics Engineering - ICECCME, Maldives.
- Casalone P., Dell'Edera O., Fontana M., Battisti B., Mattiazzo G. (2022). *Solutions to Wave Damping Over Time in CFD RANS Simulations Due to Exponential Generation of Numerical Turbulence.* Proceedings of the International Conference on Offshore Mechanics and Arctic Engineering - OMAE, vol. 8, Hamburg.
- Fontana M., Casalone P., Dell'Edera O., Niosi F., Battisti B., Mattiazzo G. (2021). *Viscous damping analysis of WEC's hull in yaw motion - Methodology and viscous damping parameters identification.* Proceedings of the European Wave and Tidal Energy Conference - EWTEC, Plymouth.

Dissertations

- Multi-fidelity multi-scale numerical modeling of wave energy converter farms. Doctoral thesis, 2024.
- Modeling of the upstream propagation of coastal surface waves into open channels - Application to the dynamics of undulating bores. Master thesis, 2018.
- Implementation of an auxiliary instrument for the design of a wingsail. Bachelor thesis, 2015.

Teaching Activities

2025/2026 – 1st semester

Université Savoie Mont Blanc — Chambéry, France

Course "Partial differential equations and discretization" — *∼ 15 students*

- Supervision and evaluation of the practical sessions of the course (using Python), for 1st year master's students

Course "Mathematical modeling and scientific computing" — *∼ 15 students*

- Supervision and evaluation of the practical sessions of the course (using Python), for 1st year master's students

Course "Numerical analysis" — *< 10 students*

- Supervision and teaching of exercise sessions of the course, for 3rd year bachelor's students

Course "Discrete probability" — *∼ 25 students*

- Supervision and teaching of exercise sessions of the course, for 2nd year bachelor's students

2023/2024 – 1st semester

Enseirb-Matmeca — Bordeaux, France

Course "Algorithm and Programming in Fortran 90" — *∼ 15 students*

- Supervision and evaluation of the practical sessions of the course, for 3rd year bachelor's students

2022/2023 – 2nd semester

Enseirb-Matmeca — Bordeaux, France

Course "Algorithm and Programming in Fortran 90" — *∼ 15 students*

- Supervision and evaluation of the practical sessions of the course, for 3rd year bachelor's students

Presentations

Invited Talks *Typically ≥ 30 min presentation; full support provided (conference fee and accommodation covered).*

- A numerical scheme for compressible two-phase flows at all Mach numbers. ETNA Conference, Catania, Italy - Nov 2025.
- A numerical scheme for compressible two-phase flows at all Mach numbers. JEARA Conference, Lyon, France - Nov 2025.
- Multi-fidelity multi-scale numerical modeling of wave energy converter farms. INORE Symposium, Zarautz, Spain - Oct 2022.

Contributed Talks

- A multi-fidelity coupling methodology for the simulation of wave energy converters. Digital Ocean for the Future, Inria Webinar Series, online - Jan 2026.
- A numerical scheme for compressible two-phase flows at all Mach numbers. LAMA Seminar, Le Bourget-du-Lac, France - Sep 2025.
- A numerical scheme for compressible two-phase flows at all Mach numbers. ARIA Workshop, Bidart, France - Sep 2025.
- A numerical scheme for compressible two-phase flows at all Mach numbers. Mathematics of Compressible Fluids Workshop, Clausthal, Germany - Jun 2025.
- A numerical scheme for compressible two-phase flows at all Mach numbers. Shark-FV Conference, Porto, Portugal - Jun 2025.
- A numerical scheme for compressible two-phase flows at all Mach numbers. 3C Conference, Chambéry, France - May 2025.
- Multi-query analysis of a PeWEC farm. EWTEC Conference, Bilbao, Spain - Sep 2023.
- A multi-fidelity coupling methodology for the simulation of wave energy converter farms. ECCOMAS MARINE Conference, Madrid, Spain - Jun 2023.
- A coupling methodology implementing high-fidelity and reduced-order models for the simulation of bi-fluid flows. ECCOMAS COUPLED PROBLEMS Conference, Chania, Crete, Greece - Jun 2023.
- Model order reduction for wave energy converter farms. SIAM CSE Conference, Amsterdam, Netherlands - Mar 2023.
- Multi-fidelity modeling of wave energy converter farms. RENEW Conference, Lisbon, Portugal - Nov 2022.
- Multi-fidelity multi-scale numerical modeling of wave energy converter farms. Closure of STSM Project at Ghent University, Gent, Belgium - Sep 2022.
- Wave energy converter farms: Modeling strategies. HYWEC Workshop, Bilbao, Spain - Jun 2022.
- Model order reduction for wave energy converter farms. 7th Wave Energy Workshop, Turin, Italy - Apr 2022.

Posters

- CFD-ROM coupling technique for the numerical simulation of wave energy converter farms. Numerical Aspects of Hyperbolic Balance Laws and Related Problems – Young Researchers Conference, Ferrara, Italy - Dec 2024.
- Multi-fidelity multi-scale numerical modeling of wave energy converter farms. Workshop on "Reduced-order models at work: Industry and Medicine", Bordeaux, France - Mar 2023.
- Coupling methodologies to enable more effective numerical simulations of WEC farms. 4th WECANet Assembly, Ghent, Belgium - Mar 2023.
- CFD-ROM coupling technique for the numerical simulation of wave energy converter farms. INORE Symposium 2022, Zarautz, Spain - Oct 2022.
- Multi-fidelity multi-scale numerical modeling of wave energy converter farms. Workshop on "Reduced-order models at work: Industry and Medicine", Bordeaux, France - Mar 2022.

Outreach

- Participation in the mathematics booth for the science festival "Fête de la Science", Chambéry, France - Oct 2025.
- Participation to the speed meeting with high school young women during the "Filles, maths et informatique : une équation lumineuse" day, Chambéry, France - May 2025.
- Vague océanique : espoir d'une énergie renouvelable ou crainte de la montée des eaux ? Amphi Pour Tous Conference, Chambéry, France - Oct 2024.
- Numerical modeling of wave energy converter farms. Seminar for the Lambda Team (association of the Bordeaux PhD students in Mathematics), Bordeaux, France - May 2023.
- The path to the PhD and an introduction to the PhD project, Talk with Master's students at ENSEIRB-MATMECA, Bordeaux, France, Nov 2022.

Languages

- **Italian** Native language.
- **French** Fluent. DALF C2 (2018).
- **English** Fluent. TOEFL iBT : 100 (2018). GRE General Test : 156-160-3.5 (2018). TOEIC (2017).
- **Spanish** Basic communication skills.

Programming skills

Advanced	**Intermediate**	**Basic**
Fortran	Java	C/C++
Matlab	Julia	HTML/CSS
Python		

Interests


Environment


Climbing


Mountains


Paragliding


Reading


Cycling