

# Beatrice BATTISTI

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## EDUCATION

<b>Politecnico di Torino &amp; Université de Bordeaux</b>	Nov 2020 – Apr 2024
<i>Doctor of Philosophy, Mechanical Engineering and Applied Mathematics</i>	<i>Cotutelle programme, with high honours</i>
<i>Supervisors: Dr. Michel Bergmann, Prof. Giovanni Bracco</i>	
<i>Defense: 22nd April 2024</i>	
<b>Université Claude Bernard - Lyon 1 &amp; Ecole Centrale de Lyon</b>	Sep 2017 – Oct 2018
<i>Master of Science, Fluid Mechanics and Energy</i>	
<b>Ecole Centrale de Lyon</b>	Sep 2016 – Oct 2018
<i>Master of Science, General Engineering</i>	<i>Double Degree</i>
<i>Major in Aeronautics</i>	
<b>Politecnico di Torino</b>	Sep 2015 – Oct 2018
<i>Master of Science, Aerospace Engineering and Astronautics</i>	<i>Double Degree, with high honours</i>
<i>Major in Aerodynamics</i>	
<b>Politecnico di Torino</b>	Sep 2012 – Sep 2015
<i>Bachelor of Science, Aerospace Engineering</i>	<i>with high honours</i>

## RESEARCH INTERESTS

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

## CURRENT POSITION

<b>CNRS, Université Savoie Mont Blanc (LAMA)</b>	Sep 2024 – present
<i>Post-doctoral Fellow</i>	<i>Supervisor: Prof. Walter Boscheri</i>
<i>Numerical simulation and analysis of multiphase flows applied to volcanic phenomena.</i>	

## PROFESSIONAL AND RESEARCH EXPERIENCE

<b>Politecnico di Torino</b>	Turin, Italy
<i>Pre-Doctoral program</i>	<i>Apr 2020 – Oct 2020</i>
• Wave energy converter array development	
<b>Politecnico di Torino</b>	Turin, Italy
<i>Research scholarship</i>	<i>Jan 2020 – Apr 2020</i>
• Development of a CFD in-house code - Application to the wave energy	
<b>IKOS Consulting, at ALSTOM</b>	La Rochelle, France
<i>Engineering full-time job</i>	<i>Mar 2019 – Dec 2019</i>
• Numerical simulation of train dynamics in extreme conditions - Application to trams and to trains for the "TGV 2020" project	
<b>INRIA Bordeaux - Sud-Ouest</b>	Bordeaux, France
<i>Internship</i>	<i>Apr 2018 – Sep 2018</i>
• Numerical simulation of undulating bores in open channels and study of the influence of the sloping banks on the flow dynamics	
<b>Naval Group</b>	Ollioules, France
<i>Internship</i>	<i>Apr 2017 – Aug 2017</i>
• Hydrodynamics of the towed "V-Wing" systems and dimensioning of the drop cable	

## TEACHING ACTIVITIES

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### Enseirb-Matmeca

Course "Algorithm and Programming in Fortran 90"

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

Bordeaux, France

2023/2024 – 1st semester

### Enseirb-Matmeca

Course "Algorithm and Programming in Fortran 90"

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

Bordeaux, France

2022/2023 – 2nd semester

## RESEARCH STAYS

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### Optimad Srl

Secondment, ARIA (Accurate ROMs for Industrial Applications) project

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

Turin, Italy

Winter 2023 – 3 months

### Ghent University

WECANet Short Term Scientific Mission (STSM)

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

Ghent, Belgium

Fall 2022 – 3 weeks

### CIRM

Research project in the context of the summer school CEMRACS 2021

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

Luminy, France

Summer 2021 – 5 weeks

## ORGANIZATION OF SCIENTIFIC MEETINGS

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### Université Savoie Mont Blanc

Co-organizer of the 3C conference

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

Chambéry, France

May 2025

### LAMA - Université Savoie Mont Blanc

Co-organizer of the PhD day in Mathematics of USMB

- with Cassandre Lebot

Chambéry, France

November 2024

## OUTREACH

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- 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.

## PUBLICATIONS

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### Referred Publications in International Journals

- Battisti B., Boscheri W., *A linearly implicit shock capturing scheme for compressible two-phase flows at all Mach numbers*. Journal of Computational Physics (JCP), 2025. <https://doi.org/10.1016/j.jcp.2025.114227>
- Battisti B., Bracco G., Bergmann M. *A multi-fidelity model for wave energy converters*. International Journal for Numerical Methods in Fluids (IJNMF), 2024. <https://doi.org/10.1002/fld.5354>
- Battisti B., Giorgi G., Verao Fernandez G. *Balancing power production and coastal protection: A bi-objective analysis of Wave Energy Converters*. Renewable Energy, 2024. <https://doi.org/10.1016/j.renene.2023.119702>
- Cervelli G., Battisti B., Mattiazzo G. *On the influence of multidirectional irregular waves on the PeWEC device*. Frontiers in Energy Research, 2022. <https://doi.org/10.3389/fenrg.2022.908529>

## Conference Proceedings Publications

- Battisti B., Giorgi G., Verao Fernandez G. *Enhancing synergy for power generation and coastal protection through wave energy converters.* Innovations in Renewable Energies Offshore - RENEW. Lisbon, 2024.
- Battisti B., Giorgi G., Verao Fernandez G., Troch P. *Multi-query analysis of a PeWEC farm.* Proceedings of the European Wave and Tidal Energy Conference - EWTEC, vol. 15. Bilbao, 2023.
- Battisti B., Blickhan T., Enchery G., Ehrlacher V., Lombardi D., Mula O. *Wasserstein model reduction approach for parametrized flow problems in porous media.* ESAIM: Proceedings and Surveys, vol. 73, p. 28-47. Luminy, 2023.
- Battisti B., Bracco G., Bergmann M. *Multi-fidelity modeling of wave energy converter farms.* Trends in Renewable Energies Offshore - RENEW, p. 351-357. Lisbon, 2022.
- Niosi F., Battisti B., Sirigu S.A. *Influence of hydrodynamic interactions on the productivity of PeWEC wave energy converter array.* International Conference on Electrical, Computer, Communications and Mechatronics Engineering - ICECCME. Maldives, 2022.
- Casalone P., Dell'Edera O., Fontana M., Battisti B., Mattiazzo G. *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, 2022.
- Fontana M., Casalone P., Dell'Edera O., Niosi F., Battisti B., Mattiazzo G. *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, 2021.

## Submitted Papers

- Boscheri W., Battisti B., *A penalized IMEX finite volume scheme for the isentropic Euler system at all Mach numbers.* 2025. <https://hal.science/hal-05001272v1>

## 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.

## PRESENTATIONS

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- A numerical scheme for compressible two-phase flows at all Mach numbers. Mathematics of compressible fluids Workshop, Clausthal, Germany - June 2025.
- A numerical scheme for compressible two-phase flows at all Mach numbers. Shark-FV Conference, Porto, Portugal - June 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. INORE Symposium, Zarautz, Spain - Oct 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

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- 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.

## LANGUAGES

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- **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.

## INTERESTS

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Environment



Climbing



Mountains



Paragliding



Reading



Cycling