

Beatrice BATTISTI

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EDUCATION

Politecnico di Torino & Université de Bordeaux

Nov 2020 – Apr 2024

Doctor of Philosophy, Mechanical Engineering and Applied Mathematics *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 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

CNRS, Université Savoie Mont Blanc (LAMA)

Sep 2024 – present

Post-doctoral Fellow

Supervisor: Prof. Walter Boscheri

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

PROFESSIONAL AND RESEARCH EXPERIENCE

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

TEACHING ACTIVITIES

Enseirb-Matmeca

Course "Algorithm and Programming in Fortran 90"

Bordeaux, France

2023/2024 – 1st semester

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

Enseirb-Matmeca

Course "Algorithm and Programming in Fortran 90"

Bordeaux, France

2022/2023 – 2nd semester

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

RESEARCH STAYS

Optimad Srl

Secondment, ARIA (Accurate ROMs for Industrial Applications) project

Turin, Italy

Winter 2023 – 3 months

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

Ghent University

WECANet Short Term Scientific Mission (STSM)

Ghent, Belgium

Fall 2022 – 3 weeks

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

CIRM

Research project in the context of the summer school CEMRACS 2021

Luminy, France

Summer 2021 – 5 weeks

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

ORGANIZATION OF SCIENTIFIC MEETINGS

Université Savoie Mont Blanc

Co-organizer of the 3C conference

Chambéry, France

May 2025

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

LAMA - Université Savoie Mont Blanc

Co-organizer of the PhD day in Mathematics of USMB

Chambéry, France

November 2024

- with Cassandre Lebot

OUTREACH

- 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

Referred Publications in International Journals

- 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/flid.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., Vero 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., Vero 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

- Battisti B., Boscheri W., *A linearly implicit shock capturing scheme for compressible two-phase flows at all Mach numbers*. 2025. <https://hal.science/hal-04963046>
- 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

- 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

- 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 WECA Net 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

- **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



Environment



Climbing



Mountains



Paragliding



Reading



Cycling