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

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 — Bordeaux, France
Course "Algorithm and Programming in Fortran 90" — *2023/2024 – 1st semester*
- Supervision of the practical sessions of the course, for 3rd year bachelor's students

Enseirb-Matmeca — Bordeaux, France
Course "Algorithm and Programming in Fortran 90" — *2022/2023 – 2nd semester*
- Supervision of the practical sessions of the course, for 3rd year bachelor's students

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

Organization of Scientific Meetings

Université Savoie Mont Blanc — Chambéry, France
Co-organizer of the 3C conference — *Scheduled for May 2025*
- 3C: Challenges in Computational methods for Complex environmental applications
- with Prof. Walter Boscheri and Prof. Arnaud Duran

LAMA — Chambéry, France
Co-organizer of the PhD day in Mathematics of USMB — *November 2024*
- with Cassandre Lebot

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/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

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

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

- Vague océanique : espoir d'une énergie renouvelable ou crainte de la montée des eaux ? Amphi Pour Tous Conference, Chambéry, France - Oct 2024.
- 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.
- Numerical modeling of wave energy converter farms. Seminar for the Lambda Team (association of the Bordeaux PhD students in Mathematics), Bordeaux, France - May 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.
- The path to the PhD and an introduction to the PhD project, Talk with Master's students at ENSEIRB-MATMECA, Bordeaux, France, 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 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.