

## EDUCATION AND EXPERIENCE

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### Chief Technology Officer

I am co-founder and chief technology officer of the FAST Computing company

*FAST Computing Srl, Trieste*  
2022 - current

### Research Fellow

I was employed as researcher fellow (“Assegnista di ricerca”) within the SISSA math-Lab group, in the Mathematical Analysis, Modelling and Applications area. My main research topics are: model order reduction, data-driven modeling, scientific computing, parallel programming, shape parameterization, shape optimization, machine learning, deep learning

*SISSA, Trieste*  
2017 - 2023

### Internship

During the MHPC thesis, I worked as HPC specialist to build an efficient pipeline for the naval bulb shape optimization, coupling an automated freeform deformation, a finite volume solver and the model reduction

*Fincantieri, Trieste*  
2016

### Master in HPC

thesis: ‘Increasing speedup of naval hull workflow optimization using Reduced Order Method’ with the supervision of Prof. L. Heltai

*SISSA, Trieste*  
2015 - 2016

### B. Sc. in Computer Science

thesis: ‘Parallelizzazione e vettorizzazione di un algoritmo Lattice Boltzmann mediante direttive di compilazione’ with the supervision of Prof. F. S. Schifano

*University of Ferrara*  
2012 - 2015

### Scientific diploma

*Liceo Ariosto, Ferrara*  
2007 - 2012

## PROJECTS

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### AROMA

I developed methodologies for CFD using an approach data-based, implementing them inside an open source environment. I developed the web graphical interface ARGOS as frontend of the AROMA-CFD methodologies, so making them available directly on web-browser

### UBE2

In this project, I dealt with the implementation of a web interface capable to perform, and visualize, real-time algorithms for the higher order spectral analysis

## PhD4PMI

In this Proof of Concept, I collaborate with Wärtsilä in merit of application of machine learning and deep learning algorithm to estimate the fuel consumption for hybrid naval engine

## MISTI

I collaborate with the Massachusetts Institute of Technology for an advanced optimization pipeline that includes reduced order modeling, shape parameterization, multi-fidelity models, gaussian process regression

## SOPHYA

I have been involved in the POR-FESR SOPHYA project, which had the goal of increase the performances of planing hulls. In particular, I worked on the data-driven reduced order model and on the shape parameterization for an efficient shape optimization procedure

## SAFE

I contributed within the POR-FESR SAFE project for the development of a digital twin of the ship, based on graph theory, for the dynamic quantification of damages occurred on-board.

## HeAD

Within this project, I had the opportunity to collaborate with Fincantieri SpA for the development of an (open source) framework capable to exploit the reduced order modeling benefits for an industrial shape optimization problem

## SOFTWARE

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### PyDMD

Python Dynamic Mode Decomposition

<https://mathlab.sissa.it/pydmd>

### EZyRB

Easy Reduced Basis Method

<https://mathlab.sissa.it/ezyrb>

### PyGeM

Python Geometrical Morphing

<https://mathlab.sissa.it/pygem>

### ARGOS

Advanced Reduced order modellinG: Online computational web server for parametric Systems

<https://argos.sissa.it>

## CONFERENCE

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### ESB2022

*Oporto*, June 2022

27th Congress of the European Society of Biomechanics [slides: [slides.com/nicolademo/deck](https://slides.com/nicolademo/deck)]

A Web platform for data-driven, real-time modeling and visualizing cardiovascular problems

**SIMAI 2020+2021***Parma, September 2021*

Convegno nazionale della Società Italiana di Matematica Applicata e Industriale

A Computational Pipeline Exploiting Reduced Order Modeling Techniques For Industrial Shape Optimization Problems

**MARINE 2021***Virtual (Edinburgh), June 2021*

IX International Conference on Computational Methods in Marine Engineering

Data-driven reduced order modeling for efficient solution of industrial shape optimization problems

**CSE21***Virtual (Fort Worth), January 2021*

SIAM Conference on Computational Science and Engineering

Accelerating Shape Optimization Problems by Means of Model Order Reduction

**WCCM ECCOMAS***Virtual (Paris), January 2021*

A Modular And Data-driven Framework Involving Reducing Order Methods For Naval Optimization Industrial Problems

**DAEDALUS Winter School***Berlin, December 2019*

Machine Learning meets Numerical Analysis of PDE

**ROM Summer School***Trieste, July 2019*

Reduced Order Methods in Computational Fluid Dynamics

**MARINE***Goteborg, May 2019*

VII International Conference on Computational Methods in Marine Engineering

**MOR Summer School***Hamburg, September 2018*

Model Order Reduction Summer School

**NAV***Trieste, 2018*

19th International Conference on Ship &amp; Maritime Research

**PUBLICATIONS**

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The complete list of all publications is attached on a separate files.