

# GIOVANNI CORSI

## Curriculum Vitae

### EDUCATION

- 2016-2020      SISSA - Scuola Internazionale Superiore di Studi  
Avanzati
- PhD      *cum laude* · PhD in Mathematical Analysis, Modelling, and Applications - Dottorato di ricerca in Analisi Matematica, Modelli e Applicazioni · Trieste, Italy  
Thesis: *Fluid structure interaction problems involving thin active shells and microswimmers*  
Advisor: Professor Antonio DE SIMONE
- 2011-2014      Politecnico di Milano
- M. Sc.      110/110 · Mechanical Engineering - Laurea Magistrale in Ingegneria Meccanica · Milan, Italy  
Thesis: *Numerical Analysis of the unsteady flow in a turbine stage with non-uniform temperature field at inlet*  
Italian title: Analisi numerica del flusso instazionario in uno stadio di turbina assiale in presenza di disuniformità nel campo di temperatura in ingresso.  
Advisor: Professor Giacomo Bruno PERSICO
- 2008-2011      Università degli studi di Udine
- B. Sc.      110/110 *cum laude* · Mechanical Engineering - Laurea Triennale in Ingegneria Meccanica · Udine, Italy

### ACADEMIC APPOINTMENTS

- 2024-2025      CONTRACT RESEARCHER
- Scuola Superiore  
Sant'Anna -  
Istituto di  
BioRobotica
- Research contract at Scuola Superiore Sant'Anna, working on computational models of bio-inspired soft robots, with application to agri-tech and micro biomedical devices.  
References: Professor Antonio DE SIMONE
- 2023-2024      POSTDOC
- Scuola Superiore  
Sant'Anna -  
Istituto di  
BioRobotica
- Research contract at Scuola Superiore Sant'Anna, working on mathematical and computational models of Fluid-Structure Interaction problems, with application to the motility of soft robots.  
References: Professor Antonio DE SIMONE
- 2021-2023      POSTDOC
- Sapienza  
Università di  
Roma -  
Dipartimento di  
Ingegneria  
Strutturale e  
Geotecnica
- Research contract at Sapienza University of Rome, working on problems of Fluid-Structure Interaction, and on Phase-Field models for problems of fracture in thin structures. Theoretical and numerical work, using the OPENFOAM and FENICS numerical libraries.  
References: Professor Antonino FAVATA, Professor Stefano VIDOLI
- 2014-2016      RESEARCH CONTRACT (PRE-DOC)
- Scuola  
Internazionale  
Superiore di Studi  
Avanzati (SISSA)
- Research contract at SISSA *mathLab* for Danieli SpA, an international company in the region. Tasks carried out included development of CFD tools for fluid-structure interaction problems and simulation of industrial flow problems. The numerical tools developed were based on the OPENFOAM numerical library.  
References: Professor Gianluigi ROZZA

### EXPERIENCE ABROAD

## Sorbonne Université

January-June 2018,  
and December  
2019 - March 2020

Period of research abroad at the *Institut Jean Le Rond d'Alembert*, Sorbonne  
Université · Paris, France  
Scientific Host: Professor Corrado MAURINI

### SOCIETY MEMBERSHIPS, AWARDS AND HONORS

2022-2025      Member of the GNFM group, section MECCANICA DEI CONTINUI SOLIDI,  
of the ISTITUTO NAZIONALE DI ALTA MATEMATICA "FRANCESCO SEVERI"  
(INdAM).

### FURTHER TRAINING

1. **Introduction to Scientific and Technical Computing in C.**  
CINECA HPC Course. March 27-29, 2023 (Online).  
Coordinators: Luca Ferraro.
2. **Programming paradigms for GPU devices.** CINECA HPC  
Course. November 29-December 01, 2021 (Online).  
Coordinators: Luca Ferraro.
3. **Advanced Topics in Computational Mechanics.** International  
Centre for Mechanical Sciences (CISM) Advanced Webinar.  
December 07-10, 2020 (Online). Coordinators: Wolfgang A. Wall.
4. **Computational Biomechanics Advanced Models and Methods.**  
International Centre for Mechanical Sciences (CISM) Advanced  
Webinar. December 02-04, 2020 (Online). Coordinators:  
Wolfgang A. Wall and Bernhard A. Schrefler.

### RESEARCH ACTIVITIES

<i>Robotics</i>	At the institute of BioRobotics at Scuola Superiore Sant'Anna I've had the opportunity to be part of several joint collaborations with other research groups. I could thus develop a comprehension of research topics such as hand robotics, collaborative robotics, development and implementation of algorithms for direct and inverse control problems.
<i>Fracture Mechanics</i>	Modelling of fracture problems in thin structures (beams, shells), investigating the effects of the coupling of membranous and bending deformations. The study is both numerical, using the Finite Element Method for Phase-Field problems, and theoretical, e.g., using approximation techniques such as matched asymptotic expansion of problems of Linear Elastic Fracture Mechanics.
<i>Micro-Swimmers</i>	Study of the problem of locomotion of bio-inspired objects in a fluid. Experimental, theoretical and numerical modelling of locomotion problems.
<i>Fluid-Structure Interaction</i>	Numerical investigation of problems of buoyancy driven motion of bio-inspired objects (e.g., seeds) and soft robots in a viscous fluid. Problems of interaction of a viscous fluid with thin shells.

### SKILLS

<i>Programming Languages</i>	Proficiency in the C, C++, PYTHON programming languages
<i>Numerical Libraries</i>	Extensive experience in using numerical libraries for simulation of problems in

the context of continuum mechanics and fluid dynamics, in particular  
OPENFOAM (finite volumes), FENICSx (finite elements)

#### *HPC skills*

Used HPC resources on various supercomputers at French (Jean-Zay, MeSU), Italian (CINECA and SISSA resources) and Finnish (LUMI-C) institutions, with different architectures.

#### *HPC environments*

PBS scheduler, SLURM scheduler

#### *Languages*

ITALIAN · Mother tongue  
ENGLISH · Fluent

### HPC RESOURCES ALLOCATIONS

2020	<b>Italian SuperComputing Resource Allocation (ISCRA, CINECA)</b> , <i>Application Class C</i> , Call of May 2020, Project ID - FSThin20. Role: PI Accepted, core hours awarded: 200k
2021	<b>Italian SuperComputing Resource Allocation (ISCRA, CINECA)</b> , <i>Application Class C</i> , Call of April 2021, Project ID - MCR-SW21. Role: PI Accepted, core hours awarded: 60k
2021	<b>Italian SuperComputing Resource Allocation (ISCRA, CINECA)</b> , <i>Application Class B</i> , Call of June 2021, Project ID - MT-SWS21. Role: PI Accepted, core hours awarded: 2.4M
2023	<b>EuroHPC (PRACE)</b> , <i>Development Access Call</i> , Call of June 2023, Project ID - EHPC-DEV-2023Do6-027. Role: Team Member Accepted, core hours awarded: 1.9M
2024	<b>Italian SuperComputing Resource Allocation (ISCRA, CINECA)</b> , <i>Application Class B</i> , Call of December 2023, Project ID - HSFSI23. Role: Team Member Accepted, core hours awarded: 3.6M

### PRESENTATIONS AT CONFERENCES

15-19 September 2019, Rome, ITALY	Title: A NEUTRALLY STABLE SHELL IN A STOKES FLOW: A ROTATIONAL TAYLOR'S SHEET. AIMETA 2019, Sapienza University of Rome.
04-08 September 2022, Palermo, ITALY	Title: A PHASE-FIELD MODEL FOR FRACTURE IN BEAMS FROM ASYMPTOTIC RESULTS IN 2D ELASTICITY. AIMETA Palermo 2022, University of Palermo.
02-06 September 2024, Napoli, ITALY	Title: A NUMERICAL STUDY OF BUOYANCY-DRIVEN MOTIONS OF ANNULAR DISKS IN A FLUID. AIMETA Napoli 2024, University of Naples - Federico II.

### ACTIVITY AS REVIEWER

#### *Reviews for Scientific Journals*

1. Engineering with Computers (Springer)
2. Computer Methods in Applied Mechanics and Engineering (Elsevier)

## TEACHING ACTIVITY

Examination  
Board

Appointed *cultore della materia* by the *Dipartimento di Ingegneria Strutturale e Geotecnica* of *Sapienza Università di Roma* on March 1st, 2022, and as such participated in the examination boards for the exams of the following courses (taught by Prof. Antonino Favata):

1. Meccanica delle Strutture, SSD ICAR/o8, Laurea Magistrale Architetture
2. Meccanica delle Strutture, SSD ICAR/o8, Laurea Triennale Gestione del Processo Edilizio/Project Management

## Teaching Assistant

- ANALYSIS OF BIONIC AND ROBOTIC SYSTEMS  
*Dipartimento di Ingegneria dell'Informazione*, Università di Pisa.  
Academic year 2023-2024 (~20 students). Language: English.  
**Bando DINGI 2023/12-3 Didattica Sussidiaria.**
- MODELLING OF MULTIPHYSICS PHENOMENA  
*Dipartimento di Ingegneria dell'Informazione*, Università di Pisa.  
Academic year 2024-2025 (~30 students). Language: English.  
**Seminars within the course “Modelling of Multiphysics Phenomena”**

## SCIENTIFIC PUBLICATIONS

Contribution in  
Conference  
proceedings

1. Giovanni CORSI, Antonino FAVATA, and Stefano VIDOLI. **A phase-field model for fracture in beams from asymptotic results in 2D elasticity.** Materials Research Proceedings 26, 2023. <https://doi.org/10.21741/9781644902431-19>
2. Filippo SALMOIRAGHI, Francesco BALLARIN, Giovanni CORSI, Andrea MOLA, Marco TEZZELE, Gianluigi ROZZA. **Advances in geometrical parametrization and reduced order models and methods for computational fluid dynamics problems in applied sciences and engineering: overview and perspectives.** Proceedings of the ECCOMAS Congress 2016, 7th European Conference on Computational Methods in Applied Sciences and Engineering, 2016. <https://doi.org/10.7712/100016.1867.8680>

Journal  
Publications

1. G. CORSI, A. FAVATA, S. VIDOLI. **A phase-field model for the brittle fracture of Euler–Bernoulli beams coupling stretching and bending.** Computer Methods in Applied Mechanics and Engineering, 427, 117030, 2024. <https://doi.org/10.1016/j.cma.2024.117030>
2. G. CORSI, F. BATTISTA, P. GUALTIERI, S. VIDOLI. **Effect of realistic distributed loads on the bi-stable behavior of a pre-stressed aileron.** Acta Mechanica, 235(5), 3059-3071, 2024. <https://doi.org/10.1007/s00707-024-03859-5>
3. G. CORSI, P. G. LEDDA, G. VAGNOLI, F. GALLAIRE, A. DE SIMONE. **Instability and trajectories of buoyancy-driven annular disks: A numerical study.** Physical Review Fluids, 9(4), 043907, 2024. <https://doi.org/10.1103/PhysRevFluids.9.043907>
4. Giovanni CORSI, Antonino FAVATA, and Stefano VIDOLI. **A coarse-grained constitutive law for fracturing beams based on a sharp interface crack representation.** International Journal of Solids and Structures 269, 112224, 2023. <https://doi.org/10.1016/j.ijsolstr.2023.112224>

5. Alberto LOLLI, Giovanni CORSI, and Antonio DE SIMONE. **Control and navigation problems for model bio-inspired microswimmers.** *Meccanica* pp. 1–15, 2022. <https://doi.org/10.1007/s11012-022-01567-9>
6. Giovanni CORSI. **Asymptotic approach to a rotational Taylor swimming sheet.** *Comptes Rendus Mécanique*. 349.1, pp. 103–116, 2021. <https://doi.org/10.5802/crmeca.75>
7. Giovanni CORSI, Antonio DE SIMONE, Corrado MAURINI, Stefano VIDOLI. **A neutrally stable shell in a stokes flow: a rotational Taylor’s sheet.** *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences*. 475.2227, p. 20190178, 2019. <https://doi.org/10.1098/rspa.2019.0178>

April 8, 2025