ALBERTO CIAMPAGLIA

PhD Fellow/Mechanical Engineering

alberto.ciampaglia@polito.it | +39 366 3208213 | aciampaglia | 12/06/1993

EXPERIENCE

Pre-doctoral visiting researcher

Northwestern University

May 2021 - currently

- Concurrent multi-scale simulation with data-driven reduced order models of composite structure with woven ad uni-directional fibers
- Mechanistic data science algorithm for material laws discovery from experimental Digital Image Correlation data
- Multimodal integration of experimental and artificial data for active learning material law under multiaxial stress
- Teaching Assistant for Mechanistic Data Science and Deep Learning Discrete Calculus courses
- Proposal submission for Air Force Reasearch Lab, Navy and NSF calls in the field of structure-property prediction of composite materials

PhD Fellow

Department of Mechanical Engineering, Politecnico di Torino

Apr 2019 – currently

- Numerical analysis of composite structures under quasi-static and dynamic loads in non-linear field with in-house code and commercial software
- Study and test of optical sensor integrated in laminated structure for shape and damage sensing
- Data-driven Structural Health Monitoring System for damage sensing and failure prediction: design and test
- Development of multi-functional self-sensing composite material for strain sensing and health monitoring
- Design, optimization, manufacturing and testing of an origami-shaped composite crash box
- Proposal submission for Horizon Europe call on data driven integrated characterization and modeling methodology for composite crash structures

Junior Researcher

CARS - Center for Automotive Research and Sustainable mobility

Jan 2020 - currently

- Multidisciplinary research project on smart structures for lightweight vehicles
- Active research collaborations with OEM and Tier I automotive companies

Innovation Engineer

Marelli

EDUCATION

PhD Mechanical Engineering

Politecnico di Torino
Northwestern University

Apr 2019 – Nov 2022

Specializing Master in Innovative products and technologies for automotive suspensions

Politecnico di Torino and Marelli

Jan 2018 – Mar 2019

M.S. in Mechanical Engineering

Politecnico di Torino (110/110)

Oct 2015 – Jan 2017

SOFTWARE/PL

LS Dyna
Altair Hyperworks
Abaqus

MS Office
MatLab
Python
LabView

RESEARCH PROJECTS

Data-Driven Physics-Based Modeling Tools to Determine Effective Mechanical Properties of As-Built Composite Structures
Navy SBIR, Northwestern University

Damage detection in composite suspension
Principal Investigator, funded by Marelli Ride Dynamics

Flexible Link Elevated Compliance Suspension(FLECS) lightweight design
Project engineer, Marelli Ride Dynamics

Jan 2018 – Mar 2019 Torino, ITA

- Research on innovative materials, processes and technologies. Specialist in design and structural analysis of composite material components
- Project leader for "Flexible Link and Elevated Compliance suspension material replacement"
- Digital coupling of RTM and Injection molding processes with resultant micro-structure
- Virtual validation of carbon fibre epoxy suspension system with 40 % mass decrease respect to previous design

Undergraduate

IEHV Research Group

Dec 2016 – Dec 2017 Torino, ITA

- Non-linear Finite Element Analysis with curved element and snap-though instabilities
- Quasi-static and impact tests on composite materials specimens and prototypes
- Design of a suspension test rig for kinematic and compliance analysis
- Machine learning for rapid design of a composite leaf spring

PUBLICATIONS

Journal Articles

- A. Ciampaglia, e. a. (2022a). Effect of carbon black dispersion in polymeric matrix composite on the mechanical and electric properties. *Composite structures (accepted)*.
- A. Ciampaglia, e. a. (2022b). Experimentally trained physic-informed neural network as material model. *CMAME (submitted)*.
- A Ciampaglia, e. a. (2021). Impact response of an origami-shaped composite crash box: Experimental analysis and numerical optimization. *Composite Structures*, *256*.
- A. Ciampaglia, e. a. (2021). Artificial intelligence for damage detection in automotive composite parts: A use case. *SAE Technical papers*.
- A Ciampaglia, A. S., & Belingardi, G. (2020). Design and analysis of automotive lightweight materials suspension based on finite element analysis. *Proceedings of the Istitution of Mechanical Engineers. Part C, Journal of Mechanical Engineering Science*.

Conference Proceedings

- A Ciampaglia, e. a. (2020). Impact response of an origami-shaped composite crash box: Experimental analysis and numerical optimization. In *Joint event: Iccs23 - 23rd international conference on composite structures mechcomp6 - 6th international conference on mechanics of composites*, UFP.
- Ciampaglia, A. (2020). Machine learning for damage sensing in composite structures. In *Machine learning in science and engineering, poster session*, Columbia Data Science Institute, Columbia University of New York.
- Ciampaglia, A., & Belingardi, G. (2019). Combined classification and regression artificial neural network for structural health monitoring of automotive suspension. In *Automotive in ai era*, Altair Engineering.

RESEARCH TOPIC

Composite structures | Material mechanic | Finite Element Analysis | Multiscale | Structural Monitoring | Machine learning

LANGUAGES

Italian
English
Spanish

REFEREES

Prof. Giovanni Belingardi, former PhD Advisor

@ Politecnico di Torino

giovanni.belingardi@polito.it

C.so Duca degli Abruzzi 24, Torino, Italy

Ing. Andrea Santini

@ Marelli

andrea.santini@marelli.com

Strada del Drosso, Torino, Italy

COURSES AND CERTIFICATIONS

Relevant coruses

- Advances in Experimental mechanic, AIAS PhD Summer School, 2020
- Virtual Manufacturing and Testing of composites, N. Zobeiry and R. Vaziri, British Columbia, 2019
- Structural and Computational Mechanics Modeling of Multilayered Composite and Sandwich Beam, Plate, and Shell Structures, A. Tessler, NASA, 2019
- Crash of composite structures, LS-Dyna Dynamore, 2017
- Innovation4Change, CERN 20 weeks innovation program for selected PhDs and MBAs

Certifications

- IELTS 7.0, British Council, 2017
- EY Next Car Innovation Challenge award, 2018

LIFE PHILOSOPHY

"I can accept failure, but I can not accept not trying."