# Andrea **Chiocca**


Research fellow in the machine design group · University of Pisa

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*"Improving material application and safety through advanced numerical methods and experimentation."*

## Qualifications summary

- Experienced researcher with a track record of publishing peer-reviewed articles and presentations at international conferences
- Work experience in structural durability and fatigue analysis of welded joints, additive manufacturing, composite and metal materials
- Research experience in both Italian and foreign institutions with well established research collaborations
- Lecturing and tutoring experience for university courses
- Winner of national and international awards

## Professional experience

### Department of Civil and Industrial Engineering – University of Pisa

*Pisa, Italy*

Research fellow in the machine design group — *Feb. 2025 - Present*

- Evaluation of static and fatigue properties at varying temperatures of thermoplastic and thermoset composite materials
- Static and fatigue assessment of Self-Piercing Riveting (SPR) joints

### Pierburg Pump Technology Italy S.p.A. – Rheinmetall

*Livorno, Italy*

Research affiliate in R&D department lead by Dr. Raffaele Squarcini — *Feb. 2022 - Jan. 2025*

- Structural integrity of polymer composites and elastomeric grommets for automotive applications
- Structural integrity of Printed Circuit Board Assemblies (PCBAs)

### Department of Civil and Industrial Engineering – University of Pisa

*Pisa, Italy*

Assistant professor in the machine design group — *Feb. 2022 - Jan. 2025*

- Development of the Effective Critical Plane (ECP) factor approach for fatigue analysis of notched components
- Development of optimized computational methodologies for the evaluation of critical plane factors
- Numerical thermal-structural analyses, experimental tests, and analytical modeling for the evaluation of residual stresses in welded joints
- Fatigue assessment of welded components under uni-axial and multiaxial loading conditions
- Fatigue assessment of lattice structures produced via additive manufacturing

### Fraunhofer LBF

*Darmstadt, Germany*

PhD period abroad in the Component-Related Material Behavior group lead by Dr. Rainer Wagener — *Feb. 2021 - June 2021*

- Transfer the representative structure element of an additive manufactured component through different scales using analytical approaches and numerical methods

### Fraunhofer LBF

*Darmstadt, Germany*

Contract work in the Structural Durability group lead by Dr. Jörg Baumgartner — *July 2018 - Oct. 2018*

- Study of cyclic behaviour of additive manufactured specimens produced via the Selective Laser Melting (SLM) process
- Characterization of the anisotropic material behaviour through experimental and numerical tests

### Fraunhofer LBF

*Darmstadt, Germany*

Student internship in the Structural Durability group lead by Dr. Jörg Baumgartner — *Dec. 2017 - May 2018*

- Study of the interaction and coalescence behaviour of multiple cracks in welded joints by means finite element analysis and experimental tests
- Implementation of the developed multiple cracks interaction and coalescence models within the IBESS computational algorithm

# Education

**PhD in Industrial Engineering (Land Vehicle Engineering and Systems Transportation)** — *University of Pisa*

Supervisors: prof. Francesco Frendo and prof. Leonardo Bertini — *Nov. 2021*

- Thesis title: *Influence of residual stresses on the fatigue life of welded joints*

**M. Sc. in Mechanical Engineering** — *University of Pisa*

Supervisor: prof. Francesco Frendo — *May 2018*

- Thesis title: *Analysis of the interaction and propagation of multiple cracks in weldments*

**B. Sc. in Mechanical Engineering** — *University of Pisa*

Supervisor: prof. Umberto Desideri — *Dec. 2015*

- Thesis title: *Preliminary structural analysis of a support for compound parabolic collectors*

# Lecturing and tutoring

## Lecturing

**Course lecturer of Machine Design (PF60 - competition class A042)** — *University of Pisa*

Training program for teachers in secondary and junior high school (d.lgs. n. 59/2017) — *2024*

**Course lecturer of Mechanical Design Using the Finite Element Method (Code 923II)** — *University of Pisa*

Master Degree in Energy Engineering — *2021–2024*

**Course assistant of Machine Design (Code 231II)** — *University of Pisa*

Master Degree in Aerospace Engineering — *2018–2024*

**Course lecturer of Computer-aided design laboratory (Code 2167Z)** — *University of Pisa*

Bachelor Degree in Mechanical and Manufacturing Technologies — *2024–2025*

## Tutoring

**Co-supervision of a master's thesis in vehicle engineering (etd-11012024-155304)** — *University of Pisa*

Title: Experimental and numerical characterization of an EPDM 55 grommet — *June 2024 - Nov. 2024*

**Supervision of a master's thesis in aerospace engineering (etd-01232024-100941)** — *University of Pisa*

Title: Study of static and fatigue strength of steel-aluminum hybrid joints with self-piercing rivets — *Sept. 2023 - Feb. 2024*

**Co-supervision of a master's thesis in mechanical engineering (etd-10282023-165104)** — *University of Pisa*

Title: Fatigue assessment of aluminum structures produced by Wire Arc Additive Manufacturing — *June 2023 - Nov. 2023*

**Supervision of a master's thesis in mechanical engineering (etd-01192023-151632)** — *University of Pisa*

Title: Investigation of structural reliability of printed circuit boards for automotive products — *Sept. 2022 - Feb. 2023*

# Qualifications

**Italian Ministry of University and Research**

National scientific qualification as associate professor in the Italian higher education system — *Nov. 2024*

**University of Pisa**

Professional qualification to practice as an industrial engineer — *Dec. 2018*

# Awards

**AIAS Award - topic area: modeling**

Italian scientific society of mechanical design and machine construction (AIAS) — *Sept. 2024*

**Best PhD thesis in Industrial Engineering of 2021**

University of Pisa — *June 2022*

**Top 10 Academic**

Ansys Hall of Fame 2020 Competition — *Feb. 2020*

**Software simulation award**

Italian scientific society of mechanical design and machine construction (AIAS) — *Sept. 2019*

## Technical Skills

### Software

FEM: Abaqus, Ansys MAPDL, Ansys Workbench
CAD: SolidWorks
MBD: MSC Adams
Others: Mathematica, Scilab, Matlab, Mathcad, GeoGebra

### Programming Languages

LaTeX, Python, Matlab, APDL

### General

Inkscape, Gimp, ImageJ, Microsoft Office Suite

## Languages

Italian: Mother-tongue
English: Fluent — *Certificate of Academic English C1+ level*
German: Intermediate — *Certificate of German language B1 level*