



# Marco Pretto

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**Date of birth:** 29/01/1992 | **Nationality:** Italian | **Gender:** Male | **Phone number:** (+39) 0432558013 (Work) |

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## About me:

Researcher (RTDa) in SSD ING-IND/08 (fluid machinery) at the University of Udine, after completion of PhD program in Environmental and Energy Engineering Science (EEES) at the same university.

## ● WORK EXPERIENCE

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01/2022 - CURRENT Udine, Italy

### RESEARCHER (RTDA) UNIVERSITY OF UDINE

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Fixed-term researcher (RTDa) in SSD ING-IND/08 in the framework of the "PON Research & Innovation" program 2014-2020, with project titled "Modelling of ignition and combustion of green fuels in internal combustion engines". The two main research topics are modelling of flame kernels in spark-ignition engines and the modelling of combustion in HCCI and RCCI engines.

01/2021 - 01/2022 Udine, Italy

### RESEARCH FELLOW UNIVERSITY OF UDINE

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Research fellow on the "Modelling of the impingement of water droplets and ice accretion on aircraft rear-end surfaces" (SSD ING-IND/08). The research activity was conducted in the framework of EU project IMPACT (GA-885052).

10/2017 - 05/2021 Udine, Italy

### EEES PHD STUDENT UNIVERSITY OF UDINE

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Research project about the modelling (via ADS-B data and accessory databases) of the environmental impact of civil air traffic. Focus on aircraft performance reconstruction near airports on the basis of ADS-B data, prediction of noise and chemical pollution in airport areas, simulation of future air traffic scenarios.

10/2018 - 09/2020 Udine

### UNIVERSITY TUTOR UNIVERSITY OF UDINE

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Guidance and counseling to the students already enrolled in several engineering courses provided by the university, as well as to the high-school students potentially interested in enrolling in engineering courses provided by the university.

09/2016 - 12/2016 Vienna, Austria

### JUNIOR RESEARCHER FOR MSC THESIS AUSTRIAN INSTITUTE OF TECHNOLOGY AIT GMBH

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Study and modelling of noise pollution from civil air traffic through retrieval and use of big data in the field of aviation.

## ● EDUCATION AND TRAINING

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11/2017 – 05/2021

**EEES PHD** University of Udine

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**Final grade** Approved cum laude | **Level in EQF** EQF level 8 |

**Thesis** Big data enabling quieter and cleaner air transport

09/2014 – 03/2017 Udine, Italy

**MSC IN MECHANICAL ENGINEERING** University of Udine

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**Address** Udine, Italy | **Final grade** 110/110 cum laude | **Level in EQF** EQF level 7

08/2011 – 09/2014 Udine, Italy

**BSC IN MECHANICAL ENGINEERING** University of Udine

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**Address** Udine, Italy | **Final grade** 110/110 cum laude | **Level in EQF** EQF level 7

08/2006 – 06/2011 Udine, Italy

**HIGH SCHOOL DIPLOMA** Scientific high school "Giovanni Marinelli"

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**Address** Udine, Italy | **Final grade** 100/100 cum laude | **Level in EQF** EQF level 5

## ● ADDITIONAL INFORMATION

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### RESEARCH ACTIVITY

#### Civil air traffic and environmental impact

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1. Collection and use of large amounts of data (data mining) on civil air traffic;
  2. Development and use of algorithms based on flight tracking data to identify flight events (departures and arrivals);
  3. Implementation of best-practice models for the reconstruction of aircraft performance in airport areas integrated with the aforementioned algorithms based on flight tracking data;
  4. Implementation and adaptation of fuel flow models for estimating aircraft fuel consumption and pollutant emissions;
  5. Implementation and adaptation of best-practice models for predicting aircraft noise in airport areas;
  6. Adaptation of particle dispersion models for estimating pollutant dispersion in airport areas;
  7. Development of algorithms for estimating the environmental impact of future air traffic scenarios in airport areas;
  8. Simulation of the behaviour of water droplets and films on wing surfaces.
- Co-supervisor of a MSc thesis and reviewer of several papers in the present field.

#### Internal combustion engines

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1. Phenomenological models for simulating the flame front development in spark-ignited engines;
  2. Calculation of properties of air and combustible mixtures up to 100,000 K (plasma state);
  3. Modelling of plasma expansion in non-combustible mixtures;
  4. Modelling of flame kernel growth in combustible mixtures;
  5. Chemical kinetics and reaction mechanisms for combustible mixtures and several fuel types (methane, propane, TRF);
  6. Single-zone and multi-zone modelling of combustion in HCCI engines.
- Co-supervisor of a MSc thesis and a PhD project in the present field.

#### Participation in research projects

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1. EU project IMPACT (GA-885052, call JTI-CS2-2019-CfP10-LPA-01-80), titled "Aircraft rear end and empennage optimisation enhanced by anti-ice coatings". Role: support to the UNIUD research group on anti-icing.
2. EU project NEEDED (GA-101095754, call HORIZON-CL5-2022-D5-01-12), titled "Next generation data-driven reference European models and methods towards silent and green aircraft operations around airports". Roles: proposal submission, technical lead for UNIUD on modelling of aircraft performance and present / future air traffic scenarios.

## TEACHING ACTIVITY

### AY 2020/21

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1. Lecturer on "Energy Systems Management" (ING-IND/09) within the MSc course in Management Engineering (LM-31 class)

### AY 2021/22

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1. Lecturer on "Energy Systems Management" (ING-IND/09) within the MSc course in Management Engineering (LM-31 class)
2. Assistant lecturer on "Design of Turbomachinery" (ING-IND/08), within the MSc course in Mechanical Engineering (LM-33 class)

### AY 2022/23

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1. Lecturer on "Energy Production Systems" (ING-IND/09) within the MSc course in Mechanical Engineering (LM-33 class)
2. Lecturer on "Energy Systems Management" (ING-IND/09) within the MSc course in Management Engineering (LM-31 class)
3. Assistant lecturer on "Design of Turbomachinery" (ING-IND/08), within the MSc course in Mechanical Engineering (LM-33 class)

## PUBLICATIONS

### Articles in journals and conference papers

All publications are listed on the IRIS online catalogue

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## CONFERENCES AND SEMINARS

### Conferences

1. Participation in EuroScience Open Forum (ESOF) 2018, as an ambassador for ESOF 2020 (Toulouse, France, 2018);
2. Participation in "TESI meeting on ESOF2020 programme" (Trieste, 2019);
3. Participation in "3rd study session on internal combustion engines AIMSEA" (Perugia, 2022).

### Seminars

1. Participation in advanced fluid dynamics CISM seminar on "Turbulent mixing in stratified flows" (Udine, 2018);
2. Participation in advanced fluid dynamics CISM seminar on "Anisotropic particles in viscous and turbulent flows" (Udine, 2019);
3. Lecturer at webinar "Big data in transport - H2020 PBNv2 workshop", coordinated by AIT GmbH, on the topic "Web data for assessing real-world noise from civil aviation" (Vienna, Austria, 2020).

## ADDITIONAL SKILLS

### Organisational and communication skills

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- Organisation and management of research teams, both as team member and team leader;
- Organisation and management of public events of small and large size;
- Excellent communication skills both in small teams and in public (public speaking).

### Digital skills

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- Excellent baseline skills in MS windows field (web browsing, office, etc.);
- Good experience in Python programming;
- Acceptable skills in other programming languages (MATLAB, C, Fortran);
- Moderate experience in the data mining field, as well as in the management of big data;
- In general, good capabilities in solving hardware and software issues concerning PCs.

### Language skills

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- Italian: native speaker;
- English: proficient user (C1 level).

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*I authorise the use of the personal data listed in this CV in accordance with d. lgs. 30 June 2003 n. 196, art. 13, and with GDPR 679/16, art. 13.*

Udine , 16/05/2023