

Current

- Aug. 2021 - current **Research Assistant in Agricultural Machinery and Mechanization**, *Free University of Bozen-Bolzano*, Competence Centre for Plant Health
 supervisor prof. F. Mazzetto
 description Investigation of the performance of sprayers for agricultural use with the aid of a wind tunnel, especially in terms of the control of primary and secondary drift phenomena in the distribution of plant phytosanitary products. Development of a data acquisition systems based on optical sensors and ultrafast-imaging systems for the study of flow propagation phenomena related to secondary drift and interception systems to quantify the amount of product deposited on appropriate target media.
 Main activities:
- extensive experience with Particle/Droplet Image Analysis for the characterisation of multiphase flows, especially of liquid droplets in air at micrometre scale;
 - research on liquid atomisation phenomena and modeling of macroscopic aerosol transport;
 - design of wind tunnel experiments for the measurement of spray deposition and the size characterisation of aerosol from commercial orchard sprayers;
 - design and implementation of data processing algorithms for the aggregation, comparison and visualisation of data from laboratory equipment;
 - analysis of ISO standard testing methodologies for agricultural equipment;
 - analysis of requirements for the acquisition of new laboratory instrumentation and facilities in support of the research activities;
 - redaction of Standard Operative Procedures for laboratory instrumentation
- Sept. 2021 - current **Teaching Assistant**, *Agricultural Machinery and Mechanization*, (prof. F. Mazzetto), *Free University of Bozen-Bolzano*
 Correction of exercises, assistance to students, laboratory demonstrations, active participation in final examinations
- Sept. 2023 - current **Teaching Assistant**, *Information and Decision Support Systems in Fruit Production*, (prof. G. Carabin), *Free University of Bozen-Bolzano*
 Conduction of exercises on elaboration of raw GNSS data, GIS systems, practical laboratory demonstrations

Education

- Nov. 2022 - current **PhD in Advanced Systems Engineering**, *Free University of Bozen-Bolzano (unibz)*
 supervisors prof. F. Mazzetto, prof. R. Vidoni
 description Investigation of the performance of sprayers for agricultural use in controlled environment, especially in terms of monitoring and control of drift phenomena. Leveraging existing facilities at unibz, including a sort of wind tunnel, the project focuses on three lines of action: (a) basic and advanced characterisation of spray nozzles in terms of droplet generation, (b) research into advanced techniques for the characterisation of spray deposition and aerosol drift, and (c) employment of optical systems for aerosol cloud quantification.
- mar. 2018– dec. 2020 **Master of Sciences in Aerospace Engineering**, *Politecnico di Torino*, Torino, 103/110
 Aeromechanics & Systems Engineering
 Thesis title *Guidance and Control strategies for UAS applications for Precision Agriculture*
 supervisors prof. G. Guglieri, dr. N. Bloise
 description Development of a waypoint-based guidance algorithm for an autonomous UAS over a number of plants in order to precisely administer plant protection products. A feasible path through the yard is generated by a Traveling Salesman Problem (TSP) solver and a suitable path planning routine (Theta*) based on a Digital Elevation Model (DEM) of the field for obstacle avoidance. Then, the UAS autopilot is implemented in Simulink and fed the obtained path for the execution of the task.
- 2014–2018 **Bachelor of Sciences in Aerospace Engineering - EASA part 66**, *Politecnico di Torino*, Torino, 90/110

Thesis title *Development of a pressurization module for small aircraft*

supervisors prof. M. Battipede, prof. P. Maggiore

description Preliminary and conceptual approach to the design of an Environmental Control System for aircraft, focusing on the relations between components and control laws. With a high flexibility requirement, the scheme has been implemented and tested in Simulink.

Participation in Research Projects

Aug. - Dec. 2021 **BROTWEG - a Path of Bread in Alpine Environments, FESR**

The project BROTWEG sought to recover the cereal value chain in extreme mountain areas through responsible mechanisation in partnership with local stakeholders. The project proposed new development models for mountain agriculture to complement the pasture-livestock model, currently prevailing in the region.

Contributions:

- participation in the sampling campaign for the evaluation of the performances of the developed machines
- recovery of raw GNSS data for the monitoring of operational performances
- redaction of parts of the documenting literature and final reports

Jul. - Dec. 2022 **USAGE - Up-Skilling Agricultural Engineering in Europe, Erasmus+**

Dec. 2022 - onw. **USAGE – Next Generation in Europe and Abroad, Erasmus+**

The two projects strive to enable smart, sustainable and inclusive growth of the skills and competencies of workers in the agricultural sector through innovative pedagogic approaches and practical experience with state of the art technologies. Through a fruitful cooperation between universities and companies, the project developed curricula of a modularized lifelong learning programmes at the host universities: the Swedish University of Agricultural Sciences, the University of Natural Resources and Life Sciences, Vienna, the Technical University of Munich and the Free University of Bozen-Bolzano.

Main contributions:

- Participated in meetings for the periodic reporting of activities
- Held lectures and practical laboratory demonstrations for the continuing education courses developed within the project framework
- Participated in the drafting of documents for proposal of the second project

Languages

Italian Native

English Proficient

German Proficient

French Intermediate

Certified B2 FCE and at unibz

Certified B1 at unibz

Computer skills

CAD SolidWorks, FreeCAD

Organization Vim, MS Excel, L^AT_EX

Programming C/C++, Arduino, Python

Num. Modelling MATLAB, Simulink

Oper. Syst. Windows, Ubuntu

GIS QGIS/QField

Graphics Inkscape, Gimp

Memberships

2024 onw. **“Cultore della Materia” for Agricultural Mechanisation**

2021 onw. **Italian Association of Agricultural Engineering (AIIA)**

2020 onw. **Honorary Member of the Aerospace Engineering Students’ Association (AESA), Politecnico di Torino**
Member of the Directive Board in A.Y. 2016-2017. Coordinated small teams of students to organize conferences with experts in the field of aeronautics and space exploration, visits to companies in the industry and other minor events. I organized and personally held some divulgative meetings on the history of space exploration for students.

- gained good knowledge of the interaction with groups, experts and stakeholders;
- practiced teamwork and team organization;
- practiced leadership and negotiation;
- fostered my keenness for teaching and communication.

Participation in Conferences

- Nov. 6-8, 2023 **2023 IEEE Workshop on Metrology for Agriculture and Forestry (MetroAgriFor)**, Pisa, IT
Contributed paper
Nozzle characterisation to support aerosol spray drift measurement in a Semi-Controlled environment
- Feb. 28 - Mar. 2, 2023 **49th Symposium "Actual Tasks on Agricultural Engineering"**, Opatija, HR
Contributed paper
Evaluation of air flow influence on sprayer nozzle performance by shadowgraphy
- Nov. 3-5, 2022 **2022 IEEE Workshop on Metrology for Agriculture and Forestry (MetroAgriFor)**, Perugia, IT
Contributed paper
Preliminary spray nozzle characterization activities through shadowgraphy at the AgroForestry Innovation Lab (AFI-Lab)
- Sept. 19-22, 2022 **AIIA 2022: Biosystems Engineering Towards the Green Deal**, Palermo, IT
Poster presentation
Agroforestry Innovations Lab Activities on Sprayer Performance and Certification
- June 15-17, 2021 **International Conference on UAS (ICUAS 21)**, Athens, GR
Contributed paper
Optimal Path Planning for Autonomous Spraying UAS framework in Precision Agriculture