

# Raffaele BELLINI

## PERSONAL DATA

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## WORK EXPERIENCE

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JUNE 2019 - FEB. 2020 | Project Engineer - Graduate at **Wood PLC**, Corsico, Milano, Italy.  
My responsibilities are to support the Project Manager in coordinating the Engineers, organize meetings with international clients and provide the members of the projects with the lists of activities. I am involved in one project in Romania and one in UAE.

JUNE 2018 - APRIL 2019 | Research Project at **SPLab** at Politecnico di Milano  
My work consisted in the development and validation of new density-based solver able to simulate the behavior of liquid Aluminum Oxide particles inside a Solid Rocket Motor's combustion chamber at different pressures and temperatures (the thermophysical properties of  $Al_2O_3$  were also added in OpenFOAM's libraries). The development of the project was divided into two operative phases: the numerical simulation and the experimental validation. In particular, I created this new solver starting from a density-based solver (rhoCentralFoam) coupling the eulerian gas phase description to a Lagrangian particle tracking by means of already existing and to-be-implemented libraries. At the end of this work I gained experience on the mesh parametric analysis, turbulence models, C++ and Python languages, multiphase flows, OpenFOAM and post-processing analysis.

APRIL - JULY 2016 | Internship at **Brembo S.p.A.**, Curno, Bergamo, Italy  
*Performance-Racing intern*  
I worked as an intern on the development of an algorithm able to estimate the rigidity of a calliper in relation to its weight for Formula 1, Rally, NASCAR and other competition vehicles. I analyzed the relations and the forces between wheels and asphalt, and how the pressure to the brake fluid influences the rigidity of the calliper. I used Catia to analyze forces, deformation, strain and stress of all the components of the calliper (through the FEM Analysis), Microsoft office Excel (VBA) and Matlab to develop the algorithm.

## EDUCATION

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FEB. 2020 - PRESENT | PhD in MECHANICAL AND AERONAUTICAL ENGINEERING, **City, University of London**, London, United Kingdom  
Project Title: "DNS for collapsing bubble dynamics and surface erosion for fuel mixtures"  
Supervisors: Prof. Manolis GAVAISES and Foivos KOUKOUVINIS.  
This PhD is part of the EDEM Project, a Marie Sklodowska-Curie European Industrial Doctorate (EID) network, funded by the EU.

OCT. 2016 - APR. 2019 | Master of Science in AERONAUTICAL ENGINEERING, **Politecnico di Milano**, Milan, Italy - Major: Aerodynamics and Propulsion  
Thesis: "Aluminum Agglomerates in the Core Flow of a Windowed Rocket: Simulation and Experimental Characterization" | Advisor: Prof. Filippo MAGGI.  
Final Grade: 110/110 - Top 5%

SPRING 2018 | Exchange Program at **Tomsk Polytechnic University**, Tomsk, Russia  
At TPU, I studied on Finance, Material, Nuclear engineering and Russian Language.  
GPA 4/4 - Top 1%

OCT. 2012 - JULY 2016 | Undergraduate Degree in MECHANICAL ENGINEERING, **Politecnico di Milano**, Milan, Italy  
Major: Ground Vehicles  
Thesis: "Calcolo Stima Assorbimento, Pinza Freno" | Advisor: Prof. M. GOBBI

## MAIN PROJECTS

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- JUNE - JULY 2018 | **High Pressure Turbine Design**  
The goal was to design a multistage steam turbine that accomplishes a pressure drop given the initial pressure, temperature and mass flow rate. A further request was to design the blades for both rotor and stator by using Constant Flow Angle and Free Vortex Method. The software used were Matlab and Ansys.
- OCT - DEC. 2016 | **Experimental and Computational study of single and tandem airfoils**  
This project consisted of both numerical and experimental aerodynamic analysis. In the computational part, the Hess-Smith panel method was implemented in Matlab in order to simulate the incompressible potential flow over a single and two tandem airfoils. In the experimental part, the same problem was studied in a wind tunnel measuring the values of the aerodynamic quantities. The purpose was to check the correctness of the mathematical model and to discuss the differences between the model and reality.
- OCT. - DEC. 2017 | **3D combustor Fluid Dynamics analysis based on OpenFOAM**  
During the course *Computational Techniques for Thermochemical Propulsion* (taught by Prof. Piscaglia) I performed a CFD analysis over a 3D combustor model with the shape of a cylinder in which the fuel was injected. A bluff body, placed inside the combustor, enhances the turbulence that helps the mixing between the hot air and the sprayed fuel. The combustion of the multiphase flow was also considered.

## SCHOLARSHIPS AND CERTIFICATES

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- FEBR. 2016 | **AWARD "GIACOMO VOLONTE 2016"**  
I ranked first of over 200 students for my thesis: "CALCOLO STIMA ASSORBIMENTO, Pinza freno per auto da competizione".
- AUGUST 2016 | **ENGLISH COURSE AND TEST**  
I spent 4 weeks in the Centre of English Studies in Leeds, UK, achieving the final level C1.
- MAY 2019 | **BECOME A PROJECT MANAGER WITH LEONARDO**  
I was among the 25 selected students to attend a 3 month course on Project Manager at Leonardo Helicopters

## SCIENTIFIC PUBLICATIONS AND PRESENTATION

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- JULY 2019 | **8TH EUROPEAN CONFERENCE FOR AERONAUTICS AND AEROSPACE SCIENCES**  
My MSc's work has been presented during the 8th EUCASS in July 2019

## LANGUAGES

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ITALIAN: Mother tongue                      ENGLISH: Fluent - C1                      RUSSIAN: Basic - A2

## COMPUTER SKILLS

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- Adv. Knowledge: | MATLAB, OPENFOAM, LINUX, Latex, MS OFFICE, CATIAV5, MATHCAD, GMSH, WINDOWS, FREECAD, C++
- Good Knowledge: | VBA, AUTOCAD, SOLIDWORKS, INVENTOR, CAR MAKING, PYTHON