# Felix Bonnes

felix.bonnes@gmail.com +33 7 68 76 52 04 felixbonnes.fr felixbonnes

## Profile

Practical experience in aeronautics (ECM), space (MECANO ID) and cutting-edge innovation (CERN). Advanced skills in FEM analysis, Python automation and energy optimisation.

## Education

**National Institute of Applied Sciences**, MSc in Mechanical Engineering & Energy — Toulouse, FR — Sept 2020 – Sept 2025

- Mechanical Engineering, Major in Structural Mechanics and Energy Management
- **Structural Mechanics courses include:** Structural and Systems Mechanics, Strength of Materials, Mechanical Design, Mechanical and Thermal Analysis, Manufacturing, Fluid Mechanics, Heat Transfers, Advanced Mathematics, FEM, CAD
- **Energy courses include:** Energy challenges, Energy mix, Heat and power, Energy production, Alternative energies

**Linköping University**, ERASMUS+ MSc in Mechanical & Aerospace Engineering — Linköping, SE — Aug 2022 – Jan 2023

- ERASMUS+ MSc in Mechanical Engineering, Opening about Energy
- **Courses include:** Aircraft and Vehicle Design, Structural Optimisation, Flight Mechanics, Computational Mechanics (FEM), Machine Elements

**Jean Mermoz CPGE**, Scientific Preparatory Class in Physics - Technology - Engineering Science — Montpellier, FR — 2019 – 2020

- **Courses include:** Advanced coursework in Engineering Sciences, Physics, Mathematics and Computer Science
- Ranked 4th out of 46 students

## Experience

**ECM - [Work-study contract] Aeronautical Mechanical Analysis Engineer** — Blagnac, FR — Sept 2024 – Sept 2025

- Dimensioning and optimisation of aeronautical structures and equipment
- Finite element modelling (Hypermesh) & static, modal, buckling analyses (Nastran)
- Development of Python pre/post-processing tools and distribution to the calculation department ⇒ *significant improvement in the efficiency of MEF projects*
- Development of a Static Test Plan for A350 equipment

**MECANO ID - [Gap year contract] Space Structures Mechanical Analysis Engineer** — Toulouse, FR — Sept 2023 – Mar 2024

- Carrying out detailed mechanical analyses of equipment, nano-satellites and complete satellites as part of various space projects
- Developing mechanical optimisation software in Python
- Optimising the composite structure of new-generation payload fairings and LVAs for European launchers; in charge of the mechanical trade-off in the development process

**CERN - [Internship] Optimisation of Paraseismic Experimental Structure** — Geneva, CH — Jun 2023 – Sept 2023

- Mechanical dimensioning and optimisation of the nanoparticle decay vessel for CERN's *Search for Hidden Particles* (SHiP) project
- Finite element modelling and dynamic analysis (ANSYS) of the structure
- Seismic risk analysis in Python with the Latin Hypercube Sampling method
- Management of a large number of seismic data for statistical risk analysis

- Training in theoretical and experimental physics by CERN scientists

## IT and Software

**Modelling and structural calculations**

- Experience in FEM: *Nastran (advanced), ANSYS (advanced), Hypermesh, Abaqus, MSC Patran*
- CAD: *SolidWorks, CATIA V5, CREO, Fusion 360*
- Multiphysics & energy sizing: *Dymola/Modelica, Matlab Simulink*

**Programming and automation**

- Languages: *Python (advanced), Matlab (+Simulink), VBA, Linux Bash*
- Tools: *MEF pre/post-processing and specific optimisation*

**Microsoft Office**

- *Excel (advanced), Word, PowerPoint*

## Projects

**Hydrogen Fuel Cell (PEMFC) optimisation code** Sept 2022 – Jun 2023

- Research work on PEMFCs supervised by Prof. Ion Hazyuk
- Creation of a multi-criteria optimisation code for hydrogen fuel cells using Python
  ⇒ *Resulting in improvement of the PEMFC operating regime for transport applications*

**Invention of a new angle-of-attack measurement technology for light aircraft** 2020 – 2023

- Invention, R&D, and implementation of a new angle of attack measurement technology for light aircraft supported by INSA Toulouse
- Theory developed from the equations of fluid mechanics and flight mechanics (self-taught)
- Design of CAD models dimensioning and tolerancing for machining prototypes
- Wind tunnel tests at the ENAC laboratory
- Project and management, schedules, budget, registration of Intellectual Property Rights

## Languages

**English:** C1 (Highly proficient in speaking and writing)
**Spanish:** B1 (Conversational level)
**French:** Native speaker

## Areas of interest

- Space, energy and innovation
- Outdoor sports: skiing, trekking, mountaineering, paragliding, cycling, surfing
- Competitive tennis (club for 15 years, best ranking 15/3, federal initiator since 2017, A1 referee diploma)
- DIY
- Architecture

## References

**CERN**, Marco Andreini
marco.andreini@cern.ch