

Julien Deparday

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*Experimental fluid mechanics, aerodynamics,
fluid-structure interaction, wind energy, naval engineering*

Professional experience

since 2020 **Senior scientist**, *OST-Eastern Switzerland University of Applied Sciences*, Institute for Energy Technology, Rapperswil, Switzerland

Researcher at the Wind Energy group

- Mistery project (2023-2026), funded by SNSF in Switzerland and ANR in France for 2mCHF:
 - Modelling and estimation of unsteady aerodynamic flow at high Reynolds number
 - coordinator of the project with 4 partners: OST, ETHZ, CentraleSupélec, and Ecole Centrale Nantes
 - aerodynamic experiments in a large-scale wind tunnel at CSTB in Nantes, France on a blade section of 1.25m chord.
- Aerosense project (2020-2023), funded by SNSF and Innosuisse as a Bridge - Discovery programme for 1.6 mCHF:
 - **developed an aerodynamic measurement system to be installed on wind turbine blades** which is thin, minimally intrusive, easy to install, low-power, with wireless transmission, comprising 40 pressure sensors, 10 microphones and an inertial measurement unit,
 - responsible for the technical development of the aerodynamic measurement system: close communication with electronic researchers, mechanical engineers and computer researchers,
 - developed the corrections and calibration methods to acquire accurate measurements.
- **Project leader of a research and development collaboration with a Swiss company, Netico**, funded by the Swiss Innovation Agency on machine learning and in-field measurements.
- Supervised bachelor and master projects in collaboration with ETHZ.

2017 – 2020 **Postdoctoral Research Associate**, *Ecole Polytechnique Fédérale de Lausanne (EPFL)*, Mechanical Engineering Institute (IGM), UNFoLD, Lausanne, Switzerland

Experimental study of the aerodynamic performance of vertical axis wind turbine in the SMART-H project funded by the Swiss National Science Foundation,

- **developed low-order models of aerodynamic performance**,
- prepared, conducted and post-processed experiments,
- supervised PhD students, master and bachelor projects,
- safety coordinator of the lab.

- 2012 – 2016 **Teaching and Research Assistant**, *Ecole Navale, IRENav*, Mechanical and Energetical Engineering in Naval Environment department (M2EN), Brest, France
Experimental study of fluid-structure interaction on downwind sails,
 ○ developed time-resolved instrumented system onboard a sailing boat measuring sail shape, wind, loads, aerodynamic pressures and boat motions,
 ○ co-developed and used custom-made pressure sensors with the University of Auckland,
 ○ developed calibration and measurement algorithms for custom-made load cells and inertial measurement units,
 ○ designed a unique photogrammetric system to measure flying shape of downwind sails,
 ○ planned and conducted full-scale in-situ testing, led a team of 6 persons,
 ○ taught 100h per year of lectures, tutorials and practical work to naval officer trainees (master level) and to master students.
- 2014 **Guest Research Assistant**, *University of Auckland*, Mechanical Engineering department, Yacht Research Unit, Auckland, New Zealand
 3 month secondment to conduct wind tunnel and full-scale experiments in a UK-France-NZ collaboration project *SailingFluids* funded by the European Union's FP7-people and by the Royal Society of New Zealand.
- 2010 – 2012 **Naval Engineer**, *C-Job & Partners BV*, Hoofddorp, the Netherlands
 ○ designed structure and general arrangement for various types of vessels such as dredgers, heavy lift vessels, offshore installation vessels, mega yachts,
 ○ wrote reports and technical drawings in compliance with guidelines and classification societies,
 ○ analysed seakeeping for feasibility studies of offshore operations.

Education

- 2016 **PhD in Mechanical Engineering**, *Université Bretagne Occidentale - Ecole Navale*, Brest, France
 doctoral thesis Experimental studies of Fluid-Structure Interaction on Downwind sails
 supervisors Prof. M. Rabaud - FAST Université Paris Sud, Dr. P. Bot - IRENav Ecole Navale, Dr. F. Hauville - IRENav Ecole Navale
 grade Highest distinction: *Mention très honorable à l'unanimité du jury*
- 2010 **M.Sc. in Mechanical Engineering**, *ENSTA Bretagne*, Brest, France, *Diplôme d'Ingénieur*
 Studied in Naval and Offshore architecture, specialized in hydrodynamics
 master thesis Spinnaker Flying Shape determination: Comparison of a spinnaker model in a Twisted Flow Wind Tunnel with a full scale spinnaker using photogrammetric measurements
 supervisors Prof. Dr.-Ing K. Graf, Dr. K. Roncin

Skills

Teaching

- lectures **Created and taught lectures** on the physics of sailing and a lecture session on unsteady aerodynamics at a master level.
- tutorials Created and taught job-oriented practical work and tutorials.
- supervision Suggested and supervised several scientific projects at bachelor and master levels.

popular science Prepared and presented dedicated experiments to gymnasium students and to primary school pupils.

Technical skills

interdisciplinarity Responsible for the development of a measurement system with an interdisciplinary team: electronics, software development, mechanical, adhesion and machine learning expertise.

experimental **Used and developed various methods of measurement: high speed particle image velocimetry, pressure sensors, loads cells and strain gauges**, inertial measurement unit, photogrammetry.

Carried out experimental campaigns using wind tunnels, water channels, and in-field measurements.

Developed sensor calibration procedures, post-processing methods, data analysis, statistical methods and reduced-order models.

theoretical **Aerodynamics, potential flow, fluid-structure interaction, beam structure, technical drawing, naval engineering, ship stability, seakeeping.**

programming Matlab, L^AT_EX, Arduino/C++, Python, Labview.

software CATIA, Rhinoceros, AutoCAD, Photomodeler, 3DF Zephyr.

Funding application

European funding Participated in a large consortium with 32 partners for the Horizon 2020-Green Deal call. 17.5 million € for 4 years. Score: 12/15 but not among the 73 selected projects.

international funding Coordinated and wrote a research funding proposal with Ecole Centrale Nantes (FR), Centrale-Supélec (FR), ETH-Zürich and OST. 1.9 million € for 4 years. Accepted, ranked in the first 20%. starting 03/2023.

Comment of one of the reviewer: *“The proposal is well written stating clearly the research problems and the approach adopted to achieve the goals. The adopted style is compatible with the requirements of an EU project proposal.”*

national funding Answered a call from the Swiss Federal Office of Energy for “game changer” projects on the energy transition. 150000 € for 2 years.

Participated in the writing of the approved proposal for the Swiss Innovation Agency for a R&D project with a Swiss company, NETICO. 630000 € for 30 months. Current project leader.

Communication

representative Scientific staff member of the School of Engineering council during 2 years at EPFL. PhD member of the research council and of the board of the Institute during 3 years at IRENav.

Unit safety coordinator, privileged interlocutor of the lab for the safety, prevention and health domain department during 3 years.

seminars Member of the organizing committee of a weekly seminar series with a focus on the local mechanics community at EPFL.

Proposed and organised annual seminars on PhD works at IRENav.

Qualifications and membership

- membership Member of the European Mechanics Society.
Member of the American Physical Society.
Member of the French-speaking wind engineering association.
- working groups NATO Science and Technology Organization Task Group AVT-282, Unsteady Aerodynamic Response of Rigid Wings in Gust Encounters. 2017 – 2020.
IEA Wind task 47 on innovative aerodynamic experiments and simulations on wind turbines in turbulent inflow. 2021 – 2024.

Languages

- French Native.
- English Full professional proficiency - C1.
- German Intermediate working proficiency - B2.

Personal details

- date of birth 05 April 1987 at Beaumont (63), France.
- nationality French citizen.
- marital status Married, 2 children (5 and 9 years old).
- permits Driver licence (Cat. B), remote drone pilot certificate (A1/A3, A2), Training PPE against falls from height.