



2ND AND 3RD YEAR SPECIALISATION

SCIENTIFIC CHALLENGE 2024

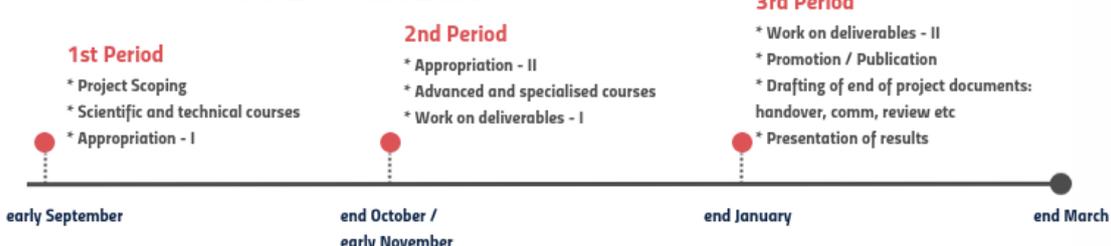
HIGH FIDELITY MODELLING OF THE COMPLETE BOAT-OAR-ROWER SYSTEM

In the run-up to the Paris 2024 Olympic and Paralympic Games, Centrale Nantes created the Scientific Challenge 2024 project-based specialisation in September 2018 in partnership with the CREPS des Pays de la Loire and the French Rowing Federation, in order to improve physical and technical expertise in rowing. This project is in line with research work conducted in the LHEEA and performance support for water sports.

The Simulator of Performance in Rowing (SPRing) has thus been developed: a high-fidelity simulator of the complex boat-oar-rower system, which aims to establish objective criteria to respond to problems experienced in the field and guide decision-making for coaching staff.



COURSE CONTENT



List of Courses (~ 100 hours)

- > Project Management
- > Tool for Scientific Computing and HPC 1
- > From reality to 3D model
- > Numerical modelling, CFD and FSI
- > Tool for Scientific Computing and HPC 2

The rest of the time is devoted to independent project work:

- > Framework and appropriation
- > Simulator development
- > Studies and responding to field issues
- > Completion and review



2019/2020 project team



PROJECT-BASED LEARNING

This innovative project-based teaching method will allow students to acquire competences in a different way thanks to:

- > A customised training programme (100 hours of courses)
- > Agile and autonomous organisation
- > Tailored support
- > Immersion in the world of sports engineering
- > Scientific challenges linked to industrial issues (naval hydrodynamics, MRE, digital simulation, 3D modelling etc.)
- > An opportunity to take concrete action on an ambitious performance support project in the run up to the 2024 Paris Olympics

OBJECTIVES FOR 2021/2022

The first three cohorts of the specialisation have successively:

1. developed the first version of the simulator and demonstrated its feasibility
2. improved its functionality to make it more accurate and realistic
3. automated the whole calculation sequence to make the simulator operational in terms of production

The objectives for the year 2021/2022 are as follows:

- > To get to grips with the simulator and confront it with the reality in the field in order to provide initial insights and to guide coaches and rowers in their decision-making
- > Undertake additional developments on the simulator, mainly with regard to kinematic modeling of the rower, additional variables to be analyzed and realistic visual rendering.
- > To run training sessions for coaches in particular with simulation results that tangibly illustrate the mechanical laws governing oar propulsion.

EXAMPLES OF PREVIOUS INTERNSHIPS

Project-based learning is highly valued by companies. Student internships are quite varied, and reflect the diversity of backgrounds.

- > Development of hydrodynamic meta-models and CFD validation, Artemis Technologies, UK
- > Graphic reconstruction of an electronic horizon, Renault Software Labs, Sophia-Antipolis
- > Executive Assistant: Project Management and Financial Reporting, Haemers Technologies, Brussels
- > Thermo-hydrodynamic modelling on a heat exchanger, Naval group, Nantes
- > Numerical simulation of ship maneuvers, Numeca Int., Brussels,
- > CAD and subsystem design of the 'Heron Tree', Les Machines de l'île, Nantes

FIELDS OF ACTIVITY

- > IT
- > Modelling
- > Scientific computing
- > Hydrodynamics
- > Sports performance analysis
- > Management
- > Communication

SKILLS

- > Project engineering
- > Numerical simulation
- > Software development
- > Managing complexity
- > Teamwork
- > Knowledge transfer

TEACHING STAFF

HEAD OF SPECIALISATION:

Alban LEROYER

SPORTS RESEARCH CONTACT:

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