

Study the acoustic radiation of a submerged cylindrical shell close to the sea surface



NICOLAS BAUDIN
INTERNSHIPS IN FRANCE INITIATIVE

INSA Lyon + Naval Group

Name of the hosting institution in France	INSA Lyon - University of Lyon (in collaboration with Naval Group Research)
Name of the host laboratory / research team	Laboratory of Vibration and Acoustics (LVA)
Address	LVA - INSA Lyon - Univ Lyon Bat. Saint Exupéry 25 bis av. Jean Capelle 69621 Villeurbanne Cedex
Web site	http://lva.insa-lyon.fr/en/
Name of the supervisor	Laurent Maxit
Function	associate professor
Email	laurent.maxit@insa-lyon.fr

Internship offer

Topic of the internship (title) Study the acoustic radiation of a submerged cylindrical shell close to the sea surface

Proposed dates of the internship **Start:** 2019-09-02 **End** 2020-02-28

Scientific and academic objectives of the internship (detailed description of the internship content, work expected from the intern and expected outcomes):

Noise and vibrations are of first importance for an underwater vehicle. The prediction of its vibro-acoustic behavior by analytical or numerical models is of strong interest for the industry. An underwater vehicle can be modeled by a cylindrical shell coupled to water. The vibro-acoustic response of a submerged cylindrical shell is well known when the surrounding fluid is infinite. However, only a few studies in the literature have presented results when the cylindrical shell comes closer to the sea surface. In this situation, the acoustic waves can interact between the surface and the structure and modify the vibrations and the radiation of the cylindrical shell. In the acoustic department of Naval Group Research, the internship consists in studying the vibro-acoustic behavior of a submerged cylindrical shell close to the surface in order to have a better understanding of the underlying physical phenomena. To achieve this, the literature will be studied and analytical and numerical model will be developed. The tasks are:

- Literature survey and use of previously developed models
- Development of an analytical method to take into account the effect of the sea surface
- Development of numerical models with COMSOL Multiphysics
- Understanding of the physical phenomena
- Application to academic test cases
- Summarize the developments and results in a report

Type of contract: Paid internship Duration of the contract: 6 months, Location: Ollioules (south of France)

Name of industrial partner	Naval Group Research
Role of the industrial partner in the internship project	The topic was proposed by the industrial partner. The internship will take place in the facilities of Naval Group in Ollioules (South of France). The candidate will be part of the research group in acoustics. Different numerical tools will be provided to model the problem.
Main contact at the French industrial partner	Valentin Meyer, valentin.meyer@naval-group.com
Main contact at the French industrial partner's branch in Australia (if applicable)	Margaret Law, margaret.law@au.naval-group.com +61 08 7099 2166
Targeted Australian university	Any

Expected profile of applicant

Level of study	Master
Discipline	Mechanical engineering
Required qualities, knowledge and skills	The applicant must be a second year master student, in mechanical engineering with preferably an emphasis on acoustics and structural dynamics. The applicant should have the following skills: <ul style="list-style-type: none"> • Well organized • Autonomous at work • Technical and scientific rigor • Analytical mind • Matlab skills • Interest for research