2023 Master internship at University of Split, Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture

Prototyping and dynamical testing of advanced meta-materials and porous structures

LAB & PEOPLE

- Structural Laboratory, Department of Structural Mechanics and Design, Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, University of Split
- General activities of the lab: Dynamical testing at low and high strain rates
- Website: www.fesb.hr/kk
- Number of staff / PhD: 5/4
- Supervisor name and contact: Prof. Dr.-Ing. Lovre Krstuović-Opara (www.fesb.hr/kk)

TOPIC OF THE INTERNSHIP

- Scientific context of the internship: Experimental testing of advanced materials. The research is based on dynamical testing of numerically generated cellular structures. Research includes testing at speed up to 24 m/s, acquisition of displacement field by means of Digital Image Correlation - DIC together with processing of images. Specimens used in testing are generated by rapid prototyping techniques such as Fused Deposition Modelling – FDM and Sterolitography - STL (in house), or trough collaboration Laser Sintering, Electron Beam Melting and Casting. Research is also done in field of relating Infrared images with DIC by means of Machine Learning – ML.

- Keywrods:
    - Experimental Mechanics.
    - Dynamical testing at speeds up to 24 m/s.
    - Digital image correlation.
    - Infrared thermography.
    - Non-Destructive Testing.
    - Development of advanced structures via means of rapid prototyping.

- Testing of advanced structures produced by means of rapid prototyping on FDM and or SLA printers.
- Programming in MATLAB/Python 3.0.
- Finite Elements Analysis.

Bibliography: http://marjan.fesb.hr/~opara/publications.htm

- Tasks and duties entrusted to the student:
  - Research in experimental mechanics involving advanced meta materials and porous structures such as auxetics, cellular materials and metal foams.
  - Digital image processing of infrared images and images taken from high-speed cameras.
  - Development of tools and/or small standalone application in MATLAB/Python.
  - Finite elements analysis of auxetics, cellular materials and metal foams.
  - Use of several FDM and an SLA Printer.

- Skills to be acquired or developed:
  - Advanced knowledge in experimental mechanics
  - Advanced knowledge in Digital image Correlation
  - Advanced knowledge in Thermography
  - Advanced knowledge in programming with MATLAB/Python

PROFILE OF THE DESIRED STUDENT

- Minimum level of study required: Master study enrolled

- Field(s) of study: Mechanical engineering

- Scientific skills: Programming experience in MATLAB/Python, Finite Element Method, 3D modelling in any of software's mentioned: Solidworks, Catia, NX

- Language skills required: English level C2 (understanding, speaking, writing)

THE INTERNSHIP ASSIGNMENT:

Desired duration of the internship (in months): at least 3 months

Desired Starting date of the mission: *whole year except 15. July to 1. September*

Indicative weekly schedule: *35h / week*

Remuneration *not included!*

Erasmus grant accepted, application should be made by student at local sending institution.

Internship agreement: *an internship agreement will be signed.*

To SEA-EU students:

If you're interested please send your CV and letter of motivation to the scientist in charge, Lovre.Krstulovic-Opara@fesb.hr.