Opening for PhD student position
– numerical modelling of fluid-solid interaction in the elements under mechanical loading in the hydrogen environment.

In the frame of OPUS-23 Call project No 2022/45/B/ST8/03494
entitled: "Degradation processes of mechanically loaded structures in hydrogen environment"
funded by the National Science Centre, Poland

Institute of Fluid-Flow Machinery, Polish Academy of Sciences, Gdańsk, Poland

About the project

We are looking for a talented person holding MSc title, who is interested in continuing her/ his scientific work and writing a doctoral dissertation. The research will be realised in the cooperation of three Departments, namely at the Department of Mechanics of Intelligent Structures (http://www.imp.gda.pl/en/o4/z1/), Department of Energy Conversion (https://www.imp.gda.pl/en/o2/z3/) and Department of Thermoaerodynamics (https://www.imp.gda.pl/en/o2/z2/).

The aims of the research are experimental and numerical analyses of phenomena related to the degradation processes of structures under mechanical loading in a hydrogen environment and the development of prediction models of their degradation processes. The analysed will be performed on single material (carbon fibre reinforced polymer (CFRP), metal, polymer) or complex (metal/CFRP or polymer/CFRP) structures. For the purpose of a better understanding of the degradation processes advanced modern phenomenological modelling methods (fluid-solid interaction, FSI) combined with structural health monitoring methods based on optical sensors (OFs) will be applied. The FSI models and the optical-based SHM systems will be combined together to possess a complex image of the degradation process and develop an appropriate damage development prediction model.

The offer

We offer a PhD position:

- in the Department of Thermoaerodynamics, IMP PAN Gdańsk, Poland (http://www.imp.gda.pl/en/o2/z2/).
- position funded with a PhD scholarship is offered for 48 months
- the monthly amount of the PhD scholarship is 4400 PLN/month gross

Eligibility criteria/ Skills/Qualifications

1. Masters in mechanical engineering, material science, physics or related fields.
2. High average grade obtained during studies.
3. Good knowledge of written and spoken English.
4. High motivation for scientific work and a strong commitment to research work.

Tasks

1. Numerical modelling of fluid-solid interaction in the elements under mechanical loading and hydrogen.
2. Designing the measurement set-up for experimental tests.
3. The experimental investigations related to FSI in the measurement chamber
4. Development of codes in LabView.
5. Signal processing and results analysis.
6. Preparation of reports based on results analysis.
7. Preparation of journal and conference publications.
8. Presentation of results at scientific conferences related to research topics.
9. Communication and discussion of results within the research team.

Specific Requirements

We especially seek candidates who:

- possess knowledge about numerical methods (mostly finite element method) and modelling,
- practical knowledge CAD design software,
- possess knowledge about signal processing analysis methods
- mobility and flexibility for conference travels.

In addition, the following will be assessed:

- the candidates' scientific track record (publications, conferences, projects, scholarships, etc.),
- the prizes and distinctions of the candidate resulting from the research carried out.

Selection procedure

Selection process is in accordance to National Science Centre regulations.

1. Submission of applications is possible until **May 31, 2023, 10:00 AM**
2. Form of applications: Applications in English can be sent by e-mail to **tsdpan@imp.gda.pl** with a subject "PhD student in OPUS-23 application – "Numerical modelling of fluid-solid interaction in the elements under mechanical loading and hydrogen".
3. Candidates interested in applying for the position should submit the following documents:
    - cover letter
    - CV / scientific resume

- copy of the certificate of Master degree
- the list of scientific achievements (publications, participation in research projects, participation in conferences, awards, scientific stays, etc.)
- optional: letter(s) of recommendation obtained from people (e.g. supervisors, former managers) directly cooperating with the candidate.

4. The application must contain information about the educational background and work experience.
5. Please, attach the requested documents in the PDF format.
6. The result of the recruitment procedure will be sent to the candidates via email.
7. Please include in the application the following statement:

   "I hereby authorize to process my personal data included in my application for the needs of the recruitment process (in accordance with the Act of 08.20.1997 r. on personal data protection - Dz. U. No 133, item 883) ".

If necessary, selected candidates may be invited for an interview (in person or via online videoconference).

Additional questions could be sent by email to Ryszard Szwaba: ryszard.szwaba@imp.gda.pl