

Jobbnorge-ID: 101414

Søknadsfrist: Avsluttet

Nettside:

Omfang:

Varighet:

PhD position within Mathematical Modeling of Fluid -Structure Interaction

At the Norwegian University of Science and Technology (NTNU), a PhD scholarship on mathematical modeling of fluid-structure interaction is available at the Division of Fluids Engineering, Department of Energy and Process Engineering, Faculty of Engineering Science and Technology.

The PhD project is a part of a larger research project entitled Modeling of obstructive sleep apnea by fluid-structure interaction in the upper airways, which will be carried out in cooperation with the Department of Neuroscience (Faculty of Medicine, NTNU), the Department of Structural Engineering (Faculty of Engineering Science and Technology, NTNU), and SINTEF Materials and Chemistry, Trondheim, from July 2014 until June 2017.

Two other PhD positions, one on clinical research at the Department of Neuroscience and one on soft tissue modeling at the Department of Structural Engineering, are announced separately. The interdisciplinary research project is funded by the Research Council of Norway, the Center of Endoscopic Nose and Sinus Surgery, Trondheim, and the Faculty of Engineering Science and Technology, NTNU.

The objective of the research project is to develop a clinical tool to predict the response of surgeries for Obstructive Sleep Apnea Syndrome (OSAS) patients and to identify the decisive pathophysiological mechanisms for the development of OSAS. OSAS is a sleep related breathing disorder caused by repetitive collapses of the pharyngeal walls during sleep, resulting in reduced breathing, oxygen desaturation and sleep disturbances. Since OSAS is one of the most important contributive factors leading to cardiovascular diseases, improving the OSAS diagnosis and treatment effectiveness is of great importance.

The topic of the PhD scholarship at the Division of Fluids Engineering, Department of Energy and Process Engineering, Faculty of Engineering Science and Technology is:
Mathematical Modeling of Fluid-Structure Interaction.

The main tasks of the PhD project are

- to extend a high order finite difference method based on the arbitrary Lagrangian-Eulerian (ALE) approach to fluid-structure interaction (FSI) of the soft palate in the pharynx
- to develop an immersed boundary method for FSI with large deformations of the soft palate in the pharynx
- to study basic biomechanical mechanisms of OSAS using a simplified model in collaboration with the other two PhD candidates
- to provide very accurate results of FSI with a simplified OSAS model for the verification of commercial software employed by our research partners at SINTEF Materials and Chemistry.

The main ingredients of this PhD project are

- CFD / programming and numerical simulation
- Physics / modeling
- Mathematics / analysis

Previous work of our group on fluid-structure interaction can be found in Martin Larsson's PhD thesis, which can be downloaded from <http://ntnu.divaportal.org/smash/record.jsf?pid=diva2:358532>.

Further information about the position may be obtained from Professor Bernhard Müller (bernhard.muller@ntnu.no).

The candidate in Mathematical Modeling of Fluid-Structure Interaction should hold a master's degree in mechanical engineering, applied mathematics, physics or similar. Very good proficiency in fluid mechanics, structural mechanics, and numerical methods for partial differential equations as well as very good programming skills are required. Proficiency in the GNU/Linux environment is an advantage. Excellent communication skills in scientific writing and oral presentation are needed. The PhD position is limited to 3 years.

PhD Candidates are remunerated in code 1017, and are normally remunerated at wage level 50, gross NOK 420 800 before tax. The salary is adjusted according to the recent wage negotiations, and given subject to the final approval of the Storting (the Norwegian Parliament). There will be a 2 % deduction for superannuation.

The engagement is to be made in accordance with the regulations in force concerning State

Employees and Civil Servants. The positions adhere to the Norwegian Government's policy of balanced ethnicity, age and gender. According to the new Freedom of Information Act, information concerning the applicant may be made public even if the applicant has requested not to be included in the list of applicants.

Applications with CV, possible publications and other scientific works, certified copies of transcripts and reference letters should be submitted electronically via this website. Mark your application with ref.no. IVT-67/14<.

Anticipated commencement 01.07.2014.

Application deadline 15.05.2014.

Tilleggsinformasjon

Arbeidssted: