

Jobbnorge ID: 183412
Deadline: 3/5/2020
Website: <http://www.ntnu.no>
Scope: Fulltime
Duration: Temporary assistant

The Department of Energy and Process Engineering has a vacancy for a

PhD position in unravelling the structure of ammonia-hydrogen-nitrogen flames (IV-81/20)

This is NTNU

At NTNU, creating knowledge for a better world is the vision that unites our 7 400 employees and 42 000 students.

We are looking for dedicated employees to join us.

Video: <https://www.youtube.com/watch?v=clgKd1SwGLI>

About the position

A PhD position is available at the Department of Energy and Process Engineering within the Thermo-fluids research group in collaboration with the Institute of Reacting Flows and Diagnostics group at TU Darmstadt.

The appointment has a duration of 3 years and financed by the Low Emission Centre which is dedicated to the reduction of CO₂ emissions from the Norwegian Continental Shelf. The research will be an integral part of a scientific workpackage on carbon free firing of gas turbines.

The position will be supervised by Professor James Dawson and co-supervised by Professors Andreas Dreizler and Dirk Geyer from TU Darmstadt/UAS Darmstadt. Research activities will be based at both the Department of Energy and Process Engineering at NTNU to investigate the operational limits of ammonia-hydrogen-nitrogen flames and at TU Darmstadt/UAS Darmstadt to investigate the fundamental flame structure using Raman scattering and Laser Induced Fluorescence based multi-species measurements. It is envisaged that the candidate will spend a total of approximately 50% of their time at TU Darmstadt /UAS Darmstadt over several visits.

The head of department is Professor Terese Løvås. The position's day to day project management and supervision is by Professor James Dawson.

Duties of the position

The motivation of the research is the reduction of CO₂ emissions in power generation applications. One very promising approach is to operate gas turbines on zero-carbon fuels such as hydrogen or ammonia. The PhD research will focus on blends of ammonia-hydrogen-nitrogen which have similar combustion properties to natural gas and therefore can be easily burned in current gas turbines. Very recent studies have found that such flames are much more resistant to strain and are therefore more stable than natural gas flames, but we do not know why. The aim of the PhD project is to understand this and other important phenomena detailed investigations into the flame structure of ammonia-hydrogen-nitrogen flames is needed as they have not been rigorously investigated. This knowledge is a crucial enabling step to zero-emission gas turbines and large-scale reductions in CO₂ emissions.

The research project requires unique experimental capabilities and expertise in advanced laser diagnostics. The successful candidate will have access to several novel experimental facilities integrating different advanced experimental techniques including Particle Image Velocity (PIV) and Laser Induced Fluorescence (LIF) to study the operational limits of ammonia-hydrogen-nitrogen flames and Raman spectroscopy/LIF for multi-species measurements to reveal the flame structure at TU Darmstadt. The particular emphasis will be on the development of Raman spectroscopy for the diagnostics of NH₃/H₂ flames including the characterization of the relevant spectroscopic processes.

The successful candidate will be joining two internationally active research groups in fluid mechanics and laser diagnostics with experienced post-doctoral researchers as well as PhD students working across a wide variety of problems. Several joint publications in internationally leading scientific journals and attendance at international conferences is expected.

The expected start date is as soon as possible.

Required selection criteria

The PhD-position's main objective is to qualify for work in research positions. The qualification requirement is that you have completed a master's degree or second degree (equivalent to 120 credits) with a strong academic background in [subject area] or equivalent education with a grade of B or better in terms of [NTNU's grading scale](#). If you do not have letter grades from previous studies, you must have an equally good academic foundation. If you are unable to meet these criteria you may be considered only if you can document that you are particularly suitable for education leading to a PhD degree.

The appointment is to be made in accordance with the regulations in force concerning [State Employees and Civil Servants and national guidelines for appointment as PhD, post doctor and research assistant](#).

Required qualifications:

- A Masters (or second) degree in mechanical, aerospace or chemical engineering, engineering sciences, applied physics or equivalent discipline.
- Strong background in optical diagnostics, spectroscopy and measurement methods in reacting flows.
- Programming skills in MATLAB, C, Python, or similar packages.
- Excellent command of the English language, and skilled in academic writing

Desired additional qualifications:

- Experience with state-of-the-art experimental fluid mechanics or reacting flow measurements
- Experience with CAD software packages (e.g., SolidWorks, Fusion360).
- Experience in the foundations of quantum mechanics as background for simulations of the Raman scattering process

Personal characteristics

- Enthusiastic, ability to adapt and learn
- Highly motivated and scientifically curious
- Able to work effectively by themselves and in a team
- Able to work in a structured and goal orientated manner
- Able to work in a multi-cultural environment

In the evaluation of which candidate is best qualified, emphasis will be placed on education, experience and personal suitability, in terms of the qualification requirements specified in the advertisement

We offer

- world-class experimental laboratories
- state-of-the-art experimental measurement equipment
- exciting and stimulating tasks in a strong international academic environment
- an open and [inclusive work environment](#) with dedicated colleagues
- favourable terms in the [Norwegian Public Service Pension Fund](#)
- employee benefits

Salary and conditions

PhD candidates are remunerated in code 1017, and are normally remunerated at gross from NOK 479 600 per annum before tax, depending on qualifications and seniority. From the salary, 2% is deducted as a contribution to the Norwegian Public Service Pension Fund.

The period of employment is 3 years (without required duties).

Appointment to a PhD position requires that you are admitted to the PhD programme in Engineering, please see: <https://ntnu.edu/studies/phiv> within three months of employment, and that you participate in an organized PhD programme during the employment period.

The engagement is to be made in accordance with the regulations in force concerning State Employees and Civil Servants, and the acts relating to Control of the Export of Strategic Goods, Services and Technology. Candidates who by assessment of the application and attachment are seen to conflict with the criteria in the latter law will be prohibited from recruitment to NTNU. After the appointment you must assume that there may be changes in the area of work.

The position is subject to external funding.

It is a prerequisite you can be present at and accessible to the institution on a daily basis.

About the application

The application and supporting documentation to be used as the basis for the assessment must be in English.

Publications and other scientific work must follow the application. Please note that applications are only evaluated based on the information available on the application deadline. You should ensure that your application shows clearly how your skills and experience meet the criteria which are set out above.

In addition to the required fields on the Jobbnorge website, please include a "qualifications" document explicitly detailing how you meet each of the required and some (or all) of the desired qualifications listed above. An application missing this document may be considered incomplete by the selection committee.

Joint works will be considered. If it is difficult to identify your contribution to joint works, you must attach a brief description of your participation.

General information

A good work environment is characterized by diversity. We encourage qualified candidates to apply, regardless of their gender, functional capacity or cultural background.

The city of Trondheim is a modern European city with a rich cultural scene. Trondheim is the innovation capital of Norway with a population of 200,000. The Norwegian welfare state, including healthcare, schools, kindergartens and overall equality, is probably the best of its kind in the world. Professional subsidized day-care for children is easily available. Furthermore, Trondheim offers great opportunities for education (including international schools) and possibilities to enjoy nature, culture and family life and has low crime rates and clean air quality.

NTNU is committed to following evaluation criteria for research quality according to [The San Francisco Declaration on Research Assessment - DORA](#).

As an employee at NTNU, you must at all times adhere to the changes that the development in the subject entails and the organizational changes that are adopted.

Information Act (Offentleglova), your name, age, position and municipality may be made public even if you have requested not to have your name entered on the list of applicants.

If you have any questions about the position, please contact Professor James Dawson, email james.r.dawson@ntnu.no. If you have any questions about the recruitment process, please contact Ingrid Wiggen, e-mail: ingrid.wiggen@ntnu.no.

Please submit your application electronically via jobbnorge.no with your CV, diplomas and certificates. Applications submitted elsewhere will not be considered. Diploma Supplement is required to attach for European Master Diplomas outside Norway. Chinese applicants are required to provide confirmation of Master Diploma from [China Credentials Verification \(CHSI\)](#).

If you are invited for interview you must include certified copies of transcripts and reference letters. Please refer to the application number IV-81/20 when applying.

Application deadline: 05.03.2020.

NTNU - knowledge for a better world

NTNU - knowledge for a better world

The Norwegian University of Science and Technology (NTNU) creates knowledge for a better world and solutions that can change everyday life.

Department of Energy and Process Engineering

We conduct research and teaching covering the entire energy chain, from resources to the end-user. We look at how energy is produced and used by humans and machines in a sustainable way with regard to health, climate change and the resource base. [The Department of Energy and Process Engineering](#) is one of eight departments in the [Faculty of Engineering](#).

Additional information

Place of service:

Department of Energy and Process Engineering 7491 Trondheim (Trondheim Municipality)