

# Graduated student for experiments on Metal Fuel Combustion Technology

## Job description

One of the newly conceived ways to convert energy involves rethinking the way we use metals. People deal with metals every day, yet it may be hard to imagine that metals can replace hydrocarbon fuels. Nevertheless, recent research has indicated that there are huge opportunities for a **carbon-free, sustainable energy cycle based on metal fuels**, that can supply power and heat when and where needed. In order to make fast oxidation of metals possible, the metal fuel should be used as small (micron-sized) particles. In that case, they can generate flame structures similar to those of gaseous fuels. Many of the details and practical issues of burning metal fuels are, however, still unknown. Oxidized particles can be caught after combustion and reduced to metal particles again afterwards and at another location using green electricity/hydrogen where and when there is sufficient available.

A large group of researchers is working on several projects to study and understand this completely new idea. On the other hand, valorisation projects aim towards implementation of the knowledge on larger scales in industry. Recently, a consortium of partners developed and built a first demonstrator unit to burn iron powder to produce steam of 100 KW (see below). Currently, all details of this setup are studied and improved, including fuel properties. The results form the basis for a new system that is yet to be engineered.



## Job requirements

### Qualification of applicants

We are looking for a recently graduated, talented, enthusiastic candidate with the right experimental and communication skills, holding an MSc in Mechanical Engineering, Aerospace Engineering, Applied Physics or equivalent, with a solid background in thermo- and fluid dynamics. The experimental work will focus on improvement of design, combustion and emission measurements for a wide variety of powders using several measurement techniques.

## Conditions of employment

We offer:

- An exciting job in a dynamic work environment and multidisciplinary consortium.
- A temporary position of 1 years, with possible extension.
- Depending on knowledge and experience, the gross monthly salary amounts to a minimum of € ... and a maximum of € .... This is in accordance with the Collective Labour Agreement for Dutch Universities.
- The possibility to present your work at international conferences.
- An attractive package of fringe benefits, including end-of-year bonus (8,3% in December), an extra holiday allowance (8% in May), moving expenses and excellent sports facilities.

## Information and application

The Power & Flow section within Mechanical Engineering focuses on clean and efficient combustion and process technology, to cater for fast-growing energy demands. We are also seeing increased use of biofuels, and eventually the emergence of fuels derived from sustainable sources, such as solar and metal fuels. Optimizing combustion and process devices, in combination with different fuel formulations to minimize undesired emissions and maximize thermal efficiency, is essential to supporting both of these developments.

The metal combustion research is concerned with a novel type of fuels: metal powders that have a tremendously high energy density and can act as a major carbon-free energy carrier for the long term. Within the group we develop the combustion science and technology of metal powder, including solid handling for separation and regeneration through chemical reduction using renewable hydrogen. The group has a unique research infrastructure, both from an experimental and computational perspective.

More information about Eindhoven University of Technology and Mechanical Engineering Department, can be found on <https://www.tue.nl/en> Information of the involved research group can be found here: <https://www.tue.nl/en/research/research-groups/power-flow>.

Candidates can get more information about this position from Prof. dr. Philip de Goey, e-mail: [l.p.h.d.goey@tue.nl](mailto:l.p.h.d.goey@tue.nl) For more information regarding recruitment please contact: [hrservices.Gemini@tue.nl](mailto:hrservices.Gemini@tue.nl) .