Postdoctoral Research Fellowship in Renewable Energy Thermal Heating of Industrial Processes

Stellenbosch University's Centre for Renewable and Sustainable Energy (CRSES), hosted within the Faculty of Engineering, is seeking an applicant for a Postdoctoral Research Fellow in the field of solar thermal heating of industrial processes.

The Centre for Renewable and Sustainable Energy Studies (CRSES) at Stellenbosch University enables a sustainable future for Africa through world-class renewable and sustainable energy research, advisory services, awareness campaigns and training programmes. It was established in 2007 to facilitate and stimulate activities in renewable energy studies and research at the world-class Stellenbosch University and works partnership with other universities and research entities in South Africa and internationally.

One of the emerging and dynamic research areas for the CRSES and the Solar Thermal Energy Research Group (STERG) is in industrial Decarbonisation with the aim to introduce renewable and sustainable energy solutions to replace South Africa's use of fossil fuels for industrial heat. Industrial heat represents some 60-70% of industrial energy needs and while the remaining electricity requirements are increasingly met with solar and wind solutions, little has been done to reduce the burning of coal to meet thermal energy requirements.

For some years, solar heating for industrial processes have been piloted to harness solar energy to provide heat for various manufacturing and industrial activities. However, to date the adoption has been limited. The introduction of hybrid solar systems with heat pump driven by green electricity has improved the economics and reduced perceived operational risks. This sustainable approach utilizes high temperature heat pumps as the primary thermal energy delivery mechanism. The system's efficiency is increased by utilising solar thermal technologies, such as solar collectors and concentrators, to increase the heat pump's coefficient of performance.

Industrial processes that require heating, such as drying, sterilization, and material processing, can benefit from these hybrid solar heat pump systems. As the global emphasis on clean and renewable energy solutions continues to grow, integrating these renewable energy heating into industrial processes becomes an essential step toward achieving environmentally friendly and economically viable production methods. As such the CRSES/STERG and its collaborators have recently secured funding for demonstration systems that complement the efforts from the Austrian Development Agency funded Soltrain initiative with larger systems that can meet the full thermal energy requirements at production facilities.

Hosts:

- Prof Craig McGregor (craigm@sun.ac.za)
- Dr Francois Rozon (frozon@sun.ac.za)

Location: Centre for Renewable and Sustainable Energy Studies, Stellenbosch University, Stellenbosch, South Africa.

Duties and responsibilities:

The research fellow will be expected to:

- Perform research and publish the results at local and international conferences and in high-impact journals.
- Apply and secure research grants to support the design, modelling, optimization and

where possible the demonstration of hybrid solar thermal energy systems.

- Assist with demonstration projects and the implementation of hybrid solar thermal energy systems at various locations across the Western Cape and more broadly in South Africa.
- Collect and monitor data and optimise the thermal systems after installation. Data needs to be analysed to optimise the system for effective use. This monitoring data will compare expected and achieved performance indicators (including energy, cost and CO_2/GHG savings), serving as the basis for optimisation and reporting.
- Co-supervise post-graduate students
- Assist with awareness-raising and training events as well as publishing results and research through relevant conference papers, webinars, presentations, etc.
- Assist with project administration, including setting up meetings with industry, enrolling industry partners, project budgeting and overall project coordination.

General requirements:

- A PhD in a relevant field (preferably mechanical or mechatronic engineering):
  - must have graduated within the last five years,
  - candidates with a confirmed examination outcome who have not yet graduated may apply (proof required);
- Excellent communication skills in English (both written and verbal);
- A proven publication record in high-impact journals and a demonstrated capacity to conduct independent research.

Fellowship: CRSES currently has funding for one fellowship of R 400 000 for 2024. The fellowship is renewable for up to three years, subject to satisfactory performance and funding availability. Please note that postdoctoral fellows are not appointed as Stellenbosch University employees. The fellowship is thus exempt from tax, and the appointment does not include employee benefits.

Commencement of duties: March 2024 or as soon as possible after that.

Application closing date: 17h00 on 15 February 2024.

Application process: Send a letter of application, accompanied by a comprehensive curriculum vitae, including a list of publications, a link to the candidate's PhD thesis, and the names and contact details of two referees, to Prof Craig McGregor (craigm@sun.ac.za).