

# 3-year Postdoc Position

## Multiscale control of integrated energy systems

at

Department of Applied Mathematics

University of Twente

### Background

Within the organisation and management of future energy systems the integration of various energy-related domains and systems plays a crucial role (system integration). This integration concerns different sectors thereby combining *different disciplines*, (electricity, heating and transport), integration over *different time domains* (from several months to days ahead, to intra-day and even up to real-time decisions) and over *different spatial domains* (from device and building level to neighbourhood and regional level up to country or even European level). The envisioned system integration within the Energy Transition asks for a fundamentally different organisation and control of our energy systems.

### Applied Mathematics

Building our future society on modern, distributed energy systems poses important scientific engineering challenges. In this field, data-sciences, networked structural analysis, detailed component modeling, simulation and control come together. This is a field of tremendous potential and growth, for which it is crucial to step in now, with a concerted ambition. A key role is dedicated to Applied Mathematics (AM) research, enabling the mastering and optimization of integrated energy systems at all dynamical scales. The vacant position will form a nucleation point for a strong development of AM in Twente.

Applied Mathematics works together with Computer Science, Physics, Electrical, Mechanical and Chemical Engineering, as well as Behavioural and Management Science to create future energy systems that are efficient, robust, and resilient. The focus is on an important enabling role in:

- Network analysis: integration, organisation, planning and control of the system.
- Component modeling: understanding and improving network components ranging from materials and control of appliances in energysubsystems.

The envisioned system integration brings currently separated disciplines closer to each other and asks for close collaboration.

## Embedding

Research in the key directions identified above can benefit from the available expertise at our department ranging from system-scale considerations and network organization to improved understanding of materials and components. Within MOR a strong group is working already over a decade on Decentralized Energy Management (Hurink) while a research on Market Design (Skopalik) has recently been started. Within SACS the chairs HS and MMS are active in energy-related projects, involving new methods and materials for energy storage and conversion (Geurts) and optimization of energy transport (Zwart/Geurts) via physical control.

MOR and SACS will intensify this research line by also connecting to key scientists at other faculties, in industry and at other Universities of Technology. Combining MOR and SACS expertise will give our department a unique position in The Netherlands, covering a broad spectrum of techniques supporting multiscale challenges in the energy transition. Integrating this research in the 'Energy Innovation Centre' gives us a strong position over the complete spectrum from fundamental research to applications.

## Our offer

We are looking for a talented junior scientist with a PhD in applied mathematics taking the role of Postdoc in this research field. We offer the prospect of a 3-year contract. The successful candidate has interest in mathematical modeling, optimization, control, and numerical simulation and is willing to cooperate with researchers of different backgrounds in mathematics but also with researchers from disciplines like Computer Science, Electrical Engineering and Physics. If you need further information on the position or on other aspects, please contact one of the three involved researchers given below.

## Application

Please send your application electronically to one of the researchers mentioned below. Your application should contain a CV and a motivation letter. The **deadline** for submission is **April, 9 2021**

## Contacts

If you want to achieve further information on the offered position or the intended research direction, you may contact one of the involved researchers given below.

- Bernhard Geurts [b.j.geurts@utwente.nl](mailto:b.j.geurts@utwente.nl); <https://people.utwente.nl/b.j.geurts>
- Johann Hurink [j.l.hurink@utwente.nl](mailto:j.l.hurink@utwente.nl); <https://wwwhome.ewi.utwente.nl/~hurinkjl/>
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