

Press Release

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AIT and TU Delft launch international doctoral programme on the sustainable transformation of the energy system using artificial intelligence

- New PhD programme to develop breakthrough planning and operational methods based on artificial intelligence and machine learning
- Bundling technological expertise and systemic know-how from applied and academic research

The AIT Austrian Institute of Technology and TU Delft are launching their first joint doctoral programme (PhD programme) in the winter semester of 2022/23. By cooperating in the use of artificial intelligence (AI) and machine learning in planning and operating future sustainable energy systems, the two institutions are creating a new doctoral programme designed to promote the development of innovative methods.

Focus on digitalisation and AI in method development

The joint PhD programme focuses on increasing digitalisation in the energy system and its potential for operating our energy infrastructure more efficiently, reliably and securely. New technologies, political developments and market mechanisms in the energy sector will make tomorrow's energy systems increasingly complex, and this will present us with new technical challenges. The research results generated by the six PhD candidates on the new programme will create the scientific framework for using artificial intelligence and machine learning in developing energy infrastructure. The PhD programme will address the following key research areas: using Big Data analytics to efficiently plan, design and operate future energy systems based on novel methods for data acquisition and management; data integration and dissemination; data processing; and security and privacy issues and resilience.

Supervision of the PhD candidates will include academic exchanges, in-house lectures and seminars, as well as flexible research stays in both Vienna and Delft. The research results are also expected to make significant contributions to international bodies, groups and associations working in the field of energy systems and technologies. The winter semester 2022/23 will see the start of the first joint PhD programme which offers six places and runs over a period of five years. The application phase has already started. <https://www.tudelft.nl/ai/delft-ai-energy-lab/vacancies-1>

Wolfgang Hribernik, Head of Center for Energy, AIT

“The increasing complexity of future energy systems can be addressed using artificial intelligence and machine learning. We offer a unique setting for this PhD programme, with a team of high-level experts and researchers providing the scientific leadership in cooperation with TU Delft. The AIT Center for Energy brings its expertise in techno-economic analysis, the use of flexibility in the power system, the evaluation of energy system and market models and their impact on energy

markets. Working in collaboration with industry and infrastructure operators, the PhD programme will use artificial intelligence and machine learning to create innovative use cases such as energy forecasting, energy market price prediction, fault detection, and efficient demand-side management techniques. TU Delft is a renowned academic partner with an international reputation in this field, reflecting the programme's shared claim to excellence."

Jochen Cremer, Co-Director of the TU Delft AI Energy Lab and Assistant Professor at the Faculty of Electrical Engineering, Mathematics and Computer Science

"In a sustainable energy system, new use cases are emerging. They include predicting flexibility in the power grid and the self-learning optimisation of electric vehicle charging management. As part of the AI initiative at TU Delft, the Delft AI Energy Lab is developing new AI-based algorithms to improve existing and create new use cases for a sustainable energy system. This involves the use of AI methods such as graph neural networks, reinforcement learning, and methods from signal processing. New use cases are urgently needed to master the energy transition and achieve the Net Zero goals. In the AIT Center for Energy, we have an important partner with whom to tap the potential of these methods. Together with the PhD programme, we have created the framework for our talent to explore the most relevant questions. I am looking forward to our exciting cooperation."

Announcement of PhD positions: <https://www.tudelft.nl/ai/delft-ai-energy-lab/vacancies-1>

AIT Center for Energy

At the AIT Center for Energy, around 250 employees are working on solutions for tomorrow's sustainable energy supply under the leadership of Wolfgang Hribernik. AIT experts with their many years of experience and scientific excellence, paired with high-quality laboratory infrastructure and global networking, offer companies innovative and applied research services to give them a clear competitive advantage in this future market. The Center for Energy's topic portfolio is oriented towards three central systems: sustainable public energy supply systems; decarbonisation of industrial processes and plants; and innovative technologies and solutions for urban resilience (buildings, cities). <https://www.ait.ac.at/en/about-the-ait/center/center-for-energy>

Delft University of Technology

The Delft University of Technology (TU Delft) is the oldest, largest and most comprehensive technical university in the Netherlands. With more than 23,000 students and 3,000 academic staff, it is an important national institution and enjoys an international reputation. The university collaborates with other international educational institutions and research institutes and works in partnership with governments, industry organisations, consultancies, industry and SMEs. The Faculty of Electrical Engineering, Mathematics and Computer Science (EEMCS) has departments in Applied Mathematics, Intelligent Systems, Microelectronics, Software and Computer Technology and Sustainable Electric Energy. The latter focuses on the sustainable generation, transmission, distribution and use of electrical energy. The department has extensive laboratories used for the production of photovoltaic cells and testing high-voltage devices. Other applied methods are based on simulation clusters such as RTDS and Opal-RT as well as in-situ settings of sustainable electrical devices.

AI-Energy-Lab: <https://www.tudelft.nl/ai/delft-ai-energy-lab>

TU Delft AI Initiative: <https://www.tudelft.nl/ai/tu-delft-ai-initiative>

Press photo:



BU: Artificial intelligence and machine learning can be used to address the increasing complexity of tomorrow's energy system. The scientific leadership on the PhD programme is provided by experts from TU Delft and the AIT Center for Energy. © TU Delft

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