



PhD Positions Cluster Wake Control

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As pioneers in the field of wind turbine and wind farm control, we are looking for ambitious PhD candidates to join our research group on the new topic of Cluster Wake Control

Job description

Wind turbines packed in large offshore wind farms hinder each other by the formation of turbulent wind wakes, which lead to large efficiency losses at downstream turbines. With the growing number and attention for wind farms, it becomes clear that the wake effect is not only present on a turbine-to-turbine level, but also on a farm-to-farm level. On a wind farm level the energy extraction by each individual turbine cumulates, leaving a pronounced wake in the downstream region, the so-called cluster wakes.

Wind turbine wakes have been studied extensively and the state-of-the-art includes various strategies for mitigating their effects on downstream turbines, amongst others accelerating the wake recovery by dynamically exciting the blade pitch angles, known as Active Wake Mixing (AWM). In contrast, the collective wake of an entire wind turbine cluster is not yet fundamentally well understood, and no strategies have yet been presented to mitigate this. However, the effect of cluster wakes on the power generation of neighboring wind farms is expected to be of major importance considering the extent of planned offshore wind farms and their proximity to each other. In the CLUSTERWAKE project, we will study the novel concept of Active Cluster Wake Mixing (ACWM), which is capable of decreasing the length of the wake downstream of the wind farm. Active Cluster Wake Mixing generates dynamic force patterns over the wind farm, by adapting the thrust of the individual turbines. These patterns are designed to trigger instabilities of the wind farm cluster wake.

Within the CLUSTERWAKE project we will have two open positions: one with a focus on the aerodynamics and high fidelity simulations of active cluster wakes and the second with a focus on the control system (the optimal pattern to trigger the instabilities).

Requirements

The successful candidate has the following qualifications:

- An MSc. degree in systems and control, fluid dynamics wind energy, aeroelastics, mechatronics, applied mathematics, mechanical engineering, or a related field.
- The capacity to communicate effectively with peers, students and stakeholders in the application field
- Good programming skills are a plus: MATLAB, Python, Git
- Fluency in English
- An open personality and good communication skills in written and spoken English.

Doing a PhD at TU Delft requires English proficiency at a certain level to ensure that the candidate is able to communicate and interact well, participate in English-taught Doctoral Education courses, and write scientific articles and a final thesis. For more details please check the [Graduate Schools Admission Requirements](#).

Conditions of employment

Doctoral candidates will be offered a 4-year period of employment in principle, but in the form of 2 employment contracts. An initial 1,5 year contract with an official go/no go progress assessment within 15 months. Followed by an additional contract for the remaining 2,5 years assuming everything goes well and performance requirements are met.

Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities, increasing from € 2770 per month in the first year to € 3539 in the fourth year. As a PhD candidate you will be enrolled in the TU Delft Graduate School. The TU Delft Graduate School provides an inspiring research environment with an excellent team of supervisors, academic staff and a mentor. The Doctoral Education Programme is aimed at developing your transferable, discipline-related and research skills.

The TU Delft offers a customisable compensation package, discounts on health insurance, and a monthly work costs contribution. Flexible work schedules can be arranged.

For international applicants, TU Delft has the [Coming to Delft Service](#). This service provides information for new international employees to help you prepare the relocation and to settle in the Netherlands. The Coming to Delft Service offers a [Dual Career Programme](#) for partners and they organise events to expand your (social) network.

TU Delft (Delft University of Technology)

Delft University of Technology is built on strong foundations. As creators of the world-famous Dutch waterworks and pioneers in biotech, TU Delft is a top international university combining science, engineering and design. It delivers world class results in education, research and innovation to address challenges in the areas of energy, climate, mobility, health and digital society. For generations, our engineers have proven to be entrepreneurial problem-solvers, both in business and in a social context.

At TU Delft we embrace diversity as one of our core [values](#) and we actively [engage](#) to be a university where you feel at home and can flourish. We value different perspectives and qualities. We believe this makes our work more innovative, the TU Delft community more vibrant and the world more just. Together, we imagine, invent and create solutions using technology to have a positive impact on a global scale. That is why we invite you to apply. Your application will receive fair consideration.

Challenge. Change. Impact!

Faculty Mechanical Engineering

From chip to ship. From machine to human being. From idea to solution. Driven by a deep-rooted desire to understand our environment and discover its underlying mechanisms, research and education at the ME faculty focusses on fundamental understanding, design, production including application and product improvement, materials, processes and (mechanical) systems.

ME is a dynamic and innovative faculty with high-tech lab facilities and international reach. It's a large faculty but also versatile, so we can often make unique connections by combining different disciplines. This is reflected in ME's outstanding, state-of-the-art education, which trains students to become responsible and socially engaged engineers and scientists. We translate our knowledge and insights into solutions to societal issues, contributing to a sustainable society and to the development of prosperity and well-being. That is what unites us in pioneering research, inspiring education and (inter)national cooperation.

Click [here](#) to go to the website of the Faculty of Mechanical Engineering. Do you want to experience working at our faculty? These [videos](#) will introduce you to some of our researchers and their work.

Additional information

For more information about this vacancy, please contact Prof. Jan-Willem van Wingerden, j.w.vanwingerden@tudelft.nl.

For information about the application procedure, please contact Mr. Giedo Kocken, HR advisor, recruitment-me@tudelft.nl.

Application procedure

Are you interested in this vacancy? Please apply no later than **1 September 2024** via the application button and upload:

- CV;
- Motivation letter;
- Names and contact information of two referees;
- (Draft) Master thesis.

Please note:

- A pre-employment screening can be part of the selection procedure.
- You can apply online. We will not process applications sent by email and/or post.
- Please do not contact us for unsolicited services.

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