

## **PhD position in Machine Learning, Wind Energy, Automatic Control, IFP Energies, France..**

### **Description**

PhD position in Machine Learning, Wind Energy, Automatic Control

Design of Real-time Estimation Algorithms for Fault Detection and Load Mitigation Control at the Wind Farms Scale

In the field of wind energy, operators are now focusing on using existing wind farms more efficiently, reducing farm-level mechanical stress and reducing maintenance costs through improved fault detection. In this context, our central question will be “How to design an algorithm capable of optimally and robustly estimate the wake and the wind field properties in real-time at the wind farm scale?” These estimations will make it possible to design improved fault detection algorithms, as well as farm-level load distribution controls. Classical centralized estimation approaches are unfortunately unable to address such a question due to the inaccuracy in the estimations and the high computational burden. To address our problem, we will rely on the theoretical tools of machine learning and advanced estimation methods. The machine learning paradigm makes it possible to adapt itself to create an increasingly robust and reliable model of the studied phenomena based on observations. The interest is to learn information from the uncertain and fluctuating environment. In particular, the Gaussian process approach shows good potential in terms of performance and ability to learn from a large amount of data. This research work will greatly support the developments of the next generation of the IFPEN industrial solutions for wind estimation. Academic supervisor: Prof. Nicolas PETIT, CAS, MINES ParisTech Doctoral School ED432 - Sciences des Metiers de l'Ingénieur IFPEN supervisor Dr. Olivier LEPREUX, Research engineer, Control, Signal, Systems. Dpt. PhD location IFP Energies nouvelles, Lyon, France

Duration and start date: 3 years, starting preferably on October 1, 2019

Academic requirements: University Master degree in mathematics, automatic control or signal proc.

Language requirements: Fluency in English

Gross annual salary: e26940–30960. Additional company benefits.

For more information or to submit an application contact the IFPEN supervisor at [recruit.postdoc@ifpen.fr](mailto:recruit.postdoc@ifpen.fr) About IFP Energies nouvelles: IFP Energies nouvelles is a French public-sector research, innovation and training center. Its mission is to develop efficient, economical, clean and sustainable technologies in the fields of energy, transport and the environment. For more information, see [www.ifpen.fr](http://www.ifpen.fr).