

**Tentative title of the master thesis**

*investigation of gear diagnostic techniques of wind turbine gearboxes in a data streaming context*

**Context of the master thesis**

*The gearbox of wind turbine is a crucial element in the drivetrain of a wind turbine. During its lifetime, a wind turbine gearbox undergoes severe transient loading cases, due to start-ups, sudden stops, or grid connection loss events. These strong dynamic events impact the operational lifetime of the gears present in the system and can lead to damaging of the gears (e.g. wear, tooth cracking, pitting, spalling, ...). Replacing a gearbox in a wind turbine is however not as straightforward and very costly. Therefore, it is desirable to detect any incipient gear damage before it reaches a critical stage so that a maintenance team can plan ahead and organize a timely replacement or repair of the gearbox. The aim of this thesis is the investigation of promising gear diagnostic methods using vibration data originating from wind turbine measurements. A significant challenge will be to realize robust and effective methods that can be used in a streaming context, thus for analyzing data in a big data framework. Multiple approaches can be investigated during the thesis.*

**Tasks:**

- *Literature study of existing state-of-the-art gear diagnostic approaches for rotating machinery*
- *Validation of these methods on real life field measurements from an offshore wind turbine integrated in a big data infrastructure*
- *Comparison of the existing methods and investigation of potential for improvement*



*Figure: Investigated Offshore Wind Turbine*

**Supervisors**

*Jan Helsen  
([jan.helsen@vub.ac.be](mailto:jan.helsen@vub.ac.be))*

**Other contact persons:**

*Cédric Peeters  
[Cedric.peeters@vub.be](mailto:Cedric.peeters@vub.be)*

**Working language**

*English*

**Student profile**

*Engineering, interested in gearboxes and wind turbines, experimental signal processing techniques*