



Future Collaboration Areas Towards Doctoral Studies:

## **TOPIC 3. WIND AND MARINE ENERGIES.**

## \* Future Collaboration: Offshore Wind & Tidal Simulation Studies

- Wave/Atmospheric flow interactions: Influence of waves on wind resource/profile in offshore conditions. **Atmospheric boundary level interactions of wind turbines.**
- Floating wind turbine dynamic response – Simulation calibration studies against experiments. **Seakeeping analysis.**
- **Wake level interaction** studies at farm level for floating wind turbines.
- **Control system dynamics of floating wind turbine** conditions.
  - Scaling laws for aerodynamic & hydrodynamic conditions
- LHEEA's CFD solver + BEMT **turbine model against tidal turbine deployment measurements** w/o wake interactions.
- Study the LHEEA's software (CFD solver + FAST) for floating wind turbine controls towards southeast Asian water conditions.

## \* Future Collaboration: Offshore Wind & Tidal Material Level Collaborations Towards Extreme Conditions

- Durability studies of scalable surface engineered multi-layered PVD coated samples towards tidal turbine blade and bearing applications. The studies would evaluate the coating effectiveness against tribo-corrosion-erosion failure modes: **PhD subject on the fine metallurgical characterization and understanding of the PVD coating/substrate interface**
- Study of anisotropy of 3D structural components' in different build directions to correlate process condition and mechanical characteristics. Effort will also focus on post-heat treatment methods towards homogenization of mechanical properties to meet wind turbine structural component applications.
- Reparability of structural components' through laser cladding process towards a renewed asset life of structural & tribological components: **PhD subject to be instructed on repairing strategies and qualification of repaired components**
- Biofouling characterization study of coated samples towards confirmation of photocatalytic process effectiveness of TiO<sub>2</sub> type samples.