



H2020-MSCA-ITN-2019 N° 860879



13 Early-Stage-Researcher positions in the EU Horizon 2020 MSCA ITN Project FLOWER

- **Research fields:** Wind energy, atmospheric sciences, hydrodynamics, aerodynamics, structures, mechanical design,
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- **N° of vacancies:** 13
- **Career stage:** Early Stage Researcher (ESR) or 0-4 yrs (Post Graduate)
- **Expected starting date :** Between April 2020 and October 2020

- **Salary:** The successful candidates will be employed on a **full-time basis** with a competitive salary in accordance with the MSCA rules and the personal circumstances of the applicant. The successful candidate will receive a financial package consisting of MSCA living allowance and mobility allowance. Eligible applicants with a family will also receive an additional family allowance according to the rules of the MSCA. The exact (net) salary will be confirmed upon appointment and will depend on a Host Institution's local tax regulations.

- **Supervision:** ESRs will benefit from joint supervision and multi-sectoral advisory committees, ensuring the successful completion of their Individual Research projects.

- **Training:** In addition to their individual scientific projects ESRs will be **collaborating with world leading research** groups within the Consortium through secondments. All ESRs will benefit from extensive and varied further continuing education, completing a series of carefully designed training modules and transferable skills courses; they will participate in symposia, workshops and international conferences and will have meaningful exposure to the industrial environment through FLOWER industrial partners.

- **Selection process:** All applications proceed through the on-line recruitment portal on the FLOWER website <http://www.flower-h2020.eu>. **Candidates can apply electronically to several PhD positions within a scientific Work Package**, indicating their order of preference. Requested application details include **a detailed CV, as well as Bachelor and Master degree transcripts**. The deadline for the on-line registration is November 30, 2019. The selected candidates are evaluated and interviewed by the Recruitment and Skill Progress Committee. FLOWER is strongly committed to promoting equal opportunities and gender balance as part of the recruitment strategy.

Important notice: Applicants to ESR4 and/or ESR7 positions offered by NTNU must also apply via jobNorge.no in order for their application to be considered.



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- **Eligibility criteria:** Applicants need to fully respect three eligibility criteria¹ (to be demonstrated in the CV):
 1. At the core of the MSCA-ITNs is researcher mobility. At the time of commencing their FLOAWER employment, researchers must not have resided or carried out their main activity (work, studies, etc.) in the country of their (recruiting) host organisation for more than 12 months in the 3 years immediately prior to their recruitment. Short stays, such as holidays, are not taken into account
 2. Applicants must at the first day of their FLOAWER employment contract, **be in the first four years (full-time equivalent research experience) of their research career** and have not been awarded a doctoral degree. This research experience is measured **FROM** the date when they obtain the degree which formally entitles them to embark on a doctorate (either in the country in which the degree was obtained or in the country in which the researcher is recruited, even if a doctorate was never started or envisaged). Research Experience is measured **TO** the first day of the FLOAWER employment contract of the researcher.
 3. English language proficiency: ESRs must demonstrate proficiency in both written and spoken English. This is mandatory for the ESRs to take full advantage of the training program.

1. ¹ Usual **MSCA Eligibility Criteria** apply and will be verified during the application process. For more information on MSCA, please see : <http://ec.europa.eu/mariecurieactions>.



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Early-Stage-Researcher positions

ESR 1: Wind resource assessment in deep waters through space-distributed measurement systems

Work-package: 4 - Wind Resource Assessment in Deep Waters

Host: Centrale Nantes (ECN)

Country: France

Supervisors: Prof. Sandrine Aubrun and Dr. Yves Perignon

Duration: 36 months

Research programme:

1. Wind Resource characterization of the ECN sea test site SEM-REV
2. Relevance and reliability of the deployed instrumentation to assess the wind resource on the specific site SEM-REV
3. Relevance and reliability of the deployed instrumentation to assess the wind resource in other sites
4. A set of transfer functions between the different measurement systems in order to identify the better compromise between robustness, reliability and costs to assess wind resource in deep waters

Planned secondments: University of Stuttgart (3 months) and EOLFI (3 months)

ESR 2: Assessing the measurements of offshore wind conditions using LiDAR on floating platforms for resource assessment and power curve determination

Work-package: 4 - Wind Resource Assessment in Deep Waters

Host: University of Stuttgart (USTUTT)

Country: Germany

Supervisors: Prof. Powen Chen and Dr. Oliver Bischoff

Duration: 36 months

Research programme:

1. General study of advantages and disadvantages of different possibilities to measure wind conditions offshore with floating structures
2. Analytical comparison of different methods to measure wind conditions with a LiDAR from different floating platforms and positions (e.g. floating LiDAR, nacelle-based, transition piece based, floater based) for wind resource assessment and power curve determination
3. Development of new and extension of existing simulation environments for LiDAR measurements on floating structures performing wind field reconstruction
4. Verification of the simulation environment with real measurement data
5. Assessment of the uncertainties of LiDAR measurements on different floating structures

Planned secondments: Fraunhofer IWES (3 months) and IDEOL (3 months)



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ESR3: Offshore wind resource at deep sea applying satellite data and numerical modelling

Work-package: 4 - Wind Resource Assessment in Deep Waters

Host: Technical University of Denmark, Wind Energy Department (DTU)

Country: Denmark

Supervisors: Dr. Charlotte Bay Hasager and Dr. Ioanna Karagali

Duration: 36 months

Research programme:

1. Handle floating LiDAR data, and correct for motion including ship-based LiDAR, such that wind climate can be obtained with limited uncertainty.
2. Knowledge on the usability of satellite SAR winds at deep sea sites will be compared to numerical model results during 10 years, to estimate inter-annual variability. This result is important as measurement campaigns typically are much shorter.
3. Evaluation of the advantages and limitations of numerical modelling versus satellite ocean winds and observations from floating buoy/ship-based LiDAR, to assess wind resource statistics, and to provide maps of potential resource at selected deep sea sites for demonstration.

Planned secondments: Fraunhofer IWES (3 months) and VORTEX (3 months)

ESR4: High-fidelity determination of wave load and load effects for floating Wind Turbine hulls subjected to severe wave conditions

Work-package: 5 – Advanced Floater Analysis

Host: Norwegian University of Science and Technology (NTNU)

Country: Norway

Supervisors: Ass. Prof. Erin Bachynski and Prof. Michael Muskulus

Duration: 36 months

Research programme:

1. Development of numerical methods for determining highly nonlinear wave loads and load effects on floating offshore WTs
2. Improved engineering load models based on validated CFD simulations
3. Better understanding of long-term extrema in for local structural design.

Planned secondments: Centrale Nantes or University College of Cork (3 months) and Equinor (3 months)

Important notice: Applicants to ESR4 position offered by NTNU must also apply via jobbNorge.no in order for their application to be considered.



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ESR5: Hydrodynamic analysis and numerical modelling of heave-plates dedicated to the design of floating Wind Turbines.

Work-package: 5 – Advanced Floater Analysis

Host: Centrale Nantes (ECN)

Country: France

Supervisors: Dr. Jean-Christophe Gilloteaux and Prof. David Le Touzé

Duration: 36 months

Research programme:

1. Hydrodynamic database for various geometry, column-diameter/heave-plate diameter ratio and heave-plate depth.
2. Improved engineering models for modelling heave-plates.

Planned secondments: Norwegian University of Science and Technology (3 months) and IDEOL (3 months)

ESR6: Advanced physical Modelling Methods for Floating Wind Turbines

Work-package: 5 – Advanced Floater Analysis

Host: University College of Cork (UCC)

Country: Ireland

Supervisors: Prof. Jimmy Murphy and Dr. Cian Desmond

Duration: 36 months

Research programme:

1. Perform a set of high quality validation from physical testing of an elemental floating object.
2. Perform a set of high quality validation data for a floating wind energy platform with both aerodynamic and hydrodynamic effects.
3. LCOE analysis outputs..

Planned secondments: Centrale Nantes (3 months) and Aerodyn (3 months)



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ESR7: Advanced design and optimized cost of mooring systems

Work-package: 5 – Advanced Floater Analysis and 7 - System Design to Reduce LCOE **Host:** Norwegian University of Science and Technology (NTNU)

Country: Norway

Supervisors: Prof. Michael Muskulus and Ass. Prof. Erin Bachynski

Duration: 36 months

Research programme:

1. A parametric cost model for different mooring system technologies, including sea bed anchors and complex multi-floater layouts
2. A methodology to evaluate mooring system reliability, taking into account uncertainties in wave- and current-induced mooring system dynamics and loads
3. A methodology for robust optimization of mooring systems with respect to performance constraints, system reliability and cost
4. A comprehensive guideline on mooring system design for floating WTs, to support industrial end-users and future research

Planned secondments: University of Rostock (3 months) and Vicinay (3 months)

Important notice: Applicants to ESR7 position offered by NTNU must also apply via jobbNorge.no in order for their application to be considered.

ESR8: Multi-Used design components for different kind of floating sub-structures

Work-package: 5 – Advanced Floater Analysis and 7 - System Design to Reduce LCOE

Host: University of Rostock (UROS)

Country: Germany

Supervisors: Dr.. Frank Adam and Prof. Uwe Ritschel

Duration: 36 months

Research programme:

1. high-fidelity CFD mooring line analysis compared to a multi-body simulation approach to consider dynamic effects of inertia and viscous damping in the design
2. Multi-used structural components for different kind of floaters to reduce production and maintenance costs and in the end the LCOE
3. A comprehensive guideline on multi-used structural components on design for floating WTs, to support industrial end-users and future research

Planned secondments: WAVEC (3 months) and GICON (3 months)



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ESR9: Horizontal and vertical axis WT aerodynamic modeling and testing

Work-package: 6 – Dynamics of Wind Turbines

Host: Politecnico di Milano (POLIMI)

Country: Italy

Supervisors: Prof. Alessandro Croce and Dr. Stefano Cacciola

Duration: 36 months

Research programme:

1. From high-fidelity to engineering aerodynamic models update (for VAWT and HAWT);
2. Development of new wind turbine and wind farm control technologies and wind tunnel experimental campaign (for VAWT and HAWT);
3. Development of advance methods for WT monitoring and rotor imbalance detections and wind tunnel experimental tests (for VAWT and HAWT).

Planned secondments: CNR-INM (3 months) and Micoperi (3 months)

ESR10: Dynamics and interaction of floating turbines

Work-package: 6 – Dynamics of Wind Turbines

Host: University of Oldenburg (UOLD)

Country: Germany

Supervisors: Prof. Joachim Peinke and Dr. Michael Hölling

Duration: 36 months

Research programme:

1. Experimental investigations of a turbine array of model WT's mimicking floating motions exposed to stochastically realistic wind fields
2. Analysis of resulting turbine's dynamic response
3. Development of a stochastic description of the overall floating WT system

Planned secondments: Politecnico di Milano (3 months) and GICON (3 months)

ESR11: Ability of vertical axis Wind Turbines to be a competitive alternative to horizontal axis Wind Turbines for floating offshore applications

Work-package: 6 – Dynamics of Wind Turbines

Host: CNRS-LEGI (CNRS)

Country: France

Supervisors: Dr. Stéphane Barre and Ass. Prof. Christophe Sicot

Duration: 36 months

Research programme:

1. Have a fine mapping of the wake of the WT
2. Propose a simplified modeling of the wake in order to be able to simulate it in farm configurations
3. Validate the results obtained in wind tunnel by experiments on a floating system

Planned secondments: Ecole Nationale Supérieure de Mécanique et d'Aérotechnique (3 months) and Hydroquest (3 months)



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ESR12: Integrated design and LCOE minimization of horizontal and vertical axis Wind Turbines.

Work-package: 7 - System Design to Reduce LCOE

Host: Politecnico di Milano (POLIMI)

Country: Italy

Supervisors: Prof. Alessandro Croce and Ass. Prof. Carlo R. Riboldi

Duration: 36 months

Research programme:

1. Update of existing rotor/tower design tool with the platform sizing for offshore WTs.
2. Update of existing LCOE mathematical models for design tools and reduction of the LCOE throughout an integrated design
3. Comparison between optimal horizontal axis configurations and vertical axis ones.
4. Guidelines for future WT design

Planned secondments: Norwegian University of Science and Technology (3 months) and EOLFI (3 months)

ESR13: System design to minimize the LCOE of the Floating Offshore Wind

Work-package: 7 - System Design to Reduce LCOE

Host: WAVEC/Offshore Renewables (WAVEC)

Country: Portugal

Supervisors: Dr. Jose Candido and Ass. Prof. Luis Gato

Duration: 36 months

Research programme:

1. Development of techno-economic model to assess FOW projects.
2. Development of comprehensive cost database (for WT, floating platform, moorings, anchors and electric components and sub-systems).
3. Delivery of system design that minimizes LCOE.

Planned secondments: Politecnico di Milano (3 months) and EOLFI (3 months)