NATECH Risk management and Resilience of High-TECH industries and Critical infrastructures across EUrope

JOB DESCRIPTION FOR POSITION DC3

The ***Institute of Steel Construction*** at ***RWTH Aachen University, Germany*** is seeking to appoint a Doctoral Candidate to join the Marie Skłodowska-Curie Doctoral Network '*NATECH Risk management and Resilience of High-TECH industries and Critical infrastructures across EUrope*' (REUNATECH).

ABOUT THE REUNATECH PROJECT

Ageing infrastructures, urbanization, and climate change are intensifying the vulnerability of critical infrastructures (CI), high-tech industries (HTI), and communities to cascading hazards, particularly NaTech (Natural Hazard Triggering Technological) events. REUNATECH is a Horizon Europe Marie Skłodowska-Curie Doctoral Network that aims to educate and train the new generation of Doctoral Candidates (DCs) capable of tackling these challenges through cutting-edge interdisciplinary research and innovation. REUNATECH brings together leading universities, research institutes, and industrial partners across Europe to deliver a world-class doctoral training programme in risk assessment, resilience engineering, and smart technologies. Its scientific vision targets: (1) the development of a holistic multi-hazard risk framework capturing cascading effects across systems and scales; (2) the creation of digital environments utilizing real-time data for dynamic risk evaluation; (3) the advancement of risk-to-resilience methodologies; and (4) the establishment of digital twin-based resilience frameworks for CI, HTI, and urban environments. The network emphasizes innovation through the development of a Virtual Training Environment (VTE) for disaster response simulation, integration of Building Information Modelling (BIM) with Structural Health Monitoring (SHM) using smart sensor networks, and resilience-informed design platforms. Furthermore, REUNATECH promotes transdisciplinary collaboration via multi-stakeholder platforms, bridging academia, industry, and policy. Through its holistic, digital, and resilience-centered approach, REUNATECH supports the European Green Deal, Sendai Framework, and UN Sustainable Development Goals. DCs will benefit from an immersive training structure comprising cross-sectoral secondments, workshops, and summer schools, enhancing their expertise in NaTech risk and resilience and enabling their integration into European and international research and innovation landscapes.

Position Title

DC3: Design of towers to withstand extreme wind scenarios

Research Project

The research project aims to improve the wind resilience of towers and tall structures considered part of critical infrastructure (CI) across Europe. Through experimental aerodynamics via boundary layer wind tunnel testing and statistical modelling using extreme value theory, the project will yield predictive frameworks for structural risk under rare yet damaging wind conditions. The results will support resilience-oriented structural design guidelines for tall infrastructure in both inland and coastal regions, with emphasis on emerging climate-driven extremes.

Objectives

DC3 will develop predictive wind models for extreme wind and cyclone effects on critical infrastructure in Europe, with a particular focus on towers and vertical structures. The research will involve building monthly and annual forecasting models by analysing historical wind records alongside high-resolution COSMO-REA2 reanalysis data. Boundary layer wind tunnel experiments will be conducted to distinguish the structural impact of cyclone-induced winds from synoptic wind conditions. Additionally, extreme value statistical methods will be applied to establish predictive risk models for tower performance under rare wind events, leading to the derivation of probability-based damage thresholds and metrics to support the development of risk-informed design codes and vulnerability maps for critical infrastructure.

This project has received funding from the European Union under grant agreement no. 101225914.
Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or REA. Neither the European Union nor the REA can be held responsible for them.

Location of the workplace

Institute of Steel Construction, Faculty of Civil Engineering, Mies-van-der-Rohe-Str. 1, Aachen, 52074 (https://www.stb.rwth-aachen.de/cms/~iozv/stb/?lidx=1)

PhD enrolment

The selected applicant will be enrolled into the Ph.D. program at the ***Institute of Steel Construction, RWTH Aachen University*** to conduct the planned research activities.

Working time

Fulltime (approx. 40 hours/week)

Duration

The fixed-term employment is possible as it constitutes one of the fixed-term options of the Wissenschaftszeitvertragsgesetz (German Act on Fixed-term Scientific Contracts). This is a full-time position.

Fixed-term (3 years).
Desired start date: 1 April 2026

Salary

The salary is based on the German public service salary scale (TV-L). The position corresponds to a pay grade of EG 13 TV-L.

Secondments

Academic secondment

DC3 will undertake a 3-month research secondment at an academic partner of the REUNATECH project. The planned host institution for this secondment is ***Technical University of Denmark, Kongens Lyngby, Denmark***.

Industrial secondment

DC3 will undertake a 3-month research secondment at an industrial partner of the REUNATECH project. The planned host institution for this secondment is ***Constructure GmbH, Germany.***

JOB REQUIREMENTS

- MSc. degree (or equivalent) in Civil Engineering, Structural Engineering, or related fields.
- Solid background in structural dynamics, wind engineering, and finite element modelling.
- Experience in programming (MATLAB/Python) and/or structural analysis software (e.g., ABAQUS, Ansys, LS-DYNA/DLUBAL) is highly desirable.
- Willingness to participate in experimental testing campaigns and multi-national secondments.
- Familiarity with wind hazard concepts, international codes, and structure response analysis under wind actions is advantageous.
- You are fluent in written and spoken English.

DUTIES AND RESPONSIBILITIES

- Carry out independent research under the guidance of the academic supervisor and in collaboration with other REUNATECH DCs.
- Conduct research on extreme wind forecasting, wind tunnel testing, and risk modelling for towers under cyclone and synoptic wind loads.
- Develop and calibrate statistical and physical models for wind-induced structural responses using extreme value analysis and experimental data integration.
- Prepare scientific publications and present findings in workshops, conferences, and training schools.

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- Actively participate in REUNATECH training activities and contribute to collaborative work across the network.

As the job descriptions cannot be exhaustive, the Researcher may be required to undertake other duties, which are broadly in line with the above duties and responsibilities.

ELIGIBILITY REQUIREMENTS

- The applicant must be a Doctoral Candidate (i.e. not already in possession of a doctoral degree at the date of the recruitment).
- At the time of recruitment, the researcher must not have resided or carried out their main activity (work, studies, etc.) in the country of their recruiting organization for more than 12 months in the three years immediately prior to the recruitment date. Compulsory national service and/or short stays such as holidays are not considered.

SELECTION PROCESS

The selection and recruitment process will be in accordance with the European Charter and Code of Conduct for the Recruitment of Researchers. The recruitment process will be open, transparent, impartial, equitable, and merit based. There will be no overt/covert discrimination based on race, gender, sexual orientation, religion or belief, disability or age. To this end, the following selection criteria will be considered:

- Curriculum
- Academic performance (diplomas, university transcripts, etc.)
- Research and industrial experience
- Awards and fellowships
- Publications and patents
- Research, leadership, and creativity potential
- English knowledge
- Other relevant items based on the specific candidate.

The application deadline is **31st October 2025 23:59 CET**. All applications will be analysed after the application deadline, and the shortlisted candidates will be invited to a teleconference interview. At the end of the selection process, all the applicants will be informed of the outcome of their application by return email.

DISCLAIMER

By applying for this position, the applicants:

- Give their consent to circulate their application and personal data within the members of the consortium.
- Declare to fulfil the eligibility requirements defined by above.
- Agree to spend an academic secondment of 3 months as well as an industrial secondment of another 3 months within the REUNATECH consortium as described.
- Agree that they will comply with the planned PhD enrolment.

HOW TO APPLY

Each application must include the following material:

- Curriculum vitae setting out the educational qualifications as well as any additional scientific achievements and publications. The CV must clearly indicate the applicant's vitae name, surname, gender, date of birth, nationality, country of residence in the last three years).
- Evidence of English proficiency.
- Copy of Bachelor's and Master's certificates.
- Copy of Bachelor's and Master's transcripts.
- Any additional material useful for the assessment of the candidate (e.g., recommendation letters, research project/statement in agreement with the requirements specified in previous text). All material must be included in one compiled pdf file. The file should be named indicating the surname of the applicant and (in

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order of preference) the three preferred positions for which the applicant is applying, i.e. Surname_Position1_Position2_Position3.pdf (*e.g. Surname_DC3_DC7_DC10*).

- Applications will be accepted via email only after **1st September 2025** for data protection reasons. The one compiled pdf file should be sent via mail to the following email address: reunatech@rwth-aachen.de
- Note: Application sent before **1st September 2025** will not be considered.

FURTHER INFORMATION

For more information, please contact the Management Team under reunatech@rwth-aachen.de

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