Doctoral Candidate (DC7) – Assessing the effect of chemical mixtures and variable temperatures on the growth of aquatic plants by the use of mechanistic models

About QTOX

Chemical risk assessment typically involves extrapolation of effects observed *in-vitro* and *in-vivo* under laboratory conditions to predictions of effects at the ecosystem level. This is a very challenging task and current extrapolation models have limitations, notably due to a number of ecological processes that are disregarded by the models and the paucity of data for parameterisation and validation. QTOX (www.qtox.eu) will develop mechanistic knowledge and data-efficient modelling tools to bridge the gap between standard toxicity data (typically acute effects of single chemicals) and ecologically relevant endpoints arising from chronic, time variable exposures to chemical mixtures. The results will be achieved through an interdisciplinary and intersectoral research and training program in which 10 doctoral candidates will characterise the mechanistic processes describing the successive events from exposure to ecosystem-level effects and develop models for extrapolation of adverse effects across levels of biological organization under environmentally realistic conditions. Notably, the effects of chemical mixtures, dynamic exposure conditions, and their interaction with climate change scenarios will be characterised in a series of mesocosm experiments at three sites in central and southern Europe. The mesocosm work will serve as a uniting training element and a rich source of data for testing and validating the modelling framework. QTOX will produce an open access toolbox for quantitative extrapolations in ecotoxicology and a cohort of researchers equipped with the knowledge and skills necessary to implement and develop rigorous approaches for predicting adverse effects of chemicals.

About University of Copenhagen

Driven by intellectual creativity and critical thinking since 1479, researchers and students at the University of Copenhagen have expanded horizons and contributed to moving the world forward. With its 5,000 researchers and 37,500 students, the University boasts an international research and study environment and is highly ranked on the leading ranking lists of the world's best universities. The University offers researchers and students the opportunity to develop their talent and launches ambitious interdisciplinary initiatives to support its strong academic communities. Through research-based teaching – and by involving them in research – students are equipped to address society's challenges and needs.The University of Copenhagen is working towards becoming one of the world's greenest campus areas, leaving as little environmental and climate footprint as possible. The University facilitates cross-organisation collaboration, liaises with the business community and helps students find relevant programmes and projects in the field of sustainability.The University also focuses on gender equality and sees diversity as a strength (https://about.ku.dk/profile-history/).

Tasks description

This DC position will be hosted by the Department of Environmental Science, Section for Environmental Chemistry and Physics at the Environmental Toxicology lab: https://plen.ku.dk/english/research/env_chem_phys/et/

In this position, you will:

- Test the ability of TKTD models for primary producers to predict effects of chemical mixtures of herbicides, applied at variable exposures mimicking those occurring from drift and run-off scenarios under variable temperature regimes.
- Parameterise the TKTD model for *Lemna minor* for herbicides with different toxicological modes of action at different temperatures.
- Validate the models under variable exposure and temperature scenarios of the individual herbicides and their mixtures, mimicking exposure scenarios predicted by chemical fate models such as the FOCUS model.
- Validate the models on the scenarios tested in the mesocosms where also variable irradiance and possible competition with algae and other macrophytes and predation by herbivores may contribute to the observed effects.
- Characterise the predictive ability of the macrophyte model(s) to predict growth under variable chemical and temperature exposure in the lab and under realistic exposure scenarios, where other stress factors are also occurring.
- Write project reports for your local and network supervisors on a regular basis
- Enroll in the Plant and Environmental Science Doctoral School and comply with the doctoral training requirements.
- Participate actively in the QTOX training, dissemination, communication, and valorization program.
- Prepare a doctoral thesis, and publish scientific articles related to the research project.

Furthermore, the selected candidate will take part in the following planned secondments:

- A two-week internship at University of Valencia with Prof. Andreu Rico to help with monitoring and measuring in the microcosm facility.
- A two-week stay at UFZ, Leibzig with Professor Beate Escher to learn how to extrapolate results from cell-based assays to primary producers
- Six-month stay at Bayer, Mohnheim, within the effect-model group of Thomas Preuss to parameterise, adjust, develop and implement TKTD models for primary producers on *Lemna* or *Myriophyllum.*

Profile & requirements

- Applicants must hold a master's degree or equivalent in the field of biology or environmental toxicology, ideally with insights in plant physiology. Knowledge of statistical and mechanistic modelling is an advantage.
- Applicants must have a solid knowledge of plant biology and physiological processes.
- Transcripts of the master's degree must be available by the date of the recruitment.
- Applicants should have obtained outstanding academic results.
- Applicants must have an ability to understand and express themselves in both written and spoken English to a level that is sufficiently high for them to derive the full benefit from the network training.
- Applicants must be eligible to enrol on a PhD programme at the host institution (or at a designated university, in case the host institution is a non-academic organisation).
- Applicants must have the necessary academic skills and background to make the success of a doctoral degree.
- Applicants can be of any nationality but must comply with the Horizon Europe MSCA eligibility criteria:
  - **HORIZON MSCA Mobility Rule**: researchers must not have resided or carried out their main activity (work, studies, etc.) in the country of the host organisation for more than 12 months in the 3 years immediately before the recruitment date. Compulsory national service, short stays such as holidays and time spent by the researcher as part of a procedure for obtaining refugee status under the Geneva Convention are not taken into account.
  - **HORIZON MSCA eligibility criteria**: supported researchers must be doctoral candidates, i.e. not already in possession of a PhD degree at the date of the recruitment. Researchers who have successfully defended their doctoral thesis but who have not yet formally been awarded the doctoral degree will not be considered eligible.

Benefits

- The selected candidate will be employed by the host organisation for **36 months.**
- **The start date will be as of December 1st, 2023**
- Doctoral candidates are offered a competitive remuneration based on the MSCA allowances in line with the MSCA WP 2021-2022. Salary, pension, and terms of employment are in accordance with the agreement between the Ministry of Finance and The Danish Confederation of Professional Associations on Academics in the State. Depending on seniority, the monthly salary begins at around 28,300 DKK/roughly 3,770 EUR (taxable) plus pension (April 2022 level). The salary is added a mobility allowance (600 EUR per month) and (if eligible) a family allowance (660 EUR per month). Moreover, funding is available for technical and personal skills training and participation in international research events.
- The opportunity to be part of an MSCA Doctoral Network: the selected candidate will benefit from the designed training programme offered by the host organisation and the QTOX consortium.
- The selected candidate will participate in international secondments to other organisations within the QTOX network.

Please, find additional information in the Horizon Europe Work Programme MSCA from p.75 onwards.

Application

- Interested candidates are invited to apply for this position by submitting the application form: https://employment.ku.dk/phd/?show=159419
- The closing date for applications is **August 16th, 2023**.
- The selection committee will review all the applications upon the application deadline.
- The recruitment process of QTOX is in line with the principles set out in the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers.
- Ukrainian researchers can benefit from the Science4Refugees initiative without the need of holding refugee status.

Additional information

For additional information about the research project and this individual position, please contact:

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