ESR Project 9
Combining forecasting tools and adaptive monitoring strategies for fast reaction plans for aquatic ecosystems at risk

Host institution: Helmholtz Centre for Environmental Research GmbH – UFZ, Magdeburg, Germany.

Supervisor: Dr. Karsten Rinke

Co-Supervisor: Prof. Dr. Dietrich Borchardt, Dresden University of Technology, Dresden, Germany. Dr. Dennis Trolle, Aarhus University, Silkeborg, Denmark

The ESR will be included in the HIGRADE graduate school at UFZ as well as enrolled in the 3-year PhD program of Dresden University of Technology, Dresden, Germany.

Project description
Highly valuable surface waters like drinking water reservoirs are carefully managed but the underlying management strategies and decision rules are often just based on engineering heuristics and long-term experience. The inclusion of state-of-the-art forecasting is required in the future in the face of climate change and increasing frequency of extreme events, but not easy to achieve because of two reasons: (i) forecasts come with uncertainty, and (ii) in case of negative developments forecasted an appropriate management response must be quickly identified. The aim of this ESR is develop and test new ways to link forecasting products with water management on the basis of real-world applications together with our Partner Ruhrverband. The specific objectives are (1) use state-of-the-art reservoir models to translate climate projections into relevant information products for water quantity & quality, (2) compensate forecasting uncertainties by adaptive monitoring schemes that improve the information basis for science-based decisions, (3) delineate reaction plans for potential emergency situations that allow a proactive and very fast decision chain. Ultimately, this ESR will give efficient, pragmatic, and tailored management instruments at the hand of water managers.

Expected Results:
1. Reservoir model simulating water quality dynamics for selected reservoir systems and long-term forecast for trends in water quantity & quality.
2. Adaptive water quality monitoring strategies to allow efficient observations during critical situations and to support management during critical situations with high uncertainties.
3. Fast reaction schemes as adaptation strategy against critical water quality deterioration (e.g. anoxia) by reservoir operation, lake restoration measures or ecosystem engineering

**Host laboratory**

The Helmholtz Centre for Environmental Research (UFZ) with its 1,100 employees has gained an excellent reputation as an international competence centre for environmental sciences. We are part of the largest scientific organisation in Germany, the Helmholtz association. Our mission: Our research seeks to find a balance between social development and the long-term protection of our natural resources. We offer:

- Top level interdisciplinary research at a research centre which enjoys an excellent reputation within Germany as well as internationally
- Excellent technical facilities
- Work in inter-disciplinary and multinational teams
- Excellent links to national and international research networks
- Support and optimal training courses by our graduate school (HIGRADE) and Helmholtz International Research School TRACER

**Secondments**

This project is carried out in strong collaboration with the following groups, and visits to their laboratories is expected during the project. A willingness to travel and spend time abroad is therefore essential:

- Dr. Dennis Trolle, Aarhus University, Silkeborg, Denmark, 3 months
- Dr. Ian Jones, University of Stirling, Stirling, Scotland, UK, 3 months
Specific requirements

- The candidate must hold a Master's degree from or equivalent to a Master degree awarded in the European Higher Education Area.
- Master's degree must be in Aquatic Ecology, Environmental Sciences, Biology, or similar.
- Technical Skills required: Good programming skills in typical scientific programming languages (e.g., Python, R, etc.).
- Basic knowledge about ecological processes affecting water quality in lakes and reservoirs. Experience in field work is advantageous. Willingness to face complex modelling problems.
- Proficiency in the English language is required, as well as good communication skills, both oral and written. Applicants from non-Anglophone countries or for those that have not completed their higher education with English as the language of instruction must include an English certificate in the application package (e.g. IELTS, TOEFL, Cambridge English).

HOW TO APPLY

Download the application form from this link: [http://u.p.c.d/LP8ctalK](http://u.p.c.d/LP8ctalK) and fill it. The application form, together with an official copy of degree(s) (if applicable, an official English translation), course transcripts (if applicable, an official English translation), and English proficiency test results cited in the form, must be sent as a SINGLE pdf in a SINGLE email to inventWater-jobs@icra.cat.

Enquiries

For additional information on this project, please contact Dr. Karsten Rinke (Karsten.rinke@ufz.de)

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 956623