



Euro-FLOW: a European training and research network for environmental FLOW management in river basins. A MARIE SKŁODOWSKA-CURIE ACTIONS Innovative Training Network (ITN) funded under H2020-MSCA-ITN-2017

ESR 2: Linking the ecological effects of e-flows with sediment regimes in rivers

3 year fixed- term PhD position.

Host institute: Eawag (Swiss Federal Institute of Aquatic Science and Technology)

Supervisors: Dr Chris Robinson (Eawag), Dr Guido Zolezzi (University of Trento), Dr Rudi Haller (Swiss National Park)

Project Description:

Environmental high flows are being implemented globally. Understanding the effects of e-flows on stream ecology is paramount to developing and implementing effective e-flow programs. This PhD aims to develop an understanding of flow-sediment-physico chemistry interactions with ecological processes in rivers subject to e-flows. The river Spöl in the Swiss National Park will be the case study system with over 30 e-flows being implemented in the last 18 years. This dataset along with other available datasets around the world will be used to quantify how major ecosystem processes respond to river flow modifications, i.e., environmental high flows. The study will examine the interaction of e-flows with sediment dynamics in affected rivers and their influence on river functional properties (e.g., ecosystem metabolism, primary production, benthic processes). System dynamics will also be assessed using current mapping techniques (drone technology, UAVs with ADP) and GIS software based analysis.

Objectives:

- (1) Mapping of flow and sediment dynamics in the upper and lower Spöl using high resolution geomorphological techniques (e.g. UAVs with digital image acquisition and thermal imaging, laser scanning, structure from motion).
- (2) Experimentation with environmental flows in BACI designs to observe impacts of flow manipulations on multiple ecosystem properties.
- (3) Link sediment dynamics with ecosystem functional properties (metabolism).

Expected outcomes:

- 1) New understanding of geomorphic and sediment response to flood flows in hydropower regulated rivers.
- (2) Driving role of abiotic habitat in ecosystem functional dynamics (e.g. sediment metabolism).
- (3) Knowledge of links between flows, habitat and invertebrate production

Secondments:

Swiss National Park, total of 7 months over years 1-3 for planning and implementation of experiments, data collection and dissemination.

Engadine Kraftwerk (hydropower company), 2 months to plan experimentation and implement flow trials.

Eligibility Criteria:

- * Applicants must not have resided or carried out their main activity in Switzerland for more than 12 months in the 3 years immediately prior to their recruitment¹.
- * Applicants must hold a first degree and/or Masters degree in degree in stream ecology or ecohydrology and be highly motivated to work in an international team including frequent travel between the Euro-FLOW beneficiaries and project partners.
- * Applicants must not have more than 4 years (full time equivalent) research experience at the date of their recruitment¹. This is counted from the date they obtain the degree that would let them start work on a doctorate. They must not have been awarded a doctoral degree.
- * Experience of field methods in stream/river ecology, GIS applications, data analysis, ecohydrology, ecosystem function are also required
- * Applicants must have excellent written and spoken English skills.

Other requirements:

Eawag, the Swiss Federal Institute of Aquatic Science and Technology, is an internationally networked aquatic research institute within the ETH Domain (Swiss Federal Institutes of Technology). Eawag conducts research, education and expert consulting to achieve the dual goals of meeting direct human needs for water and maintaining the function and integrity of aquatic ecosystems. Eawag offers a unique research and working environment and is committed to promoting equal opportunities for women and men and to support the compatibility of family and work (<http://www.eawag.ch/en/aboutus/working/employment/>).

¹Date of recruitment is defined as the first day of the applicant's employment i.e. the start date indicated in their employment contract.

EuroFLOW Information:

The regulation of river flows is one of the biggest stressors affecting river ecosystems across the world. In many countries, major legislative efforts are therefore underpinning the development of new approaches to mitigate the impacts of river flow regulation. These approaches are based on optimising the management of river flows to maintain services to humans (e.g. water supply, hydropower) whilst protecting and/or rejuvenating the aquatic environment with water of adequate quantity and quality in space and time (i.e. environmental flows). In this context, a field of applied aquatic science has developed to generate the evidence base for identifying the best ways to manage the quantity, quality and patterns of environmental flows to sustain river ecosystems, Euro-FLOW will train a new cohort of researchers to be future leaders in this field. Within Euro-FLOW, 15 early-stage researchers will develop new theoretical and empirical insights via ground-breaking experimental manipulations, large-scale field surveys and development of cutting-edge models to inform the management of water flows and aquatic ecosystems in river basins. Future research leaders will be developed through advanced training in: (i) river ecosystem science in relation to environmental flows; (ii) transferable scientific and life skills; (iii) collaborative working with international and inter-sectoral networking. Euro-FLOW will produce scientists with the ability to span subject boundaries, e.g. hydrology, geomorphology, geochemistry, ecology, microbiology, modelling and environmental management. The strong involvement of the non-academic sector will provide the PhD students with a holistic perspective on career opportunities.

Application details

The application should contain a cover letter that states your motivation, a CV and supporting documents about your education and studies (i.e. transcripts, certificates) and professional experience where applicable and two references. If you are applying for more than one EuroFLOW position, please rank your preferred projects.

For more information about this position, please contact Dr Chris Robinson Christopher.Robinson@eawag.ch. To apply, visit www.eawag.ch.

Closing date: 30 November 2017

Post start date: February 2018