



Interdisciplinary connectivity: Understanding and managing complex systems using connectivity science

Job title: Doctoral Research Fellowship (PhD)

Title: Hotspots and hot moments: the role of connectivity and resilience science for managing human-impacted catchment systems

Location: University of Vienna

https://sites.durham.ac.uk/iconn-network/esr_positions/esr-10/

Duration: 3 years

Closing date: 31st May 2020

Start: July 1st 2020 (COVID-related remote work possible)

Contact: ronald.poeppel@univie.ac.at

Gross Living Allowance: 41 800 per year plus mobility and family allowance. Salary is subject to deduction of national taxes and employer's costs.

PhD Research project

This ESR will use and combine different aspects of connectivity and resilience science to identify geomorphic hotspots and hot moments in human-impacted catchment systems, and will derive and test management options.

Objectives: (1) To identify hotspots and hot moments of hydro-geomorphic connectivity in human-impacted catchment systems by reviewing and testing/combining existing connectivity science and resilience approaches in selected medium-sized agricultural catchments; (2) To develop a conceptual and methodological framework and tools based on the findings of (1); (3) To test the this framework/tools in selected catchment systems and to derive general implications for connectivity and resilience science and its application in catchment management (e.g. field measurements incl. tracer experiments; i.e. via collecting new data in the course of the project and using already existing datasets), modelling, connectivity indices.

Expected Results: (1) Critical review of existing connectivity and resilience approaches (incl. social-ecological approaches) and their suitability to identification of hotspots and hot moments in human-impacted catchment systems; (2) Development of a conceptual and methodological framework and tools that (3a) provide a better understanding of the behaviour of human-impacted catchment systems and (3b) serve as a basis for holistic and adaptive catchment management with (3c) tested applications across selected catchments.

H2020 Marie Curie Innovative Training Network



Applying for this position

To register your interest in applying for this position please, and to ask for any further information, please contact ronald.poeppel@univie.ac.at. To apply for this position, we require a copy of your CV, degree transcripts, motivation letter and the names of 2 referees. Please indicate in your motivation letter if you are interested in being considered for any of the other PhD positions in our network (and that you are happy for your data to be shared with the respective institution; see <http://iconn.network/>).

Context

This research fellowship programme (PhD) will be carried out within the context of the i-CONN network, a Marie Skłodowska-Curie Actions– *Innovative Training Network* (ITN) – project funded by the European Commission, under their H2020 program. Through the project activities, the Fellows/PhD students will have the opportunity to come in contact and collaborate with some of the best European research groups. English is the official language of the i-CONN project. Additional details are available in “*Further particulars*”.

Responsibilities

1. Perform high quality research in the bespoke research project under the guidance of the supervisory team.
2. Meet the members of the supervisory team on a regular basis.
3. Participate in the activities of the Network as specified in the Grant Agreement and/or required by the node coordinator, including secondments in other network nodes and taking part in the network meetings and in the training activities.
4. Write up the results of the research activity and present research papers and publications at meetings and conferences, as advised by the supervisors, and contribute to the overall goals of the network.
5. Widen the personal knowledge in the research area and undertake complementary training.
6. Keep records of the activities, such as research, training, secondments, visits, leave of absence, etc.

Person Specification

The successful candidates *must satisfy the eligibility criteria* (see below) and have:

1. An excellent academic record in a quantitative discipline, including, but not restricted to: Geography (Physical Geography), Ecology, Environmental Science
2. A keen interest in pursuing research in the development of Connectivity Science.
3. The ability to work independently and as a member of a research team.
4. Excellent interpersonal and communication skills.
5. A good command of English language, with excellent oral and written skills.
6. Good background in geomorphology, hydrology, soil erosion science, GIS.
7. Willingness to perform field work.



* Note that female candidates are particularly encouraged to apply.

Eligibility Criteria

To satisfy the eligibility requirements set for an Early Stage Researcher funded by Marie Skłodowska-Curie and you must be eligible to be appointed as an Early Stage Researcher:

1. Should have — at the date of recruitment — less than 4 years of a research career, and not have a doctoral degree. The 4 years are measured from the date when they obtained the degree which would formally entitle them to embark on a PhD, either in the country where the degree was obtained or in the country where the PhD is provided.
2. Trans-national mobility: The applicant — at the date of recruitment— should not have resided in the country where the research training takes place for more than 12 months in the 3 years immediately prior to recruitment, and not have carried out their main activity (work, studies, etc.) in that country. For refugees under the Geneva Convention (1951 Refugee Convention and the 1967 Protocol), the refugee procedure (i.e. before refugee status is conferred) will not be counted as ‘period of residence/activity in the country of the beneficiary’.
3. Satisfy the eligibility requirements to enroll on a PhD degree. This includes acceptable English language requirements if English is not your first language.

Further particulars

Allowance eligibility depends on the personal circumstances of the fellow:

Marie Skłodowska-Curie PhDs are paid a competitive gross salary of 3,270 € per month, adjusted for their host country, a Mobility Allowance of 600 € per month and, for researchers who have a family, a Family Allowance of 500 € per month. All amounts are subject to employers and employees deductions and taxes.

Family is defined as persons linked to the researcher by (i) marriage, or (ii) a relationship with equivalent status to a marriage recognised by the national legislation of the country of the beneficiary or of nationality of the researcher, or (iii) dependent children who are actually being maintained by the researcher; family status is determined at recruitment and does not evolve.

The i-CONN project

In recent years, parallel developments in disciplines as disparate as Ecology, Geomorphology, Neuroscience, Social Science and Systems Biology have focused on what is termed connectivity. In its simplest form, connectivity is a description of the level of connectedness within a system, and can be quantified in terms of *structural connectivity* (SC) which describes how elements within a system are physically or spatially connected, and *functional connectivity* (FC) which describes how the strength/presence of these connections varies over space and time.



In all of these disciplines, connectivity has been a transformative concept in understanding and describing what are considered to be complex systems, allowing unprecedented analysis of how such systems behave. Connectivity research is more than a way of grouping elements in a system together

based on their SC, but is driven by the notion that a structural network will systematically shape the dynamical processes (and hence the function) within this system. As a consequence, relationships between structural and functional connectivities need to be evaluated and studied on all topological scales. Whilst conceptualisations and approaches to quantify connectivity have evolved largely within their disciplinary boundaries, similarities in the concept and its application among disciplines are also evident.

i-CONN will exploit synergies among different conceptualisations and applications of connectivity. For example, we will evaluate statistical approaches and mathematical theories that have arisen across a range of disciplines in order that we might develop generic connectivity tools to understand better the characteristics of complex systems. i-CONN will provide interdisciplinary training integrating knowledge and methods from different disciplines and stakeholders from the public, private and NGO sectors, using a synthesis of approaches that will lead to transdisciplinarity, whereby a unity of intellectual frameworks will be created beyond the disciplinary perspectives.

i-CONN brings together leading academic and non-academic partners across Europe from those disciplines that have led advances in Connectivity Science with the goal of training a new generation of experts in the application of connectivity concepts to advance both research and practical understanding to address this need. i-CONN will train ESRs to become experts with a unique skill set that includes interdisciplinary scientific techniques and applications of Connectivity Science, to address real-world challenges through a bespoke series of specialized training courses and secondments.

The i-CONN network

Coordinator: Durham University, Durham UK.

i-CONN Beneficiaries

AAI Scientific Cultural Services Ltd. (Cyprus), Aix-Marseille University (France), BOKU (Austria), Durham University (UK), European University Cyprus (Cyprus), Jacobs University (Germany), Masaryk University (Czech Republic), MODUL University Vienna (Austria), Environment Agency (UK), University of Vienna (Austria).

i-CONN partners

IIASA (Austria), The University of Sheffield (UK), University of Groningen (Netherlands)

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Data protection

The i-CONN Network is committed to respecting the confidentiality of the information provided by the applicant: personal data collected for the present proceeding will be processed for the sole purposes connected with and instrumental to the selection procedure and the eventual management of the job contact, in conformity with the current provisions. The person responsible for the Personal Data Handling is the principal investigator at the host institution.