

Jacobs University is a private, state-recognized, English-language research university in Bremen. It offers bachelor, master and PhD programs in the focus areas health, mobility and diversity and is involved in the professional development of specialists and managers and in the transfer of knowledge. The guiding principles include the highest standards in research and teaching, interculturality and systematic cross-disciplinary cooperation. The aim is to optimally prepare talents from all over the world for responsible tasks in a globalized world of work. More than 1,500 people from over 120 nations currently live and learn on campus.

The department „Life Sciences & Chemistry” invites interested candidates to apply for the next possible date for a

PhD Student Position for the topic “minimal models of dynamics on networks to study generic SC/FC relationships” (m/f/d)

(Full-time, **Deadline extended: New start date May 2020!**, limited for 3 years)

Job ID 19-77

PhD Research project:

Relationships between structural connectivity (SC) and functional connectivity (FC), i.e., between network architecture and dynamics are a cornerstone of connectivity research. Drawing from input from all disciplines involved in the ITN, this computational project will employ minimal models of various processes on networks (propagating excitations, diffusion, material flow, avalanches, etc.) to compile a list of generic relationships between structural connectivity and functional connectivity, which (1) can serve as guidelines for the empirical work in the other process, and (2) will allow us to arrive at a firm theoretical foundation of SC/FC relationships.

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”.

Your research responsibilities:

- Perform high quality research in the bespoke research project under the guidance of the supervisory team.
- Meet the members of the supervisory team on a regular basis.
- 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.
- 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.
- Widen the personal knowledge in the research area and undertake complementary training.
- Keep records of the activities, such as research, training, secondments, visits, leave of absence, etc

Your qualifications:

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

- An excellent academic record in a quantitative discipline, including, but not restricted to: Computational Systems Biology, Bioinformatics, Statistical Physics, Data Science, Applied Mathematics, Computer Science or related areas.
- A keen interest in pursuing research in the development of Connectivity Science.
- The ability to work independently and as a member of a research team.
- Excellent interpersonal and communication skills.
- Strong programming skills, e.g., in Python or R.
- A good command of English language, with excellent oral and written skills.

Any or combination of the following will be a clear advantage:

- A demonstrable ability or potential to produce research published in peer-reviewed journals.
- A good strategic fit with existing research expertise in the host institution and the i-CONN network
- Knowledge of, or willingness to learn, the language of the host institution (German)

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:

- 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.
- 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'.
- Satisfy the eligibility requirements to enrol on a PhD degree. This includes acceptable English language requirements if English is not your first language.

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)

Gross Living Allowance:

38.000 EUR per year plus mobility allowance. Salary is subject to deduction of national taxes and employer's costs.

Your application:

Please send your application stating your availability and your salary expectations as a pdf document to job-application@jacobs-university.de

Successful candidates should be ideally available to begin in May 2020. The offered position has an initial duration of three years.

Applicants should include a copy of your CV, degree transcripts, motivation letter and the names of two 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).

For further questions, please contact Prof. Dr. Marc-Thorsten Hütt via email m.huett@jacobs-university.de or phone +49 421 200-4334.

The review of applications will begin immediately and will continue until the position is filled.

Jacobs University is an equal opportunity employer.