TECHNISCHE UNIVERSITÄT DRESDEN

CAWR
Center for Advanced Water Research

Call for Participants: TU Dresden International Synthesis Summerschool 2017: "Network functional dynamics – Technological, Human & Ecological Dimensions"

Networks are basic structures underlying many natural, social and engineered systems in our environment. Technical networks are e.g. streets, power grids, communication, sewer and water supply networks, while natural networks comprise systems as diverse as river networks, pore networks in the unsaturated zone and aquifers, food webs and atmospheric transport structures. Network structures are also found in all kinds of societal settings, finance and economics, management, policy and data processing. Internet-based social networks are a relatively new and exciting object of network research. Even though network theory has been developed on a very basic level, process understanding of complex real-world networks and their functional dynamics, e.g. how networks evolve and age, react to external disturbances and recover, has not been sufficiently investigated to date.

The International Synthesis Summerschool will be organized in a format unlike those of most classical Summerschools. The Synthesis format encompasses only a few, strategic impulse lectures on network functional dynamics in different scientific fields and condensed seminar-style modules on basics of methods and tools for network analysis, modelling and simulation, and leaves plenty of time for group work, where participants jointly develop and test new approaches, closely supported by senior scientists and peer-to-peer mentors. This format is an exciting new approach for educating future scholars.

The background of the Summerschool organizing team is in water-related disciplines, consequently, a certain emphasis will be put on network aspects in water research. The Summerschool will focus on network functional dynamics. Complex networks in our environment are subject to natural and anthropogenic changes and fluctuations, and network functions dynamically change with these framework conditions. Functional dynamics of natural, engineered and socio-economic complex networks will be analyzed in different settings, in order to understand driving forces for changes in function, and to identify analogies in functional dynamics

between different network types and settings. Ultimately, the goal of network design should be optimization in terms of resilience of network functions. We will focus on the following categories of network functional dynamics:

- Fluxes and Responses (e.g. “Carrying capacity” vs. “Surcharge”)
- Interdependencies (Interconnectedness and mutual interference of networks)
- Disruptions and Recovery (e.g. impact of extreme events; cascading failures)
- Design and Management: Optimization for Resilience.

Do you work with complex networks of any kind in your PhD or PostDoc research project? Are you excited to strengthen your interdisciplinary thinking and try out new formats of collaborative scientific work? Would you like to gain new perspectives and learn to apply advanced tools and methods for network analysis? Are you interested in getting to know and utilizing approaches from other disciplines and keen on thinking outside the box? And, last but not least, do you want to build and intensify international cooperation with other excellent young network researchers from around the globe? Then the International Synthesis Summerschool is made for you!

Target disciplines: Natural Sciences (Environmental, Ecological, Hydro, Life, Geological/Earth Sciences…), Engineering Sciences (Civil and Environmental Engineering, Energy, Traffic…), Social Sciences, Business and Economics, Management, Political Sciences…

Time and Location: The TU Dresden Summer School “Network functional dynamics – Technological, Human & Ecological Dimensions” will take place from August 4–18, 2017 at the TU Dresden.

Participants: The invitation is aimed towards early stage researchers, primarily doctoral candidates and PostDocs, working with theory, analysis, modelling and simulation of natural and anthropogenic networks in any scientific field. Students enrolled in BSc and MSc programs can unfortunately not be considered. A balanced mixture of participants from natural, engineering, social and economic sciences is intended; this will be considered in the selection.

Application documents: If you are interested in being part of the Synthesis Summerschool 2017 in Dresden, please provide a Curriculum Vitae, containing also a list of publications, an outline of your PhD thesis or current research projects (2 pages maximum), a letter of motivation (max. 1 page), and a letter of recommendation by a senior scientist of your own choice.

Participation information: The Synthesis Summerschool will be held in English. All participants will be required to provide a research poster that they will present during the workshop. Participation is free of charge; lunch and coffee breaks will be provided. Travel costs will be partly reimbursed according to the guidelines of the Deutsche Forschungsgemeinschaft (DFG). Accommodation will be organized and fully funded for all participants.

Website: Please visit our website at www.networks.cawr.de for more information and updates on the program, keynote speakers, mentors…!

Please submit your complete application documents until **April 30th, 2017** to networks@msx.tu-dresden.de. Any further inquiries may be sent to the same address.

The International Synthesis Summerschool is part of TU Dresden’s Institutional Strategy. TU Dresden’s Institutional Strategy is funded by the Excellence Initiative of the German Federal and State Governments.