

## PhD Position (4 years)

### **CLIMATE CHANGE AND REGIME SHIFTS IN FLOOD-PRONE URBAN AREAS: AN AGENT-BASED APPROACH**

#### **Background:**

Coupled socio-ecological systems (SES) are known to experience regime shifts. By this we mean fast and usually irreversible changes in systems, like the ones that we observe when ecosystems collapse due to overexploitation, or when economy cannot recover after natural disasters (floods, droughts, etc.), or when societies undergo dramatic changes as in resource-driven conflicts. The topic is of significant interest in the international arena since understanding of tipping points is crucial for many challenges our society faces. Yet, often behavior of socio-economic actors in SES models is overly simplified with preferences, attitudes and opinions of actors assumed to be static. Changes in individual and public opinions, which may drive behavioral change, cumulatively increasing the chances of a regime shift in coupled SES, are understudied.

This project aims to study regime shifts in flood-prone urban areas under various climate-change scenarios. Climate change intensifies the frequency and severity of catastrophic floods and hurricanes, and calls for adaptation. At the same time, people rarely perceive hazard probabilities objectively. Subjective opinions about risks and the way they diffuse in the society may amplify an effect of a disaster after an event as well as may intensify the vanishing effect of this information about risks over time. As a consequence, climate-driven hazard (objective) probabilities and diffusion of opinions about potential future risks (subjective risk perceptions) are expected to result in considerable changes in economic choices. This could significantly impact flood risk management policies and alter resilience of societies adapting to the growing threats.

The University of Twente focuses on high-quality research, which combines innovative social sciences and technology, offering solutions to grand societal challenges. This PhD trajectory falls under a broader research line that uses computer science techniques to consolidate state-of-the-art findings from behavioral sciences to support design of policies. The focus on studying regime shifts in society and economy is highly relevant on national and international agenda. This research topic with applications to safety and smart and sustainable cities aims at actual societal impact, and has already proved successful in attracting prestigious NWO and EU projects. Collaboration with international partners as well as with policy-oriented research institutes is at the core of our agenda.

#### **Job description**

We are seeking a PhD student (4 year terms) to explore the emergence of critical transitions in SES in flood-prone urban areas driven by micro-level changes in individual economic behavior and social interactions including diffusion of opinions about risks (subjective risk perceptions). The PhD student will develop an economic agent-based model (ABM) to explore the trends in households' risk perceptions,

property prices and the emergence of regime shifts in flood-prone housing markets modeled as complex adaptive systems. Rich GIS-based data on disaster occurrence, reaction of the housing market, and aggregated changes in risk premiums over two decades for North Carolina is available and can be explored in collaboration with the Center for Natural Hazards Research, East Carolina University, USA (<http://www.ecu.edu/hazards/>).

## Your profile

A candidate should ideally have:

- a master's degree in Economics, Mathematics, Computer Science or Computational Sociology;
- strong quantitative skills and ability to program in Netlogo or an object-oriented language;
- knowledge of statistics and capacity to perform data analysis, including working knowledge of R;
- fluent written and spoken English;
- independent research and publication skills;
- ability to work with GIS data is desirable;
- knowledge in the field of climate change adaptation or urban economics or social networks is an advantage.

## Our offer

As a PhD candidate you will be appointed in a full-time position for a period of four years, at the end of which you are expected to have completed a PhD thesis, and other academic publications. The gross monthly salary for a PhD increases from € 2.083,- in the first year to € 2.664,- in the final year (in accordance with the Collective Labour Agreement for Dutch Universities). In addition, the University of Twente offers additional attractive employment conditions.

**Starting date:** by arrangement at the start of 2015. Position will remain open till filled. First reviews and interviews will start on **December 1<sup>st</sup> 2014**.

## Information

For more information on this position please contact

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## Application

To apply for this position, please fill in the online application form (<http://ssl1.peoplexs.com/Peoplexs22/CandidatesPortalNoLogin/Vacancy.cfm?PortalID=2537&VacatureID=695270&BedrijfID=55479701>) including your cover letter, resume and list of publications (if applicable) before **December 1st, 2014**. Or go directly to [www.utwente.nl/vacatures/](http://www.utwente.nl/vacatures/) and select the current position from the list.

## The Organisation

**The University of Twente.** We stand for science and technology, high tech, human touch, education and research that matter. New technology which drives change, innovation and progress in society. The University of Twente is the only campus university in the Netherlands; divided over five faculties we provide more than fifty educational programs. The University of Twente has a strong focus on personal development and talented researchers are given scope for carrying out pioneering research. The Faculty of Behavioural, Management and Social Sciences strives to hold a leading position in their fields in relation to the science and technology research programs of the University of Twente. In all these fields, the faculty provides bachelor, master and professional development programs.

## Faculty of Behavioural, Management and Social sciences.

The Faculty of Behavioural, Management and Social sciences (BMS) strives to play a pivotal role in understanding, co-engineering and evaluating innovation in society. Innovation is driven by advances in technology. Through 'social engineering' these technological advances are embedded in society befitting human needs and behaviour, within proper public and private management and business structures. For this the faculty of BMS upholds high quality disciplinary knowledge in psychology, business administration, public administration, communication science, philosophy, educational science and health sciences. All with a focus on the challenges in society. Research is strongly connected to our Institutes on Governance ([IGS](#)), ICT ([CTIT](#)), Health ([MIRA](#)) and Nanotechnology ([MESA+](#)).