

System dynamics modelling of linked circular economies



Coventry University (CU) is inviting applications from suitably-qualified graduates for a fully funded PhD studentship.

Funding	Bursary plus tuition fees (UK/EU)
Start Date	May 2019
Duration of Study	Full Time – between three and three and a half years fixed term
Application Deadline	7 th March 2019

Background

In many urban areas, pathways of essential resources such as food, water and energy are subject to multiple inefficiencies. Circular economies try to minimize wastages by reusing or recycling the waste products within each resource stream. Explicitly linking these circular economies will enable us to exploit synergies between these cycles, thereby further reducing waste in the urban food-energy-water nexus.

Aim and Methodology

This PhD aims to analyse the potential for waste reduction in urban food-energy-water nexus by explicitly linking the circular economies. The PhD focuses on System Dynamics Modelling (SDM) methodology of food, energy and water cycles in urban or urbanising environments. Innovatively, these cycles will be modelled as an integrated system, explicitly recognizing that they do not operate in isolation and that feedbacks can cause non-linearly propagating effects.

SDM can:

- visualize the structure of both current and alternative resource pathways;
- suggest improvements to reduce overall waste in the nexus;
- illustrate how intended improvements affect the resource fluxes in other cycles; and
- identify possible bottlenecks, thresholds and other potential problems under different management or usage scenarios.

Four SDMs will be developed for up to four case study cities (metropolitan areas), located in the UK, the Netherlands, Brazil and South Africa.

This PhD project is linked to a broader research project (Waste FEW-ULL), funded by ESRC, which aims to map, model and reduce waste in the urban food-energy-water nexus in the four countries and cities with additional partners from the USA and Norway. There are further research activities (incl. PhDs) in this project which co-operate in data sourcing and sharing.

About the Research Centre

Coventry University has been the UK's top modern university for seven consecutive years (Guardian University Guide 2013-2019) and holds a number of other prestigious accolades. Established in 2014 through substantial university investment, the **Centre for Agroecology, Water & Resilience (CAWR)** is rapidly building a global reputation for transdisciplinary research into processes of resilience in social-ecological systems. Among its key lines of research is work focusing on modelling of water and food systems, aided by high performance computing facilities.

Training and Development

The successful candidate will receive comprehensive research training including technical, personal and professional skills.

All researchers at Coventry University (from PhD to Professor) are part of the Doctoral College and Centre for Research Capability and Development, which provides support with high-quality training and career development activities.

Entry criteria for applicants to PHD

- A minimum of a 2:1 first degree in a relevant discipline/subject area with a minimum 60% mark in the project element or equivalent with a minimum 60% overall module average.
PLUS
the potential to engage in innovative research and to complete the PhD within 3.5 years
- a minimum of English language proficiency (IELTS overall minimum score of 7.0 with a minimum of 6.5 in each component)

For further details see: <https://www.coventry.ac.uk/research/research-students/making-an-application/>

Essential criteria

- a proven ability to undertake independent study
- excellent written and spoken language skills
- sound knowledge of food, water and energy resource cycles

Desirable criteria

- MSc in geography, environmental sciences or similar
- experience with system dynamics modelling
- an understanding of standard statistical techniques
- basic-intermediate programming skills

How to Apply

To apply on line please visit: <https://pgrplus.coventry.ac.uk/>

All applications require full supporting documentation, a covering letter, plus a 2000-word supporting statement showing how the applicant's expertise and interests are relevant to the project.

To find out more about the project please contact Dr. Marco Van De Wiel (marco.vandewiel@coventry.ac.uk)