



CALL FOR APPLICATIONS FOR DOCTORAL STUDENTSHIPS IN THE AREAS OF SUSTAINABLE BIOENERGY, WASTE MANAGEMENT AND AIR POLLUTION CONTROL

Background

The University of Rwanda (UR) with its partnering Swedish universities offer the opportunity to complete 5 doctoral degrees (PhDs) in sustainable bioenergy, waste management and air pollution control areas. The University of Rwanda is partnering with three Swedish universities (KTH Royal Institute of Technology, Umeå University and Swedish University of Agricultural Sciences), in a new five-year Research Training Program (2019-2024) funded by the Swedish International Development Agency (SIDA) aiming to establish a long-term partnership between the involved partners, which in turn will enable Rwanda to develop its biomass resources in a sustainable way with low environmental impact.

Program description

Five PhD students will be enrolled in a **PhD sandwich program at our partnering Swedish universities**. Students will take courses in Sweden and be supervised jointly by Swedish and UR senior academic staff. The program aims at developing household-, agricultural-, and industrial waste-to-energy systems based on valorization of different local bio-based solid waste materials and residues to promote sustainable development in Rwanda. Candidates are invited to submit their applications according to the sub-theme and process as described below. Studies are expected to start in January 2020 and last 5 years with 80% PhD studies and 20% teaching (at UR).

We invite candidates who are interested in one or several of the following five sub-themes:

- a) *Sustainable bio-based waste-to-energy systems in urban Rwanda - system perspectives and environmental assessment*

Research issues for this PhD student include waste biomass for a circular bioeconomy, by recycling of nutrients, sequestration of carbon and extraction of bioenergy. Through case studies, methods for improved management of selected waste streams will be analysed, considering technology and environmental impacts (e.g. air pollution, climate change), but also financing and organization. Industrial ecology methods such as mass and energy flow analysis will be used, as well as other methods from integrated solid waste management.

Suitable background would be MSc degree in Environmental Engineering, Chemical Engineering, Natural Resource Management or equivalent





b) Small industrial scale pyrolysis/gasification of bio-based waste materials for production of electricity and designed biochar materials

Research issues for this PhD student includes determination of physico-chemical properties of biochars originating from different bio-fuels and various pyrolysis, gasification or hydro thermal carbonization techniques. Biochar applications, e.g. usages as soil amendment or adsorbents, will be evaluated with focus on removal of organic pollutants. A pilot scale gasification unit, that also produce biochar, could also be included in this project. The project links to other projects in this programme through the evaluation of biochar.

Suitable background would be a MSc degree in Chemistry, Water Resources & Environmental Management, Soil and Water Engineering, Environmental Engineering or equivalent.

c) Clean cooking with biomass in households – development of improved/advanced stoves and novel fuels

Research issues for this PhD student includes emission measurements and evaluations of different biomass cookstove technologies and fuels in both controlled laboratory (Umeå) and real-life field (Rwanda) studies. The project will focus on the influences of stove technology, biomass fuel properties and real-life cooking practices on the emissions of relevance for health and climate impacts. The project links to other projects in this programme through the assessment of the sustainability and implementation aspects of different biomass-based household cooking solutions.

Suitable background would be a MSc degree in Energy Engineering, Environmental Engineering, Chemical Engineering or equivalent.

d) Improved cooking and farming systems in rural households – sustainability, technology and biochar

Research issues for this PhD student concern fuel consumption in cooking systems that use biomass resources to produce energy and biochar for soil amendment. A case study with biochar-producing cookstoves in households will be performed. Climate impact and biochar C sequestration will be assessed. User perceptions of cook-stoves will also be investigated through household surveys and observation. The project links to others in the programme regarding emissions and biomass growth.

Suitable background would be MSc degree in Environmental Engineering, Chemical Engineering, Agricultural Engineering, Natural Resource Management or equivalent





e) *Agroforestry for sustainable bioenergy and improved soil fertility – improved fallows and agro-economy*

Research issues for this PhD student includes quantification and analyses of effects, longevity and economic value of soil fertility and crop yield effects of both improved fallows and of biochar application. The project links to other scales and projects in this programme through the production of wood in the improved fallows, i.e. the bioenergy source, the use of improved cook-stoves and its emission reductions. Wood production for sale as bioenergy will be an important incentive for farmers.

Suitable background would be MSc degree in Agronomy, Environmental Sciences, Soil and Agroforestry, Agricultural Engineering or Environmental Engineering.

The PhD students working on themes a) and d) will be enrolled at KTH Royal Institute of Technology, those working on themes b) and c) will be enrolled at Umeå University whereas the one working on theme e) will be enrolled at Swedish University of Agricultural Sciences.

Eligibility

The applicant must be :

- i. Be a Rwandan Citizen
- ii. Holding an MSc degree in a relevant field
- iii. All things being equal, priority will be given to UR staff. Candidates from outside of UR are eligible and invited to apply. When successful, such candidates shall have to produce commitment letters from their respective institutions to release them to undertake the PhD on sandwich model. Furthermore, UR shall have an agreement with these institutions on how the acquired expertise shall benefit both the institution of origin and of the candidate and UR.
- iv. English proficient
- v. Able to work independently as well as work in a team
- vi. Ready to spend a half of her/his study period abroad (the candidate should spend 5 to 7 months per year in Sweden)
- vii. Prepared to work full time on the project and not in possession of another fellowship for PhD studies.

Female applicants are encouraged to apply and special support will be offered for women with young children.





Interested applicants should submit the following:

- i. A cover letter for the position. The letter should describe the personal motivation and merits of relevance for joining the program and also specify which of the sub-themes the applicant is applying for. (max 1 page).
- ii. Two Recommendation letters: preferably one from your current line manager or employer and one from your master's supervisor.
- i. Copy of the Master's degree certificate (or equivalent).
- ii. Copy of valid identification card or passport
- iii. A copy of published papers (Optional).
- iv. A pre-proposal of maximum 4 pages
- v. Current CV (include full specification of the of the Masters' degree specialization)

Submission deadline

The deadline for application is September 29th 2019.

Mode of submission

An electronic version of the application should be sent to: gashayijagloriose@gmail.com and copy to kaberacriss@gmail.com and cecilia.sundberg@abe.kth.se

Recruitment process

Applications must be submitted to Mrs UMULISA GASHAYIJA, the scholarships officer at UR-CPGS (email: gashayijagloriose@gmail.com) no later than September 29th 2019. The candidates will be notified if they are called for an interview and the interviews are expected to take place at UR campus in Kigali from 8th till 10th October 2019. Successful candidates will be notified shortly after the interview and expected to start on their new position at University of Rwanda January 1st 2020.

Enquiries: Send an e-mail to the Principal Investigators: Dr Kabera Telesphore at the e-mail address: kaberacriss@gmail.com or Dr Cecilia Sundberg at the e-mail address: cecilia.sundberg@abe.kth.se

Done at Kigali, on 02nd September 2019

Dr. Celestin NTIVUGURUZA

Acting Director, University of Rwanda Centre for Postgraduate Studies (UR-CPGS)

