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# UNIVERSITY OF DAR ES SALAAM

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## DEPARTMENT OF MATHEMATICS

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### CAF-HOME PROJECT: SCHOLARSHIP IN MATHEMATICAL MODELING OF DISEASES AT THE UNIVERSITY OF DAR ES SALAAM

**Call for Application for Award of a Scholarship to Study PhD in Mathematics at the University of Dar es Salaam Under the CAF-HOME project funded by Bill & Melinda Gates Foundation**

The project titled ***Central and Eastern Africa Female Health-Oriented Modeling Epidemic Consortium*** (called **CAF-HOME**) is funded by the Bill & Melinda Gates Foundation and implemented by five African countries (Cameroon, Tanzania, Central African Republic, DRC and South Africa). It is hosted by the University of Dschang (UDs) in Cameroon.

The University of Dar es Salaam, under the support of CAF-HOME project wishes to announce a **three-year** PhD in Mathematics scholarship. This is a call for applications from eligible candidates in Mathematical modelling of diseases.

#### **1. PhD Description**

Mathematical and statistical modeling and simulations of infectious and non-communicable diseases is a powerful tool to inform our understanding of disease transmission, evolution and prediction. Human papillomavirus (HPV) is a vaccine preventable infectious disease. HPV vaccines have been introduced in several countries, including Cameroon, Democratic Republic of Congo, South Africa, Tanzania and other low or middle-income countries (LMICs) in Sub-Saharan Africa (SSA). HPV is the main cause of cervical cancer in women and adolescent girls who have recurrent infections. People with HPV are twice at risk of contracting HIV infection and six times prone to AIDS. The implementation of HPV vaccines has shown some positive results in reducing HPV infections and related diseases.

Nevertheless, the expanded programs for immunization (EPI) remain sub-optimal in LMICs in SSA and more efforts are needed to design efficient and cost-effective vaccination development. Within the framework of CAFHOMECEC project, we are looking for a highly motivated applicant capable of conducting high quality research work. The successful candidate will be required to use existing data in LMICs, to build mathematical and/or statistical models. He/she will be able to analyse and carry out simulations to help inform decision-making and healthcare policy. More specifically, we welcome applicants who will develop and analyse (sex-) structured deterministic models which incorporate the most important epidemiological/biological features of HPV infection and associated cancers, as well as models that describe and inform the interplay between HPV and related opportunistic diseases.

In addition, any model developed for HPV, cervical cancer or HIV must be designed to provide possible answers to the following fundamental research questions:

- What does it mean for a disease to be controlled/eradicated and which thresholds should be used?
- What prevention strategies could lead to disease control/eradication?
- How many disease deaths/cases could be averted on the path to disease control/eradication?
- What strategies to reach control/eradication could be the most efficient and cost-effective?
- How long could it take for a disease to be controlled/eradicated?

## 2. Eligibility Criteria

- ✧ Must be a Tanzania citizen
- ✧ Must have admission to UDSM to study PhD in Mathematics
- ✧ Must hold a Master degree in Applied Mathematics/Mathematical modelling or have completed the coursework year in the UDSM PhD in Mathematics programme during the 2022-2023 academic year
- ✧ Must undertake PhD research related to mathematical modelling of HPV/Cervical Cancer/HIV.

## 3. Requirements

- ✧ Be able to conduct research in mathematical modelling of diseases, use both dynamical and statistical tools
- ✧ Demonstrate relevant experience and strong skills in analysing and simulating dynamical systems using MatLab, Python or any other relevant computational software.
- ✧ Be able to work collaboratively in an interdisciplinary and international research project involving mathematicians, statisticians, biologists and epidemiologists.
- ✧ Contribute to research productivity in the Department of Mathematics of the University of Dar es Salaam.
- ✧ Participate in CAFHOMECEC activities.

## 4. What we Offer

- ✧ A **maximum of 3 years bursary** covering tuition fees and monthly stipend at the University of Dar es Salaam in Tanzania.

- ✧ Support to participate in international conferences
- ✧ The opportunity to work with renowned co-supervisors across the world.

## 5. Application and Supporting Documents

- ✧ A motivation letter, including half a page outline of relevant expertise and experience.
- ✧ A comprehensive CV including research publications, conference papers.
- ✧ Two letters of reference from academic referees (one of which must be from a MSc or current PhD supervisor) and sent directly by the referees.
- ✧ Certified copies of the Bachelor and masters' degrees transcripts.

## 6. Submission and Selection Procedure

- ✧ Applications and supporting documents are to be sent *via* email to
  - **Prof. Berge Tsanou** (Email: [bergetsanou@gmail.com](mailto:bergetsanou@gmail.com) ) with cc to
  - **Prof. Eunice Mureithi** (Email: [ewambui02@gmail.com](mailto:ewambui02@gmail.com)) and
  - **Dr. Maurice Kenfack Nangho** (Email: [kenfnang@gmail.com](mailto:kenfnang@gmail.com)).
- ✧ Interviews will be conducted in a **hybrid mode** at the University of Dar es Salaam.

## 7. Deadline and Start date

All applications must be sent on or before **30<sup>th</sup> November, 2023**. The successful candidate will start studies in **December, 2023**.

**Female candidates are highly encouraged to apply.**