

**Tanzania: Dr Ben Adams, Centre for Mathematical Biology, University of Bath and Dr Estomih S. Massawe, Department of Mathematics, University of Dar es Salaam, Tanzania**

## **Background**

The Department of Mathematics at the University of Dar es Salaam (UDSM) was established in 1965. It has 20 academic staff, out of a notional full complement of 46. The department offers undergraduate, Master and PhD programmes. Active research areas include epidemiological modelling, fluid dynamics, numerical analysis, computational mathematics, differential equations and operations research. The department is involved in several international programmes in addition to MARM. The Eastern African Universities Mathematics Programme (EAUMP) is a partnership with other universities in the region to enhance postgraduate training and strengthen collaborative research; the Techno-mathematics in East Africa project, sponsored by the Finnish Centre for International Mobility (CIMO), provides opportunities for staff and student exchange, research collaborations, intensive courses, and conferences; the Southern African Masters Programme in Mathematical Modelling, sponsored by the Norwegian Research Council, provides specialist postgraduate training.

## **Activities**

The first visit by the mentor to UDSM took place in March 2011. Over a one week period he gave a 12 hour postgraduate course in mathematical epidemiology, concluding with a presentation of current research. In the afternoons he discussed research with members of staff, students and visitors. There is a great deal of interest in mathematical biology at UDSM and throughout the region. Several staff members are involved in active research: H Shaban works on contact structure in epidemiological models; E Massawe works on the analysis of differential equations in epidemiological models; M Alphonse works on within host models of HIV dynamics; A Isdory is interested in various aspects of epidemiology modelling. In addition, E Mtisi is a local PhD student visiting the department and working on models for HIV and TB co-epidemiology, and there is widespread interest in epidemiological modelling research projects among the Mathematical Modelling MSc students.

In October 2011, A Isdory of UDSM visited the University of Bath for a week to collaborate on a research project investigating the potential emergence of new malaria strains. This collaboration will continue during Adams's second visit to UDSM. The longer term objective is to obtain funding for Isdory to pursue this research full time as part of a PhD programme.

Many aspects of the research infrastructure function well at UDSM. The computer systems are good; the internet provision is fairly fast and stable most of the time. Journal articles are generally available electronically through a number of schemes funded by international agencies. Up to date graduate level text books are not, however, so widely available. So it can be difficult to get to the fundamental theory that underpins current research. Therefore, under the MARM programme, a small investment in a library of key mathematical biology text books was made. These books will be an invaluable resource for quite some time.

It is clear that mathematical biology is an increasingly popular area for research in East Africa. There is great need, and potential, for the sustained development of local expertise in this research field. The widespread prevalence of severe infectious diseases in the region undoubtedly drives interest in epidemiological modelling. There seems to be less interest in mathematical ecology, at least at UDSM. However, the unique wildlife of the Serengeti, and the importance of the safari industry in Tanzania, suggest that this could be a scientifically and economically productive area for interdisciplinary mathematical biology research. The second trip to UDSM by Adams took place in June 2012. The focus of this trip was to strengthen research collaboration, in particular exploring the opportunities to work on ecological and eco-epidemiological studies related to the Serengeti wildlife