



SACEMA
DST/NRF Centre of Excellence in Epidemiological Modelling and Analysis

SACEMA NEWSLETTER

NO. 5, March 2007

The first few months of 2007 have marked SACEMA's first annual review, which we have successfully passed, as well as the first Research Day with our students. We have also been very busy planning several events for later in 2007 – see details below. Please also see the advert on the last page for a postdoctoral researcher in tsetse and trypanosomiasis modelling.

People on the move:

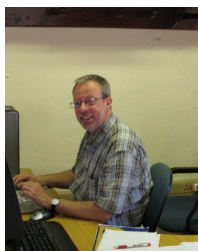
We were very sad to say farewell to two of our visitors, who have left us to go back to Europe. Dr Nicolas Bacaer was with SACEMA for three months from the Institut de Recherche pour le Développement (IRD) in Paris. He developed a deterministic compartmental model for the HIV and TB epidemics with particular reference to modelling the changes in HIV prevalence and TB incidence in Masiphumelele. Dr Bacaer will be continuing this work back in Paris and will collaborate with Rachid Ouifki, with further inputs from Carel Pretorius.



Carel, Nicolas and daughter Nina, and Joris

We were also sad to say goodbye to Joris Borgdorff who has been with SACEMA for six months since September 2006. Joris worked closely with Carel Pretorius on the microsimulation project sponsored by the WHO, playing a major role in the technical side of developing the HIVMM model. The hope, indeed intention, is that Joris will keep doing some work with SACEMA on the microsimulation modelling after his successful time here.

Dr Rachid Ouifki was invited to be a visiting fellow at the University of Paris, to collaborate with Prof Pakdaman from February to July 2007. He is currently in Paris, based at IRD, working with Prof Pakdaman, while also continuing work with Dr Bacaer. Rachid and Prof Pakdaman are finalizing a paper on gene expression and regulation which includes a model providing a basic representation of the gene network. As a continuation of this paper, a general model with a more complex network will be considered. They are also working on generalising the theoretical results obtained in this paper to include more applications in mathematical biology and in epidemiology.



Roel at SACEMA

We also hosted Dr Roel Bakker from Erasmus MC, Rotterdam, for two weeks in mid-March. Roel is investigating using STDSIM with a view to comparative work on its potential modelling of HIV and TB epidemics of Masiphumelele and elsewhere. He spent some time at SACEMA in November 2006 at the Microsimulation Meeting, and SACEMA was glad to have him on site to share his expertise on microsimulation modelling.

We also welcome Theresia Marijani to the SACEMA offices, as one of our first resident students. Theresia joins us from Tanzania and is working on malaria modelling for her Masters Degree at Stellenbosch.



Theresia doing some drumming

Events:

Research Day:

SACEMA's Research Day was held on 14 March 2007. Invited to attend were the SACEMA Board, various Stellenbosch staff members, SACEMA researchers as well as the SACEMA students and their supervisors. The day started off with a report of current research being conducted through SACEMA in order to introduce those who were not familiar with SACEMA to our various activities. The students also presented their research topics to the group, which covered a wide range of subjects including intracellular, immune response and drug-resistance modelling; spatial and temporal, including GIS, modelling of diseases, and various issues in HIV, TB and malaria.



*SACEMA students, supervisors, researchers and guests at the Research Day.
(Unfortunately this picture was taken at the end of the day after some attendees had had to leave.)*

DIMACS and SACEMA Workshops:

SACEMA and DIMACS (see <http://dimacs.rutgers.edu/Workshops/AIMS/>) are co-sponsoring a training institute and modelling workshop in June 2007. The first of these, the US-Africa Advanced Studies Institute on Mathematical Modelling of Infectious Diseases in Africa, consists of a two-week intensive course in modelling techniques for US and African students running from 11-22 June. The intention is to develop critical skills amongst both US and African students, but also to encourage collaboration between the two groups. The Institute will be held at AIMS in Muizenberg, Cape Town. The deadline for applications for both US and African students has closed and places have been offered to applicants with the necessary mathematical background. The following workshop, the DIMACS Workshop on Mathematical Modelling of Infectious Diseases in Africa, will be held in Stellenbosch and will enable all those from the Advanced Studies Institute to apply what they have learnt to relevant issues that researchers around the world are tackling. Presentations will be given by researchers working in the field and students are encouraged to present posters during this Workshop.

Introductory course in the Application of Mathematics in Biology & Medicine:

SACEMA is sponsoring an introductory course on the use of maths in biology and medicine, to be held at AIMS from 9-13 July 2007. This will be predominantly for South African students in their 3rd year or Honours year of study in a mathematical subject, to interest them in the use of mathematics to solve issues in biology or medicine. South African students with a mathematical major are invited to contact Margaret Ward (mward@sun.ac.za) for more information.

The course is being run as a collaborative venture with AIMS and the Centre for Actuarial Research (CARE) at UCT. CARE's Professor Rob Dorrington and Leigh Johnson have kindly agreed to provide teaching services, as have Prof Cathal Seighe from the Bioinformatics Node at UCT and Johan Rohwer from Biochemistry at Stellenbosch University. From the SACEMA staff and associates: Prof Edward Lungu; Dr Farai Nyabadza; Carel Pretorius; Dr Alex Welte; Prof Ekkehard Kopp and Prof John Hargrove will all be involved in the programme. We also hope that, by the time of the course, our new postdoctoral researcher, Dr Farai Nyabadza will have started work at SACEMA and will also take part as a lecturer on the course. Special mention should finally be made of Edward Lungu, who holds the post of Extraordinary Professor at SACEMA - Edward will be spending a month at SACEMA over the time of the DIMACS activities and the introductory course and will be lecturing at both events.

For the students attending this course there will be the added bonus of attending an introductory course on Distributed Computing to be given by a team from CERN [the international elementary particle physics research centre] in Switzerland.

Meeting on Male Circumcision:

SACEMA will be hosting a meeting on male circumcision in November 2007. Leading researchers who are investigating the efficacy of this intervention in helping to prevent the spread in HIV and the sociological and economic impact of such interventions have indicated their wish to attend. More details will follow soon, so please keep an eye on our website if you are interested in this topic.

SACEMA co-organised the first meeting on this topic, held in Geneva under the auspices of UNAIDS in November 2005, and we remain interested in ensuring that this often controversial issue can be debated rationally on a sound scientific basis.

Research Issues:

Collaboration with Onderstepoort Veterinarian Institute:

SACEMA has recently agreed to collaborate with the Onderstepoort Veterinarian Institute based at the University of Pretoria. We envisage pursuing various projects on matters of common interest. The first of these involves co-funding a postdoctoral researcher, based principally at SACEMA, to work on tsetse population dynamics and modelling and combating trypanosomiasis (see advert below). This will include fitting these models to existing data, particularly from Zimbabwe and KwaZulu Natal in South Africa. We will also be investigating the possibility of utilising sampling methodology developed by SACEMA Visiting Fellow, Prof Vale, to work on culicoides, vectors of African Horse Sickness.

Prof Hargrove visited Onderstepoort in February and was involved in the review of their culicoides and black fly research programme. Further, Prof Vale, has been invited to speak on prospects for tsetse control at Onderstepoort's Centenary Celebrations next year.

Work with the World Health Organisation (WHO):

The final report for SACEMA's first contract with the WHO has been completed. This project required SACEMA to prepare the generic effectiveness tools for contextualization of cost-effectiveness work on HIV/AIDS and tuberculosis (TB). This basically included the development of the HIVMM microsimulation tool for the modelling of HIV and TB.

SACEMA hopes to continue work of this nature and has submitted a concept note for funding from CIDA to pursue microsimulation modelling of TB and HIV. Continuing interaction with Dr Roel Bakker (see above) as well as with Joris Borgdorff will also assist these objectives.

Male Circumcision

SACEMA Director, Prof Hargrove, and Carel Pretorius are involved on the modelling work on male-circumcision spearheaded by Prof Bertran Auvert. An abstract on the subject has been submitted to the International AIDS Society in preparation for their up-coming meeting in Sydney. A paper will shortly be submitted for publication on the costs of a roll-out of male circumcision in sub-Saharan Africa.

Progress with research projects:

Progress has been made with the Desmond Tutu HIV Centre, with the agreement and transfer of research funds near to being finalised. Similarly we are continuing work with the Desmond Tutu TB Centre and are actively looking for a statistician to contribute to this project.

We are also looking forward to working more closely with Dr Alex Welte, who will continue to be involved in several SACEMA activities. He will be teaching at SACEMA's Introductory course in July at AIMS, and working with Prof Hargrove on a more long-term basis aimed at developing improved methods for estimating the window periods for STARHS-type methods of HIV incidence.

Work on the BED assay is continuing with Wolfgang Preiser (Head of Virology, Tygerberg). To date, the necessary samples from patients who are known to be HIV-infected for long periods of time have been prepared in order to perform the assay.

Dr Alan Matthews, based at UKZN, has been involved with SACEMA for some time. He has been collaborating with Dr Michel Garenne and Ms Pauline Leclerc on a microsimulation model known as PHEM (Pasteur HIV-AIDS Epidemic Micro-simulation). Dr Matthews has just returned from about 3 months in Paris, where he has finalized programming on the PHEM model with regards to the 'simulation' engine and the population initialization methods. Testing of the model is now continuing after which definitive runs of the epidemic will be done.

Finally, an application has been initiated and has passed through the first hurdle, for the development of a new bio-mathematics stream within the Mathematical Sciences Department at Stellenbosch University. This would include the funding of a lectureship, to be a joint SACEMA/Maths appointment, for several years by SACEMA.

Adverts:

Postdoctoral Fellowship in population dynamics modelling with particular reference to tsetse and trypanosomiasis

A post-doctoral fellowship is available at SACEMA (the *DST/NRF Centre of Excellence in Epidemiological Modelling and Analysis*), which is a national research centre based at Stellenbosch University, South Africa, for a motivated candidate who is interested in the study of the application of mathematical modelling to biological problems. The successful candidate will be involved in research programmes concerning:

- i) the derivation of mathematical models of the population dynamics of tsetse flies (*Glossina* spp) and the trypanosome parasites that they transmit;
- ii) fitting these models to existing data, particularly from Zimbabwe and KwaZulu Natal, South Africa.

The successful candidate will further be involved in working with and advising, wherever appropriate, local and national authorities on issues related to the planning and execution of tsetse and trypanosomiasis control operations.

Basic requirements include a PhD in the field of mathematical modelling or theoretical biology and relevant experience in mathematical and statistical modelling of biological problems.

The fellowship is available from mid-2007 for two years, and will be reviewed thereafter for an additional term not exceeding a further two years.

Interested candidates may wish to contact the Director of SACEMA, Prof John Hargrove, at the telephone number below, to discuss the position. Information on SACEMA activities may be found on the SACEMA web site: www.sacema.co.za.

Applications should include a curriculum vitae and three contact email addresses of potential references, and must be submitted to: Ms Fazia du Plessis, SACEMA, Stellenbosch University, fduplessis@sun.ac.za, tel: +27 21 808 2589, fax: +27 21 808 2586. Please also send copies of maximum three (3) relevant publications.

The closing date for applications is 15 April 2007.