



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

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SACEMA NEWSLETTER

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NEWS:

HIV Modelling Consortium Initiative on the Characterisation of Tests for Recent Infection: Workshop at Harvard University, Boston, 19-20 July 2012

The estimation of HIV incidence from cross-sectional surveys, using tests for recent infection, has attracted much interest over the years, and this is an area in which SACEMA has been greatly involved. While the overall concept of using prevalence of test-defined recent infection, together with test characteristics, to infer incidence, is widely accepted, there has been a lack of consensus about methodology in the field.

In response to a request by the HIV Modelling Consortium steering committee, for collaborations to build consensus on aspects of cross-sectional HIV incidence estimation, SACEMA recently hosted a workshop on the characterisation of tests for recent infection. The workshop, led by Alex Welte, and his colleagues Phillip Labuschagne and Reshma Kassanjee, was hosted at Harvard University in Boston on 19-20 July 2012.

The workshop kicked off with a public Biostatistics seminar by Alex Welte, presenting the latest innovations in incidence estimation.

The first phase of the collaborative project, which was the focus of the workshop, aims to provide guidance, to the public, on the estimation of the mean duration of recent infection. The mean duration of recent infection, which describes the average time that infected individuals remain classified as recently infected by the test, is a test characteristic required for incidence estimation.

The workshop provided the opportunity for preliminary results to be discussed amongst the collaborators, which includes representatives from SACEMA; Harvard University; Medical Research Council, UK; Public Health Agency of Canada; National Institute of Allergy and Infectious Diseases (NIAID); French Public Health Institute; Centres for Disease Control and Prevention (CDC); National Institute of Health, Rome; and the FHI360. Currently used and proposed methods for estimating this test characteristic are being reviewed by the group, and the methods are being benchmarked through their application to simulated data. SACEMA has developed a tool to create large numbers of datasets with ease, allowing for varying study designs and test dynamics. Various methods of analyses are currently being applying to the datasets, and an article providing guidance on the appropriateness and use of the methods is being produced by the group.



Workshop on the characterisation of tests for recent infection, Harvard University, Boston, July 2012

2012 Graduations



SACEMA researcher, Roxanne Beauclair received an MPH in Epidemiology with first class distinction from the University of Cape Town, under the supervision of Prof Landon Myer. The title of her thesis was, "Adverse Outcomes Associated with Timing of Antenatal Care Initiation: A Retrospective Cohort Study of Pregnancies in Cape Town, South Africa."

Well done, Roxy!

VISITORS:

In July we welcomed 3 visiting students to the wine cellar:



Lucio Tolentino, a PhD student from the University of Iowa in Iowa City, USA is spending a year at SACEMA working with Wim Delva on combination prevention within the context of the Simpack simulation model. Lucio is funded by the Fulbright Fellowship program.

Fei Meng, originally from China is currently studying towards a PhD at Hasselt University in Belgium. She will be a regular visitor to SACEMA for the following couple of years and will be here until late October this time. She is working with Wim Delva, Roxy Beauclair and Lucio Tolentino on stochastically modelling the effect of ARV interventions on HIV epidemic and sexual network structure.



Andrea Daubenbüchel, an MSc student from Johannes Gutenberg-University Mainz in Germany, is spending 6 months at SACEMA working with Alex Welte on HIV and TB topics. Her research interests are infectious disease epidemiology and epidemiological modelling.

RESIGNATIONS:



At the end of September we said goodbye to Guy Mahiane who spent 2 years at SACEMA as a postdoctoral research fellow working on HIV incidence modelling. We wish Guy all the best for the future.

SCIENTIFIC MEETINGS:

Society for Mathematical Biology Annual Meeting and Conference, July 25-28, 2012

Damian Kajunguri attended the Annual Meeting and Conference of The Society for Mathematical Biology held from 25-28 July in Knoxville, Tennessee, USA. The theme of the conference was *Mathematics and Biology: Interdisciplinary connections and living systems*. The meeting brought together scientists and mathematicians from across the world. Topics presented at the conference included stem cell research, modelling of infectious diseases, understanding ecosystem dynamics, educating future biologists and mathematicians, and developing natural pesticides, to name just a few. Damian presented part of his PhD work at the conference in a talk entitled “Cost-effectiveness analysis of tsetse and *Trypanosoma brucei rhodesiense* control through application of insecticides on cattle”.

EVENTS:

Applications of Mathematics in Biology and Medicine, 2 – 6 July 2012

Forty final-year mathematical sciences students from eleven South African universities spent five packed days at the African Institute for Mathematical Sciences (AIMS) in Muizenberg, discovering the power of abstract mathematical theory being applied in very practical real-world situations. The forty were carefully selected from many applicants to attend this intensive, fully-funded course, co-sponsored by SACEMA and AIMS. Fifteen presenters (from SACEMA, AIMS, University of Stellenbosch, SANBI, MRC and the University of Cape Town) shared the exciting work they do, using mathematical techniques to shed light on areas such as HIV epidemiology, phylogenetics, biochemistry, mathematical physiology, and sexual network modelling. Much hard work and fertile imagination went into preparation, and the consistently high quality of presentation is shown by the fact that every session won a place in at least seven people's top three, and almost every session was somebody's favourite.

The programme included four integrated half-days – three by individuals, one by a team of three – and incorporated many computer practical sessions. Scientific programming was a major challenge for many who had little experience of it, and Dr Lafras Uys from AIMS deserves special mention in

this regard. He prepared a suite of Python programming problems related to course material, and gave many hours of contact time during the week, ably assisted by three tutors: two SACEMA MSc students (who also participated fully in the week's sessions) and one University of Stellenbosch Biomathematics MSc student. Participants were very positive in evaluations of the course, and expressed appreciation of what they had learned about the varied possibilities for application of mathematics and statistics, and the opportunities for postgraduate work. We trust that some have been persuaded to embark upon careers in biomathematics, epidemiological modelling and other fields where their skills will contribute to bringing new solutions to some of South Africa's greatest problems. Some comments: "I believe if you introduced this type of workshop in high schools, it would have a great impact on careers and on sexual behaviour." "Marvellous food!!" "Thank you for this great experience!" "A valuable experience ... the course is perfect." On a lighter note: "Our government should be warned about the existence and importance of this course!"



Applications of Mathematics in Biology and Medicine, Muizenberg, July 2012

Introduction to Statistics and its Applications in Biology, 9 – 20 July

Following its successful launch in July 2011, this course was mounted again this July by SACEMA, in association with the Universities of KwaZulu-Natal (UKZN) and Cape Town (UCT), and the University of Ghent, Belgium. Funded by the Flemish Inter-University Council (VLIR) under a project initiated and managed by SACEMA's Dr Wim Delva, the course is designed to assist post-graduate students and health professionals develop the biostatistical capacity requisite for their work. In its second edition, it comprised two levels, offered concurrently over ten days in Stellenbosch.

Level 1: Basic Concepts and Methods was designed and presented by a UKZN team: Profs Delia North and Temesgen Zewotir. *Level 2: Biostatistics* was designed and presented by a UCT team: Ms Katya Mauff (4 days – *Generalized Linear Models*), Prof Sugnet Lubbe (2 days – *Multivariate Analysis*), Prof Francesca Little (4 days – *Survival Analysis and Longitudinal Data Analysis*). SACEMA staff and students gave support as course tutors: Wim Delva, Cari Van Schalkwyk, Hilmarié Brand, Guy Mahiane, Roxanne Beauclair, Renier van Rooyen, and Faikah Bruce.

The Department of Mathematical Sciences was used as venue, by kind permission of the Head, Professor Ingrid Rewitzky, and visiting participants were accommodated at Metanoia Residence, where all participants had lunch each day. Social events took place every couple of days: a reception at SACEMA, an evening with “Drumming SA”, a dinner at Decameron restaurant, an excursion to Cape Point, and an evening at a wine farm, including wine-tasting and dinner.

There were thirty-three participants (counting both levels), representing twelve countries: South Africa, Zimbabwe, Mozambique, Namibia, Zambia, Uganda, Cameroon, Nigeria, Libya, Madagascar, UK, and USA. Institutions represented by the external participants were: Stellenbosch University (4), Stellenbosch University Tygerberg (2); UCT (4); UWC (2); University of Venda (2); UNISA; CDC, ZIMBABWE & MOHCW, Zimbabwe; Ladoke Akintola University of Technology, Ogbomosho, Oyo-State, Nigeria; International Livestock Research Institute, Kenya & University of Edinburgh; PharmAccess Foundation Namibia.



Introduction to Statistics and its Applications in Biology, Stellenbosch, July 2012

Advanced Epidemiological Methods, 20 – 24 August, 2012

This popular seminar was presented in Stellenbosch for the 3rd year running, by Professor Matthew Fox of the University of Boston, and, in addition to a contingent of local SACEMA students and staff, attracted applicants from many different institutions, representing fourteen different countries. Matt demonstrated again his remarkable ability to challenge participants to deepen their understanding of many basic epidemiological concepts by persistent, probing questioning of their meaning and implications.

Evaluations have not yet been processed, but the learning experience was warmly commended by participants, coming (especially for the course) from as far afield as Sweden.

SACEMA writing retreat, 13-15 August, 2012

SACEMA held a VLIR-funded writing retreat at St James from 13-15 August, to boost SACEMA's scientific output and facilitate capacity building in scientific writing among its students and junior staff.

During the 3-day retreat, the St James Villa - a national monument overlooking the waves and occasional visiting whale - was transformed into a bustling hub for manuscript drafting and editing. Periods of "quiet time" were interspersed with group sessions that focused on common issues that frequently come up during the scientific writing process, such as choosing the best journal for your manuscript, efficient strategies for searching biomedical literature, frequently made spelling, grammar and style mistakes, guidelines for deciding on manuscript authorships, and good practice in reporting statistics in biomedical literature. The excellent catering, cosy wood fire and pool table made sure we were all fuelled and inspired throughout the retreat.

SACEMA Seminars

The following seminars were presented in August and September:

17 August Doreen Mbabazi: Effect of a training intervention on malaria and pneumonia

14 September Lucio Tolentino: Finding optimal parameters for models