

Kenya: Enrico Rogora, University of Rome "La Sapienza", Italy, and David M. Malonza and Leo Odongo, Kenyatta University, Kenya

General description of partner department

The Department of Mathematics at Kenyatta University has a total of 19 teaching staff, 30 postgraduate students and 200 undergraduates. There are areas of specialization in Pure, Applied and Statistics and both MSc and PhD programmes are offered in all three, as well as BSc in Mathematics.

Aims and objectives

The main objective was to initiate and maintain joint research projects on data analysis involving both staff and postgraduate students. Each project would be focussed on data from one of the following areas: biological sequences, ECG recording, ecology and standardized examination tests. The data would come from sources in the public domain and from collaborating research groups. This will involve other professors at Rome and other departments at Nairobi.

Two major aims were:

1. to focus on computer lab work with public domain software, which can proceed in parallel with theoretical development, and
2. to use data analysis as a route to more general mathematical development in areas such as commutative algebra, spectral analysis, and numerical analysis.

Preliminary discussion

The mentor discussed with the former head of the Department, Dr. Odongo and the present head of the Department, Dr Malonza, some research activities that could be organized under the MARM project. They agreed to focus the project on mathematical models for data analysis, and to try to involve kenyan researchers in other fields, especially medicine and biology, to provide data. The idea was to promote inter departmental research with strong contribution of mathematicians and statisticians. The aims here are to provide necessary background for the research projects and to motivate the introduction of more advanced algebraic techniques.

Visit of the Mentor: August 24th - September 5th 2009

The following activity was organised:

- A short course on Rasch analysis of educational data (5 lectures)
- A computer lab activity with the public domain statistical program "R" consisting of the implementation of the algorithm discussed during the short course and the analysis of simulated and real data. (4 meetings of 4 hours each).
- Two conferences on mathematical models for data analysis: the first on the analysis of biological sequences, the second on the analysis of EKG signals
- Daily meeting with the researchers of the department of mathematics and other departments in order to discuss possible joint research projects

At the end of the visit, the mentor and the researchers at the Kenyatta University agreed to pursue the following research projects

- Use some of the italian national tests for admission to the faculties of science as an entry test for students at Kenyatta and compare the results by using Rasch Model (Malonza, Odongo, Rogora)
- Discuss the possibility of joint research on the phylogeny of Kenyan dialects with italian experts (Odongo, Caglioti, Rogora)

- Research on invariants of ODE and covariants of binary forms (Malonza, Rogora)

Moreover it was decided to organize a local conference in Nairobi the following year, where the mathematicians of the Nairobi area could present their researches.

Over the period 2010-2011, the mentor participated in the organisation of the First Kenyatta University International Mathematics Conference, which took place in Kenyatta over June 8-11 2011.

Dr Malonza visited ICTP and Rome, assisted in part by MARM.



picture from the visit of the mentor at Kenyatta University