



AIMS-VOLKSWAGEN STIFTUNG WORKSHOP ON INTRODUCTION TO COMPUTER ALGEBRA AND APPLICATIONS Douala, Cameroon, October 6-13, 2017

The African Institute for Mathematical Sciences Cameroon – AIMS Cameroon and the University of Kassel will be co-organising a workshop on the theme “Introduction to Computer Algebra and Applications” to be held in Douala, Cameroon, at Hotel Prince de Galles: <http://www.hotelprincedegallesdla.com>

This workshop which is funded within the framework of the Volkswagen Foundation Funding Initiative “Symposia and Summer Schools”, is aimed globally at promoting capacity building in terms of research and training in computer algebra and applications, discussions and development of new ideas, development and enhancement of networking including south-south cooperation.

African Academics, Postdocs and PhD students are highly encouraged to apply by filling and submitting the form attached to the following email address vw-workshops@aims-cameroon.org before August 15, 2017. In this form one should state clearly the home university, the contact (email, telephone and postal address), the domain of research as well as the expected impact into their research and teaching in the domain of Mathematical sciences after attending this workshop. Those who want to give a short talk should send in addition title and abstract, PhD students should submit a motivation letter. All participants are required to bring their own laptops. The relevant computer algebra software will be installed in Cameroon.

Funding obtained from the Volkswagen Foundation will cover travel and living expenses for about 40 junior academics, postdocs and PhD students from Africa and 5 postdocs and PhD students from Germany.

More specifically, the workshop is expected to:

- Present to a broad audience the great potential of computer algebra for research and teaching of mathematical sciences, from an interdisciplinary point of view, in order to raise awareness of the importance of this modern tool and to promote its use in Africa.
- Bring together international experts, academics and PhD students mostly from the Central Africa sub-region, with good representation of women, in order to deliver an initial training and some advanced lectures in computer algebra and to create a community of practice in the use of computer algebra for research and teaching of mathematical sciences in Africa, as well as to promote new international collaborations including south-south collaborations, and enhance research in this domain.

The workshop will mainly be composed of the following activities:

- Intensive preliminary training sessions on computer algebra on October 6-7, 2017
- Plenary talks by renowned experts in the domain to present the state of art in various aspects of computer algebra and their applications.
- Tutorials by the same experts to discuss deeply and provide detailed explanations to PhD students, Postdocs and Junior Lecturers.
- Training sessions to be delivered by experts for the benefit of young scientists to enable a good mastering and proper understanding of the great potential of computer algebra. These junior scientists are expected to take over and popularise and continue to train their colleagues in their home universities.
- Contributed talks by participants to enable young researchers to present talks/achievements on their research interests in order to receive feedback from experts and also to enable networking.
- Coffee and lunch breaks combined with social events will enable additional discussions and interactions.

Computer algebra has various applications in multidisciplinary settings most of which will be covered in one way or the other in the lectures and training sessions:

1. Solution of differential equations;
2. Symbolic factorization of polynomials solves many important mathematical questions;
3. Zeilberger type algorithms to find recurrence and differential equations for series and integrals;



4. Resultants or Gröbner bases solve multivariate polynomial equation systems;
5. Applications to coding theory and cryptography;
6. Algorithms in group theory.

The workshop is considered as an introduction to computer algebra. Therefore the topics of the workshop concentrate on the following:

1. Implementation of elementary computer algebra algorithms;
2. Solving polynomial equation systems (using resultants or Gröbner bases).
3. Differential and difference equations.
4. Computer Algebra and Group Theory: The GAP system (<http://www.gap-system.org/>).
5. Training sessions.

Scientific Advisory Board

1. Prof. James Harold Davenport, University of Bath, United Kingdom
2. Prof. Eva Zerz, RWTH Aachen University, Germany

Organizing Committee

1. Prof. Barry Green, Chief Academic and Research Officer of the AIMS-Network, Center Director of AIMS-South Africa
2. Prof. Mama Foupouagnigni, University of Yaounde I, Cameroon and Center President AIMS-Cameroon
3. Prof. Kerstin Jordaan, University of South Africa, South Africa
4. Prof. Wolfram Koepf, University of Kassel, Germany
5. Prof. Boniface Nkemzi, University of Buea, Cameroon
6. Dr. Edgar Tchoundja, University of Yaounde I, Cameroon

Preliminary list of confirmed plenary speakers and trainers

Part A: Implementation of elementary computer algebra algorithms

1. Prof. Mama Foupouagnigni, AIMS Cameroon & University of Yaounde I
2. Prof. Wolfram Koepf, University of Kassel, Germany
3. Prof. Kenza Guenda, University of Science and Technology of Algiers, Algeria
4. Merlin Mouafo, PhD student, University of Kassel
5. Dr. Daniel Duviol Tchoutia, Postdoc of Cameroonian origin, University of Kassel

Part B: Solving polynomial equation systems (using resultants or Gröbner bases)

6. Prof. Bruno Buchberger, Research Institute for Symbolic Computation, Austria
7. Prof. Wolfram Koepf, University of Kassel, Germany

Part C: Differential and difference equations

8. Prof. Wolfram Koepf, University of Kassel, Germany
9. Dr. Georg Regensburger, Johann Radon Institute for Computational and Applied Mathematics (RICAM), Linz, Austria

Part D: Computer Algebra and Group Theory: The GAP system

10. Prof. Bettina Eick, Braunschweig University of Technology, Germany
11. Prof. Kenza Guenda, University of Science and Technology of Algiers, Algeria

Part E: Training Session

- Prof. Mama Foupouagnigni, AIMS-Cameroon & University of Yaounde I
- Prof. Wolfram Koepf, University of Kassel, Germany
- Dr. Daniel Duviol Tchoutia, Postdoc of Cameroonian origin, University of Kassel
- Merlin Mouafo, PhD student, University of Kassel