

**AIMS**African Institute for
Mathematical Sciences
CAMEROON

VolkswagenStiftung

**U N I K A S S E L
V E R S I T Ä T**

**AIMS-VOLKSWAGEN STIFTUNG WORKSHOP ON
ORTHOGONAL POLYNOMIALS AND APPLICATIONS
Douala, Cameroon, October 5-12, 2018**

The African Institute for Mathematical Sciences Cameroon – AIMS Cameroon and the University of Kassel will be co-organising a workshop on the theme “Orthogonal Polynomials 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 the field of orthogonal polynomials and applications, discussions and development of new ideas, development and enhancement of networking including south-south cooperation.

The following groups are highly encouraged to apply by filling online the application form at the address: <http://www.aims-volkswagen-workshops.org/index.html> before June 23, 2018:

- African lecturers/researchers whose research domain is close to orthogonal polynomials and applications;
- African postdocs or junior lecturers who are interested in doing research in the domain of orthogonal polynomials and applications;
- African Master and PhD students who would like to do their Master or PhD thesis in the domain of orthogonal polynomials and applications.

In the online application form one should fill clearly all the requested information. PhD and Master Students should type in the online form a motivation letter, while those who want to give a short talk in the workshop topics should send in addition the title and abstract.

It is our hope that some junior academics, PhD and Master students from Africa who will attend this workshop will develop interest for research in the field of orthogonal polynomials and connect with plenary speakers for possible research collaboration (for junior academics) and supervision of their PhD and Master theses (for students).

Funding obtained from the Volkswagen Foundation will cover travel and living expenses for 14 renowned international plenary speakers, about 52 junior academics, postdocs, PhD and Master students from Africa as well as postdocs and PhD students from Germany.

The main objective of the workshop is to bring together international experts, academics, PhD and Master students from the Central Africa sub-region and other regions of Africa, with good representation of women, in order to deliver an initial training and some advanced lectures in the domain of orthogonal polynomials and applications for research and teaching, as well as to promote new international collaborations including south-south collaborations, and enhance research in this domain.

More specifically, the workshop is expected to help to address the following challenges faced in Mathematics in many sub-Saharan African universities:



- insufficient number of qualified lecturers in Mathematics while some of the lecturers don't have PhD and are blocked and/or isolated in terms of research;
- only a limited number of academics are really active in research while existing research domains are narrow and limited most often to the previous PhD topic or the research domain of the PhD supervisor;
- there are so many highly talented Master and PhD students with very few available qualified lecturers for supervision and also very few interesting and up-to-date PhD topics;
- weak collaboration with other active Mathematics communities in the world, this is also the case for south-south cooperation.

The workshop, whose topics include but are not limited to the following four parts,

- Part A: Univariate orthogonal polynomials,
- Part B: Multivariate orthogonal polynomials,
- Part C: Multiple orthogonal polynomials and random matrices,
- Part D: Orthogonal polynomials and Painlevé equations,

will mainly be composed of the following activities:

- Intensive preliminary training sessions on Introduction to Orthogonal Polynomials and Applications on October 5-6, 2018,
- Plenary talks by renowned experts in the domain to present the state of art in various aspects of orthogonal polynomials and their applications,
- Tutorials by the same experts to discuss deeply and provide detailed explanations to PhD and Master 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 applications of orthogonal polynomials in various domains of science. These junior scientists are expected to take over and popularise this research domain 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.

Orthogonal polynomials as research topic, be it univariate or multivariate, have various applications in multidisciplinary settings most of which will be covered in one way or the other in the lectures and training sessions:

- Univariate orthogonal polynomials in general and classical univariate orthogonal polynomials in particular, happen to have various applications in multidisciplinary domains/topics including: Gauss quadrature; solution of differential, difference and divided-difference equations; digital signal processing; queueing theory, birth and death processes, integrable systems; number theory and combinatorics; evaluation of integrals and the approximation of functions.
- Connected to the univariate orthogonal polynomials which have been researched constantly and actively by various mathematicians worldwide, are other topics in the domain of orthogonal polynomials such as multivariate orthogonal polynomials, random matrices and orthogonal polynomials, exceptional orthogonal polynomials, as well as orthogonal polynomials and Painlevé equations. These topics which have very important connections and applications in engineering and in other



domains in Mathematics and Physics, will be discussed during the workshop by leading international experts who will in addition provide the current state of art in these research domains.

Scientific Advisory Board

1. Prof. Walter van Assche, University of Leuven (KU Leuven), Belgium and Chair of the SIAM Activity Group on Orthogonal Polynomials and Special Functions
2. Prof. Jeff Geronimo, School of Mathematics, Georgia Institute of Technology, USA

Organizing Committee

1. Prof. Barry Green, Chief Academic and Research Officer of the AIMS Global Network and Centre Director, AIMS South Africa
2. Prof. Mama Foupouagnigni, University of Yaounde I & Centre President, AIMS Cameroon
3. Prof. Kerstin Jordaan, University of Pretoria, 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

List of Plenary Speakers

1. Prof. Walter van Assche, University of Leuven (KU Leuven), Belgium
2. Prof. Gaspard Bangerezako, University of Burundi, Burundi
3. Prof. Hamza Chaggara, University of Sousse, Tunisia
4. Prof. Kathy Driver, University of Cape Town, South Africa
5. Prof. Mama Foupouagnigni, University of Yaounde I and AIMS Cameroon
6. Prof. Jeff Geronimo, Georgia Institute of Technology, USA
7. Prof. Norbert Hounkounnou, International Chair in Mathematical Physics and Applications (CIPMA), Benin
8. Prof. Kerstin Jordaan, University of South Africa, South Africa
9. Prof. Wolfram Koepf, University of Kassel, Germany
10. Dr. Ana Loureiro, University of Kent, UK
11. Prof. Francisco Marcellán Español, Universidad Carlos III de Madrid, Spain
12. Prof. David Gómez-Ullate Oteiza, Universidad Complutense de Madrid, Spain
13. Prof. Sergei Suslov, Arizona State University, US
14. Prof. Luc Vinet, Université de Montréal, Canada.

List of Trainers

1. Prof. Mama Foupouagnigni, University of Yaounde I and AIMS Cameroon
2. Prof. Wolfram Koepf, University of Kassel, Germany
3. Dr. Alta Jooste, University of Pretoria, South Africa.
4. Dr. Maurice Kenfack Nangho, University of Dschang and University of Pretoria
5. Dr. Salifou Maboutngam, University of Maroua, Cameroon
6. Dr. Merlin Mouafo Wouodjie, Postdoc, University of Kassel
7. Dr. Patrick Njionou Sadjang, University of Douala, Cameroon
8. Dr. Daniel Duviol Tchoutia, Postdoc, University of Kassel