



eastern africa university mathematics programme

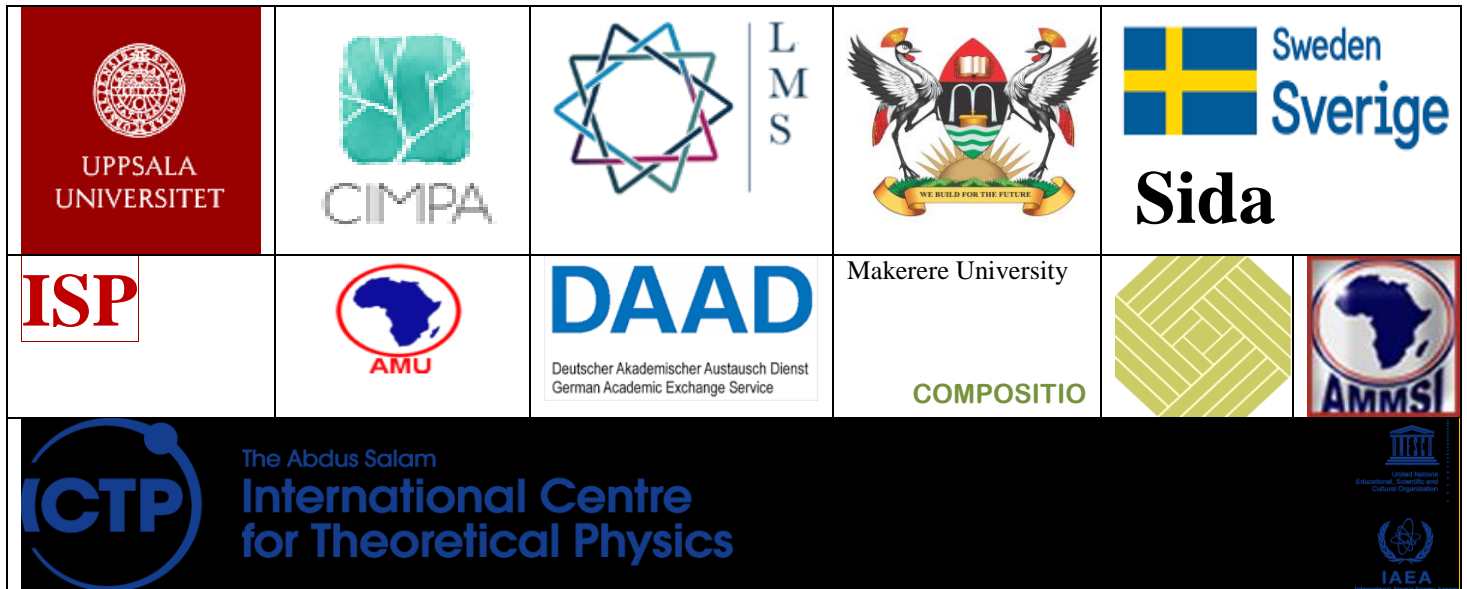
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FINAL ANNOUNCEMENT OF THE 2019 EAUMP – ICTP/SMR3310 SUMMER SCHOOL ON ALGEBRAIC TOPOLOGY AND ITS APPLICATIONS (TOPOLOGICAL DATA ANALYSIS)

<http://indico.ictp.it/event/8699/>

TO BE HELD AT

MAKERERE UNIVERSITY, KAMPALA – UGANDA

FROM 15TH JULY, 2019 TO 2ND AUGUST, 2019.

(Arrival: 14th July, 2019 Departure: 3rd August, 2019)

INTRODUCTION

The Eastern Africa Universities Mathematics Programme (EAUMP) courtesy of **the International Science Programme (ISP) of Sweden; jointly with ICTP, Trieste, Italy; Sida; CIMPA, DAAD, LMS/AMMSI, COMPOSITIO** is organizing a three weeks summer School **on Algebraic Topology and its Applications** to be held at Makerere University, Kampala, Uganda from 15th July to 2nd August, 2019. It is intended that the School will take the audience comprising young academic staff members and advanced graduate students (M.Sc, Ph.D and Postdoctoral Students) of Mathematics from the Eastern African region and beyond.

The school is the next one in a series of schools organized under the Eastern Africa Universities Mathematics Programme (EAUMP). The most recent EAUMP schools were organized in 2015 at Makerere University, Uganda, on Experimental Pure Mathematics; in 2016 at the University of Rwanda on Number Theory; in 2017 at the University of Nairobi on Modern Functional Analysis; and in 2018 at the University of Dar es Salaam on Homological methods in Algebra and Geometry. All the schools are within one of the main aims of EAUMP which is to improve the pure mathematics in the region. Earlier schools have been supported by EAUMP universities, ICTP, CIMPA, Sida, ISP, IMU, AMMSI, LMS, DAAD and Compositio, among

others. The member Universities of the EAUMP are University of Dar es Salaam, Tanzania; University of Nairobi, Kenya; University of Zambia, Zambia; Makerere University, Uganda; University of Rwanda, Rwanda.

GOALS OF THE SCHOOL

- To introduce participants to current trends in Algebraic Topology and its applications, including knot theory and Topological Data Science, and provide research topics for masters and PhD studies.
- To provide a forum for African mathematicians to interact, exchange ideas and initiate collaborations.
- Identify talented students for possible PhD programs.
- To produce digital lecture material for dissemination, which contributes to the training of master students in the Eastern Africa region.

SCHOOL PARTICIPATION

Online application form is available at <https://e-portal.ictp.it/applicant/login> and will close on **28th April, 2019**. Support by the school will only be extended to those who register online. Only those applicants who will be successful shall be contacted. Letters of invitation will be issued to participants upon request for the processing of travel documents. Certificate of participation from ICTP at the end of the school will be given to only those who register online.

Participants who wish to sponsor themselves can originate an email to kasozi@cns.mak.ac.ug copied to ssevviiri@cns.mak.ac.ug, szendroi@maths.ox.ac.uk. They will pay a registration fee of US\$300 on arrival. Registration fee will cater for lunches, teas, airport transfers and stationery. Self-sponsored participants shall meet their own travel, accommodation, insurance and meals (outside the official school meals). Only those applicants who will be successful shall be contacted. Letters of invitation will be issued to participants upon request for the processing of travel documents and/or funding. The LOC will provide the necessary support in all aspects. Deadline for self-sponsored participants is 1st July, 2019.

STRUCTURE AND PROGRAMME

As in the years 2013-2017, participants will be asked to submit **mini-projects** on the material studied at the School, with the best submissions receiving prizes/awards. They will work on their projects after the end of the School and will submit them during the third week of the school. The speakers at the school are:

Balazs Szendroi (University of Oxford)

Venuste Nyagahakwa (University of Rwanda)

Jean-Baptiste Gatsinzi (Botswana International University of Science and Technology)

Claudia Scheimbauer (NTNU, Trondheim)

Ulrike Tillmann (University of Oxford)

Mehdi Yazdi (University of Oxford)

Vidit Nanda (University of Oxford)

Here is the detailed course plan for the School:

Week 1: Introductory courses

Course 1: Introductory Topology

Lecturers: **Balazs Szendroi (University of Oxford)**
Venuste Nyagahakwa (University of Rwanda)

Description: *This course will introduce the basic ideas of topology, starting with an abstract definition of topological space, and treating many examples.*

Course 2: The Fundamental Group

Lecturer: **Jean-Baptiste Gatsinzi (Botswana International University of Science and Technology)**

Description: *The fundamental group is a basic but key algebraic invariant of a topological space. This course will define this group and give some interesting examples of how to compute it.*

Week 2: Intermediate courses

Course 3: Manifolds

Lecturer: Claudia Scheimbauer (NTNU, Trondheim)

Description: Manifolds provide a very interesting class of examples of topological spaces, of great interest in applications to geometry, physics and elsewhere. This course will introduce this notion with many examples, mainly from dimensions 1, 2 and 3.

Course 4: Introduction to persistent homology

Lecturer: Ulrike Tillmann (University of Oxford)

Description: Persistent homology, a method for computing topological features of a space at different spatial resolutions, will be explained in this course, with a view towards applications.

Week 3: Advanced courses

Course 5: Introduction to Knot Theory

Lecturer: Mehdi Yazdi (University of Oxford)

Description: A knot is a tangled piece of rope in the three dimensional space, with the two loose ends glued together. Knot theory asks questions such as: can this knot be untangled by continuously deforming the rope? Are there ways to tell two knots apart? This course will discuss the basic invariants and quantities defined for knots, together with the connection with the theory of 3-dimensional manifolds.

Course 6: Topological Data Analysis

Lecturer: Vidit Nanda (University of Oxford)

Description: Topological data analysis is a recent and fast-growing field providing a set of new topological and geometric tools to infer global features from complex data. This course will give an introduction to this circle of ideas.

INTERNATIONAL ORGANISING COMMITTEE (IOC)

- Leif Abrahamson (University of Uppsala, Sweden)
- Bengt-Ove Turesson (Linköping University, Sweden)
- Fernando Rodrigues Villegas (ICTP, Italy)
- Balazs Szendroi (University of Oxford, UK) – Lead International Organiser
- Patrick Weke (University of Nairobi, Kenya)

LOCAL ORGANIZING COMMITTEE (LOC)

- David Ssevviiri - Makerere University (Overall Coordinator)
- Juma Kasozi - Makerere University (Network Secretary)
- John Mango - Makerere University (Inter-network Coordinator)
- Patrick Weke - University of Nairobi
- Jared Ongaro - University of Nairobi
- Eunice Mureithi - University of Dar es Salaam
- James Makungu - University of Dar es Salaam
- Michael Gahirima - UR-CST, Nyarugenge
- Wellars Banzi - UR-CST, Nyarugenge
- Mubanga Lombe - University of Zambia
- Isaac D. Tembo - University of Zambia

LANGUAGE

English will be the official language at the School.

CURRENCY

Local currency is the Uganda Shilling at the foreign exchange rate of US\$ 1 = 3,650 UgShs . There are many local Forex bureaus in Kampala, some of them open 24 hours. Banks and Forex bureaus accept traveler's cheques and major credits cards are accepted at leading hotels, restaurants and super markets.

VISA

Visa may be required for International visitors to Kampala - Uganda. Please check with the respective local Embassy for details and other requirements (e.g. You will not be allowed to enter Uganda without a valid yellow fever vaccination certificate). Letters of invitation will be issued to participants upon request for processing of the visa.

FURTHER INFORMATION

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