

AIMS-IMAGINARY Maths Communication in Africa Workshop-Exhibition / final program/ Nov 14, 2014

This is the final program of the workshop as it was conducted. There were some last minute changes with respect to the announced talks. You can find the complete documentation of the workshop including the slides of the talks and the description of the group work at www.imaginary.org/aims

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Program Overview

Day (Nov, 2014)	Morning activity	Afternoon Activity	Comment
Tuesday 04	<ul style="list-style-type: none"> Preparation of exhibition 	<ul style="list-style-type: none"> School tours at exhibition 	For exhibitors
Wednesday 05	<ul style="list-style-type: none"> Official opening Tour of the exhibition Talks 	<ul style="list-style-type: none"> Workshops School tours at exhibition 	For workshop participants
Thursday 06	<ul style="list-style-type: none"> Talks & Workshops School tours at exhibition 	<ul style="list-style-type: none"> Workshops School tours at exhibition Conference Dinner 	For workshop participants
Friday 07	<ul style="list-style-type: none"> Talks & Workshops School tours at exhibition 	<ul style="list-style-type: none"> Hosting of the science slam Finalization, networking 	For workshop participants

Detailed Program

Time	Workshop	Exhibition	Comment
Tuesday, November 04, 2014 - Venue AIMS-South Africa, Melrose place, Muizenberg (SETUP / EXHIBITION / ARRIVAL)			
8:30 - 12:00	Setting up of the exhibition space		AIMS and IMAGINARY Team
12:00 - 13:00	Training of exhibition support members		IMAGINARY team and exhibition team
14:00 - 17:30	Finalize workshop framework (AIMS, IMAGINARY team and any interested attendees present)	2 school groups (1.5 hours each)	Exhibition support members
All day	Arrival of the participants of the workshop		
Wednesday, 05 November, 2014 - Venue AIMS-South Africa, Melrose place, Muizenberg (WORKSHOP DAY 1)			
8:30 - 9:00	Opening and welcome address by Prof. Barry Green (AIMS, South Africa), Andreas Matt (IMAGINARY) and Magdaleen Marais (University of Pretoria)		At the exhibition hall
9:00 - 10:00	Visit of the AIMS-IMAGINARY exhibition and discussions about the exhibits by workshop participants and AIMS staff representatives		Exhibition organizers and support members
10:15 - 13:00	10:15 Talk 1: International Mathematics Communication (AndreasMatt) 10:45 Talk 2: Interactive software exhibits for mathematics outreach (Antonia Mey) 11:15 Break for Coffee and Discussions	Exhibition visits by schools and Universities (2 groups; 1.5 hours each)	

Time	Workshop	Exhibition	Comment
	<p>11:45 Talk 3: Discussion on “Second language as a barrier to effective learning of Mathematics and Sciences in Southern Africa”, moderator: Marie Joubert</p> <p>12:15 Planning of the workshop program in the afternoon</p>		
13:00 – 14:00	Lunch		
14:15 – 17:30	<p>Knowledge workshop Weaving Geometric Shape (Marcos Cherinda)</p> <p>Action workshop Planning a mathematics museum in Tanzania (three workshop groups)</p>		Parallel workshop sessions
18:00 – 19:00	Supper		
20:00 – 22:00	Action workshop Status Quo on Maths Communication and Sharing Experiences Workshop		
Thursday 06 November, 2014 - Venue AIMS-South Africa, Melrose place, Muizenberg (WORKSHOP DAY 2)			
9:00 – 11:00	<p>09:00 Talk 4: Hands on Mathematics! (Jean-Michel Kantor)</p> <p>09:30 Talk 5: Mathematics as a journey (Karin-Therese Howell)</p> <p>10:00 Talk 6: How “i” got into in pricing (Diane Wilcox)</p> <p>10:30 Break for Coffee and Discussions</p>	Exhibition with school groups (3 groups; 1.5 hour each)	

Time	Workshop	Exhibition	Comment
11:00 – 13:00	<p>11:00 Talk 7: Ready, steady... go, Spin8! (Alessandra Renieri)</p> <p>11:30 Talk 8: The AIMS Schools Enrichment Centre: professional development and research (Marie Joubert)</p> <p>12:00 Short Talk: Collaboration Tools for Higher Education (Rob Bristow)</p> <p>12:15 Planning of the workshop program for the afternoon and continuation of the workshops</p>		Parallel workshop sessions
13:00 – 14:00	Lunch		
14:15 – 17:30	<p>Action workshops</p> <p>Planning a mathematics museum in Tanzania (continuation)</p> <p>Creation of a Blog/Info Portal on Maths in Africa Workshop</p> <p>Presentation of first results of workshop activities</p>	Exhibition visits by visiting schools and Universities (2 groups; 1.5 hours each)	Parallel workshop sessions
18:00 – 22:00	Group Dinner; outside AIMS (African Restaurant – Gold)		
Friday 07, November, 2014 - Venue AIMS-South Africa, Melrose place, Muizenberg (WORKSHOP DAY 3)			
9:00 - 13:00	<p>9:00 Talk 9: Crypto Giants: Undergraduates mathematics research group (Mokwetha Mabula)</p> <p>9:30 Talk 10: AIMS – Public Engagement Overview (Samuel Awuku)</p>	Exhibition with school groups (2 groups; 1.5 hour each)	

Time	Workshop	Exhibition	Comment
	<p>10:00 Knowledge workshop Writing a funding proposal workshop (Julie Staples, Andreas Matt)</p> <p>11:00 Action workshops Writing a funding proposal workshop</p> <p>Computer Science Programming Centre Workshop</p>		
13:30 - 14:15	Lunch		
14:15 - 17:00	Science slam event		
17:30	Closing remarks, supper, networking, departures		

List of Talks

All talks have a duration of 20 minutes plus 10 minutes open discussion with the audience.

- **Crypto Giants: Undergraduates mathematics research group**

Presenter: Mokhwetha Mabula, University Pretoria, South Africa

The aim of the project is to address the shortage of postgraduate's students in the field of mathematics and applied mathematics. At the University of Pretoria mathematics department most of the postgraduate students are not from UP undergraduates programmes. We are aiming to change this situation through this project. We want to represent mathematics as one of the "cool" subjects and market it widely across our communities by visiting high schools around Pretoria.

- **International mathematics communication and IMAGINARY**

Presenter: Andreas Daniel Matt, IMAGINARY / Mathematisches Forschungsinstitut Oberwolfach, Germany

In this talk we give a quick overview of international mathematics communication. It contains glimpses into maths museums and interactive maths exhibitions, it shows successful media projects and many novel forms to raise awareness of mathematics, to show its beauty, to engage a general public, and to disseminate mathematical contents. In the second part of the talk a brief introduction into IMAGINARY is given, an open and collaborative way to communicate mathematics with projects in over 30 countries.

- **Interactive software exhibits for mathematics outreach**

Presenter: Antonia Mey, IMAGINARY / Freie Universität Berlin, Germany

Changing the image mathematics has in the mind of the general public is one of the main goals of any outreach activity. Only if mathematics educators make the subject an interesting subject, as well as mothers and fathers encourage their children to do well, a good mathematics education can be guaranteed. Mathematics is not just memorising formulas and working out problems that seem to have no connection to real life, but it is actually hidden everywhere in every day life. I will present a small collection of software tools free to download on the IMAGINARY.org platform that allow to connect mathematics with art, chemistry and meteorology. These tools can, to some extent, be used as educational tools, but at the same time be an informative resource away from a classroom, to encourage a general interest in the subject.

- **Ready, steady... go, Spin8!**

Presenter: Silvia Benvenuti, Alessandra Renieri, Mathematical Division
University of Camerino, Italy

What is the initial spark to create a math outreach group? How should you put together different people? What is the training and the education of a math communicator? Work in a team: limits and potentialities. In this talk we will tell you about our story, that is still at the beginning. We would like to share some - potentially- useful recommendations with those who want to create a similar team-group.

- **Hands on Mathematics!**

Presenter: Jean-Michel Kantor, IMJ Jussieu, Paris, France

Promotion and education of mathematics take new forms nowadays, in particular interactive travelling exhibits. Light and cheap elements of an exhibition can introduce to important mathematical ideas, fundamental concepts (calculus, symmetry) and daily-life applications. Curiosity and fun can be developed by hands-on material, games, puzzles, and be enjoyed by kids, students, teachers, and parents simultaneously. We will present the exhibition „Experiencing mathematics“ made in France with the help of Cité des Sciences de Paris-La Villette and UNESCO and suggest the duplication of some of its elements, for which we will give historical background and suggestions of use.

- **The AIMS Schools Enrichment Centre: professional development and research**

Presenter: Marie Joubert, Barrie Barnard, AIMSSEC, South Africa

This talk describes key aspects of the outreach activities (for schools) of AIMS South Africa, carried out by the AIMS Schools Enrichment Centre (AIMSSEC). AIMSSEC recognises first that the teacher is usually the most important influence on children's learning of mathematics, and second that in South Africa the quality of teaching in mathematics is poor. It seems that many teachers lack both the mathematical and pedagogical content knowledge necessary for good teaching. AIMSSEC's work aims to address this concern by providing professional development for teachers of mathematics which places an equal emphasis on both mathematical and pedagogical content knowledge. It also adopts approaches which encourage teachers to enquire into their own practice. In this talk we describe how we do this and outline some of the challenges in doing so. One important aspect of pedagogical content knowledge is the effective use of formal and informal assessment data, known as formative assessment. AIMSSEC's research, part of an international project on formative assessment in mathematics

(FaSMEd), takes a design-based approach to develop a 'toolkit' for teachers to support them in the effective use of formative assessment. We will explain what the toolkit is, how it will be developed and how we hope it will be used.

- **How "i" got into pricing**

Presenter: Diane Wilcox, Wit Water Srand University, Johannesburg

The presentation highlights some advanced mathematical approaches to pricing market-listed securities. It offers a brief introduction to pricing models for investment and risk-management, intersecting discussion with interdisciplinary aspect of modelling complex systems as well as mathematical methods which explicitly include the number "i". From a communication perspective, this talk will give communicators insight into actual applications of advanced mathematics to show where some new horizons of research are.

- **Mathematics as a journey**

Presenter: Karin-Therese Howell, Mathematics Division, Stellenbosch University, South Africa

This talk will discuss some of the multimedia tools I have used in teaching first-year mathematics to try to address the negative attitude many learners have towards mathematics. My emphasis is on seeing the study of mathematics as journey, most times challenging, but also exciting, with many avenues of discovery and secrets along the way.

List of Workshops

General Information

We distinguish between two types of workshops: knowledge workshops and action workshops. Knowledge workshops have the aim to transmit detailed knowledge of a specific topic. The knowledge transmission is carried out in a highly interactive way (through jointly working/discussing/doing). Action workshops have the goal to create something new together in a team (where nobody has specific knowledge beforehand, and where the accumulative knowledge of the participants is needed). The deliverable could be a document, a strategy, a concrete plan, an exhibit, a software, etc.

On the first day, all workshops are briefly introduced and the participants can choose the workshops they wish to participate. There is the option to have big workshops (with many or even all participants) or to conduct several smaller workshops in parallel. New workshop ideas might arise during the conference and can then be conducted on the second or third day. The results of each workshop will be presented to all participants and will be made available online under an open license.

Requirements for the workshops:

It is recommended that the participants bring their own laptop/computer. Internet is needed for most of the workshops (especially the action workshops).

The duration of the workshops are between 2 and 4 hours (depending on the workshop). There is also the possibility to extend workshops to a second day, if required.

Knowledge workshops

- **Weaving geometric shapes**

Conducted by: Marcos Cherinda, Ethnomathematics Research Centre, Mozambique

In this workshop we will present how to gather mathematical ideas by exploration of basket weaving technique called *twill*, using a specially devised tool – the weaving board. Twill weaving by its very nature involves mathematical ideas such as translation, rotation, symmetry, sequences and series, combinations, matrices, etc. Examples of activities are given, showing ways of bringing artifacts of socio-cultural learner's environment to the mathematics classroom setting.

Action workshops

- **Status quo of maths communication in Africa and Sharing Experiences**

Supervised by: Silvia Benvenuti, Alessandra Reniere, University of Camerino, Italy
Deliverable: a survey of maths communication activities and partners for a given list of countries in Africa

In this workshop a survey on maths communication on the African continent will be prepared. For as many countries/regions as possible we collect: active maths communicators, mathematics centres working in this field, science museums or related institutions, maths research institutes who could be willing to participate in such activities, journalists/artists or general media, etc. We will also include past projects, like maths exhibitions, TV shows, school projects, etc. The idea of this survey is to learn from others and to have an idea of what is going on in the continent, to build up a network for the future.

In this workshop experiences and stories connected to maths outreach and maths communication by the various participants are shared, for example on the building of an outreach group. Also new ideas for special target groups shall be addressed, for example to address families (especially mothers) in our activities.

- **How to make an exhibition or establish a math outreach centre?**
Motivated by: Mark Roberts (AIMS Tanzania)

In this workshop, we will try to plan a mathematical exhibition (pop-up museum) for AIMS Tanzania. The idea is to work on a basic concept, involve the local community and compile a list of ideas (exhibits), which can be used as a museum installation or also in form of a traveling exhibition.

- **Creation of a Blog/Info Portal on Maths in Africa Workshop**
Motivated by: Jonathan Shock

The objective of this workshop is to plan a blog/info portal for Mathematics (Communication) in Africa. The structure, design, name and everything needed to setup such a blog and to involve the community will be discussed.

- **Computer Science Programming Centre Workshop**
Motivated by: Amadou Tall

In this workshop we are planning to establish computer science outreach centres at our various institutes (AIMS), with the goal to teach young students (including kids) basic programming and computer science skills. This project shall be part of our "education" focus, which supports our research and higher training programs.

- **Funding math outreach activities in Africa**
Supervised by: Julie Staples, AIMS and Andreas Matt, IMAGINARY
Deliverable: Ideas/Hints to write a funding proposal, list of possible funders (foundations, institutes, embassies)

Funding is crucial for sustainable projects. The goal of this workshop is to share experiences in writing funding proposals (hints, problems, general templates) for many types of grants (sponsors, foundations, institutes, embassies, etc.). At the

same time a list of possible funders is prepared (local, national, international). In the best case, a proposal is already send out to a funding agency.

Workshops and talks which had to be cancelled or workshops which were combined into other workshops:

- **Talk: Second language as a barrier to effective learning of Mathematics and Sciences in Southern Africa**

Presenters: Kinnock V. Munthal, Efraim Muzambani, Brian Makaka, University of Namibia, Namibia

In most African countries, kids use a second language in learning science subjects at school. The major second languages used in African schools are English, French and Portuguese. This paper will explore, from the available literature, how the use of a second language negatively impacts the acquisition of science knowledge by students in Africa. Strategies to facilitate the comprehension of science by learners while using the second language will then be explored.

- **Talk: Improving Mathematics Performance of Female Students in Rural Secondary Schools of Uganda using Self-Regulated Learning Techniques**

Presenter: Charles Magoba Muwonge

Pedagogical studies have revealed a significant relationship between use of self-regulation skills and better performance of students at all levels of learning. In this talk we examine how best self-regulated learning techniques may be used in rural USE schools to boost performance of female students in Mathematics at Ordinary Level (O' Level). Self-regulated learning techniques such as pre-action, performance control and self-reflection skills will be discussed in detail. Such techniques require participatory and integrated efforts of school administrators, parents/guardians and the individual students.

- **Low cost 3D printing**

Conducted by: Carlo Fonda, Tarig Abdelgadir, International Center for Theoretical Physics

Technical introduction into the creation of 3D printed mathematical objects. It is shown how to use special software to prepare the 3D data and how to create the 3D sculptures. A low cost 3D printer and sample data from IMAGINARY sculptures will be available for this workshop. It is recommended to bring a laptop for this workshop.

- **Workshop: Network and future plans (best to be conducted at the last day)**

Supervised by: to be defined

Deliverable: Tools, blog structure, action plan

This workshop is designed to prepare an action plan for the next year (or several years) involving all local participants. Tools to foster communication and exchange (like a newsletter, forum, blog post) shall be established and ways to guarantee communication and sustainable projects.

- **Develop concrete math exhibits for Africa (several workshops possible)**

Supervised by: to be defined

Deliverable: concrete exhibit (including "how to use guide" with explanations, etc.)

This workshop is meant to focus on developing or adapting an exhibit which can be used at a math outreach activities. For example: Ichiro Tanioka Escher tilings.

- **Workshop: Media work**

How to write press release, contact media, publish articles, write for a general public, collaborate with journalists, etc.

- **How to use IMAGINARY resources for math communication**

Conducted by: Andreas Matt, Antonia Mey, IMAGINARY

The open and collaborative platform imaginary.org is presented and several ways how to concretely use it for own mathematics communication activities. These activities include preparing a mathematical image gallery, using mathematical software in schools, and sharing own material and new creations. It is recommended to bring a laptop for this workshop.

Contact

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