



AIMS

African Institute for
Mathematical Sciences
NEXT EINSTEIN INITIATIVE

March 2015

Network News



Note from the President & CEO

Catch and embrace the light in 2015

The United Nations declared 2015 the International Year of Light. As we embark together in 2015, I am excited to shine a spotlight on our path ahead. AIMS is set to have an incredible year with much to anticipate.

This year marks several important scientific anniversaries related to “light:” discoveries and applications that have illuminated human understanding in mathematics, physics, astronomy and the natural world. It is the 1000th anniversary of Ibn Al-Haytham’s work *Optics*. Al-Haytham (956 - 1040 CE) was born in Basra, Iraq and settled in Egypt where he made significant contributions to optics, astronomy, mathematics, meteorology, visual perception and the scientific method. Historians dubbed him “The Physicist” – and UNESCO, is conducting a global campaign celebrating his contribution to mathematics and science.

We also mark the 200th anniversary of French physicist and engineer Augustin-Jean Fresnel proposition of light as a wave, key in wave optics; 150th for James Clerk Maxwell’s electromagnetic theory of light propagation; 110th for Einstein’s theory of photovoltaic effect and 100th for his embedding of light in cosmology through general relativity; the 50th for both the discovery of cosmic microwave background by Arno Allan Penzias and Robert Woodrow Wilson, Charles Kao breakthroughs in light transmission through fibres for optical communication. These important achievements support so many innovations in our everyday lives.

AIMS also has much to celebrate. At the end of 2014, we

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welcomed eight new graduates from AIMS South Africa bringing our total alumni family to 748. Congratulations to them as they begin their careers as leaders in science, each of them a spark we are confident will ignite Africa.

In the first quarter, AIMS also held its Program



United Nations
Educational, Scientific and
Cultural Organization



International
Year of Light
2015

Implementation Planning (PIP) meetings for the MasterCard Foundation (MCF) program roll out in South Africa, Sénégal and Cameroon and were recruited. Several key roles for the organization going forward including leaders for the MCF program, the Co-op Masters MCF program, the MCF Teaching Training program and Gender Equity and Inclusion. With the MCF program underway, we look forward to the official launch scheduled for June this year. We also had a successful meeting with the Next Einstein Forum Scientific Steering Committee selecting, our first cohort of NEF Fellows.

In February, we travelled to the University of Chicago to enter discussions for a partnership with the private research university that has 89 Nobel Laureates – the most of any institution in the world – 9 Fields Medalists. We are excited to make an impact at the Africa Higher Education Summit in Dakar in March, and we look forward to the first AIMS Global Scientific Council meeting to be chaired by Prof. Green in the United Kingdom this May.

The year is off to an energetic start. Keep up the momentum and please take a moment to read the newsletter to keep informed about news around the network.

Sincerely,
Thierry Zomahoun

AIMS expands into Tanzania

AIMS opened its fifth Centre – first in East Africa – on 13 October 2014 in the city of Arusha, Tanzania, with 40 students from ten different countries – one third of them female. They were joined by the five tutors who will be supporting their studies throughout the year, and were welcomed by the Rector of AIMS Tanzania, Prof. Mark Roberts, and the AIMS Director of Centre Development, Mr Samuel Awuku. ●



AIMS African Institute for Mathematical Sciences TANZANIA



Guest Speaker: Prof. Fancis Benyah



Valentia Boledi Tlomatsana

Eight South African students graduate from AIMS South Africa

AIMS South Africa graduated its third group of South African students at a special Recognition of Achievement Ceremony which was held on 27 November 2014.



Ms Valentia Boledi Tlomatsana, a student from Ekangala, Gauteng Province, said, "This year has been a tough but enjoyable journey for us all. AIMS has taught me to be patient with myself and what it means to be African. AIMS enables young Africans to advance maths and science in Africa for a brighter future." ●

AIMSSEC gets SA Educators endorsement

AIMSSEC is delighted to announce that its Mathematical Thinking Course has recently been endorsed by SACE (South African Council for Educators) for fifteen professional development points. AIMSSEC is now an accredited service provider.



From 4 – 14 January 2015, AIMSSEC delivered the Mathematical Thinking (MT) course at Stellenbosch High School. The ten-day residential course was attended by 57 teachers from Western Cape (Metropole South), Eastern Cape, Limpopo and KwaZulu Natal provinces. The MT course has been presented twenty-three times to 1,297 teachers over 12 years.

AIMS-NEI VISION: Leading the transformation of Africa through innovative scientific training, technical advances and breakthrough discoveries that benefit the whole of society.

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AIMS-NEI Network News is produced quarterly by AIMS Next Einstein Initiative. Contact : info@nexteinstein.org

Dr Wilfred Ndifon, Joint Junior IDRC Chair, arrives at AIMS South Africa



In January 2015 Dr Ndifon arrived at AIMS South Africa to commence his duties in the Research Centre. He has been based at AIMS Ghana since his appointment last year.

Dr Ndifon shares the Joint Junior Chair with Dr Gaston Mazandu. The Chair holders spend approximately five months per year at each research centre and the remaining two months at a partner University in Canada. This appointment was made possible through funding from the Canadian International Development Research Centre (IDRC) to grow and strengthen the research programs across the AIMS Network and to contribute to the capacity building of our AIMS Alumni. Dr Ndifon's area of specialisation is in Quantitative Immunology and Bioinformatics; and his research interest is in elucidating the organising principles of T-cell diversity in health and disease, with the ultimate goal of developing new approaches (including diagnostics) to controlling various communicable and non-communicable diseases. ●



Prof. Romeel Davé



Prof. Bruce Bassett

NRF gives members of the AIMS South Africa Research Centre top ratings

AIMS South Africa is proud to report that the National Research Foundation (NRF) awarded Prof. Romeel Davé, the SARCHI in Cosmology with Multi-wavelength Data jointly held between AIMS South Africa, UCT and SAAO an A2 rating. Prof. Bruce Bassett, head of the Cosmology Group was awarded a B1 rating. NRF ratings are allocated based on a researcher's recent research outputs and impact, as perceived by international peer reviewers. An "A" rating is given to leading international researchers and a "B" rating is given to internationally acclaimed researchers.

AIMS on Canada's Parliament Hill

On 1 October 2014, AIMS held an inaugural event on Parliament Hill in Ottawa, Canada. Under the patronage of MPs Peter Braid, Lois Brown and Joe Daniel – hosted by Andrew Sheer, Speaker of the House of Commons – the event provided Parliamentarians and members of the diplomatic corps with an update on AIMS's success in Africa. It also allowed AIMS to advocate for the extension and increase of the Government of Canada's investment in AIMS through the International Development Research Centre (IDRC). The event featured all political parties and was an ideal opportunity for AIMS to showcase its programs with influential Canadian politicians, civil servants, dignitaries, donors and foreign diplomats.

The event was complemented with an interview conducted by AIMS President and CEO Thierry Zomahoun on Radio Canada, which was broadcast on 3 October 2014.

Listen to the interview in French here:

http://ici.radio-canada.ca/emissions/bernier_et_cie/2014-2015/chronique.asp?idChronique=350972

Robert Bosch Foundation approves second ARETÉ Chair

The Robert Bosch Foundation in Germany has approved a second ARETÉ Chair. The call has been published and the selection committee will meet in July 2015 to recruit a suitable candidate. For more information please visit:

<http://www.nexteinstein.org/second-aims-aret%C3%A9-junior-chair>

Alexander von Humboldt Foundation will sponsor second Chair

The Alexander von Humboldt Foundation in Germany will finance the second Research Chair for a junior research professor to be located in AIMS Ghana. The total budget will be covered by the German Ministry of Education and Research. The selection committee had their first meeting in February with Prof. Barry Green and Prof. Francis Allotey representing AIMS in this committee. ●



Next Einstein Forum preparations underway

The last few months have been very exciting for the Next Einstein Forum (NEF), the first global forum for science to be held on African soil.

In October 2014, the NEF launched its Fellows Programme which saw nearly 100 applicants respond to the call for applications. Applicants were highly qualified young scientists from all parts of Africa, including 40% women scientists. In November 2014, the NEF received endorsement from the United Nations Educational, Scientific and Cultural Organization (UNESCO) giving the NEF further credibility as a relevant and timely initiative. This coincides with a change in date of the NEF Global Gathering from October 2015 to March 2016 to accommodate the schedules of the high profile key note speakers and panellists who will make the first NEF Global Gathering in Sénégal a unique and transformative event.

In January 2015, the NEF held the first meeting of the prestigious Scientific Programme Committee which selected the first round of NEF Fellows and provided direction for the NEF as a global scientific platform as well as the Global Gathering agenda. ●





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Students focus on entrepreneurship during E-week at AIMS Centres

All AIMS South Africa students attended a course from 20 to 26 October given by Prof. Wulff Plinke (ESMT, Berlin) as part of AIMS' focus on providing students with skills and knowledge to secure employment.

1. Idyal group
2. Jokko Labs
3. Dr Howard Alper
4. Prof. Wulff Plinke
5. KOSA



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Prof. Plinke introduced the students to the concept of entrepreneurship, the characteristics of a good entrepreneur and their role in society. In addition, Dr Howard Alper, AIMS-NEI Board member and Chief Scientific Advisor to the Canadian Government, gave various talks to the students in the last week of October. His talks included, "Entrepreneurship: An Initial Foray"; "Science, Technology and Innovation" and "Asserting Leadership Affecting Organisational Change."

At AIMS Ghana, students visited Modern KOSA (an Automobile Manufacturing Company) as part of an industry visit. In Sénégal, E-week was held in early November with students participating in a *Social Impact Apps* competition, co-organized by AIMS Sénégal and Sonatel. This competition invited participants to use their knowledge and skills in mathematical sciences to develop computer applications or mathematical models to provide innovative solutions to societal problems.

Also in Sénégal, AIMS in collaboration with Jokko labs, organised a video conference panel discussion among female students of AIMS Cameroon and AIMS Sénégal on the theme "Entrepreneurship and Mathematics for Women: Challenges and Opportunities in Africa." ●



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Alumni



Eva Liliane Ujeneza

AIMS South Africa Alumni, 2011

"My country has made a great effort in promoting and empowering women; but a lot still needs to be done in terms of overcoming cultural and natural biological barriers that women encounter in their lives."

Prior to AIMS, Eva taught mathematics at a girls' high school in Rwanda. This is where she developed her passion for teaching. After obtaining a BSc in Applied Mathematics from the National University of Rwanda, she got the

opportunity to attend the AIMS program. "Since my primary school days, I knew I wanted to push my studies until I reached a postgraduate level. Coming to AIMS gave me the opportunity to start building my dreams."

Eva Liliane describes her

experience at AIMS, both as a student and as a tutor, as "incredible". According to her, the environment she found at AIMS was very different from what she had been exposed to during her undergraduate studies. The accessibility of the lecturers, their interactions with the students and the interactive learning techniques used are some of the skills she hopes to apply in her future career. "AIMS is the kind of establishment where everyone helps you to discover and develop your potential."

Currently, she is pursuing a PhD in Biomathematics at the University of Stellenbosch. She was awarded the Schlumberger Foundation's Faculty for the Future Fellowship that supports women to pursue doctorate studies in STEM (Science, Technology, Engineering and Mathematics) fields.

Her research today is on how to use mathematical models to describe the reconstitution of the immune system of HIV+ patients that are on HAARTs (Highly Active Antiretroviral Therapy). She developed an interest for mathematical models applied on biological and atmospheric processes through seminars, workshops and lectures that she attended while at AIMS.

In the future, she dreams of teaching mathematics at her home university while also contributing to the improvement of the life of both educated and uneducated women in Rwanda. "My country has made a great effort in promoting and empowering women; but a lot still needs to be done in terms of overcoming cultural and natural biological barriers that women encounter in their lives." ●



TechWomen

AIMS South Africa

On 30 January 2015, AIMS South Africa welcomed the Techwomen delegation of mentors from San Francisco and the Techwomen Emerging Leaders from Algeria, Egypt, Lebanon, Palestinian Territories, Tunisia, Yemen and Zimbabwe. They gave a presentation to the female

students on mentorship programmes for young women and girls in STEM.

On 1 December 2014, the German Secretary of State for Education, Dr Georg Schütte, visited AIMS South Africa and interacted with staff and students.

On 2 December 2014, Ms Reeta Roy,

President and CEO of the MasterCard Foundation visited AIMS South Africa. In 2006 the MasterCard Foundation decided to commit energy and resources to the continent of Africa: the MasterCard Scholarship Programme will invest \$500 million over the next decade across the continent for scholarships and leadership programmes. "Our vision is a world where all people have the opportunity to learn and prosper," said Ms Roy in her address to the AIMS South Africa students.

Internationally renowned mathematicians attended the AIMS-Stellenbosch University Number Theory Workshop held at AIMS South Africa from January 19 to 23, 2015. They included: Prof. Enrico Bombieri – Fields Medallist and one of the world's leading authorities on number theory and analysis; Prof. Nick Katz – working in the fields of algebraic geometry and currently a professor in the Mathematics Department at Princeton University; Prof. Peter Sarnak – South African-born American mathematician and currently Eugene Higgins Professor of Mathematics at Princeton University and on the permanent faculty at the School of Mathematics of the Institute for Advanced Study. He is also the recipient of the 2014 Wolf Prize in Mathematics and Dr Yuri Tschinkel, Director of Mathematics and the Physical Sciences at the Simons Foundation. ●



Dr Georg Schütte



Ms. Reeta Roy, President & CEO of the MasterCard Foundation.



Canadian High Commissioner Gaston Barban.



Canadian government visits AIMS-NEI Secretariat

On 12 February 2015, a Canadian delegation consisting of H.E. Gaston Barban Canadian High Commissioner to South Africa, H.E. Shawn Barber, Canadian High Commissioner to Mozambique and Ms. Patricia Malikail, Director General, Africa Bureau, Department of Foreign Affairs and International Trade (DFATD), visited the AIMS-NEI office and were welcomed by Dr Dorothy Nyambi, Executive Vice President, AIMS Global Network. Ms Malikail said, "AIMS is committed to excellence in education and it has a great advantage in that it is able to draw students from across the continent."



The Canadian delegation also participated in a panel discussion with AIMS alumni and researchers on "The Africa We Want: Mathematics and Science as central to development" moderated by AIMS alumni Savannah Nuwagaba. ●



Number Theory Workshop.



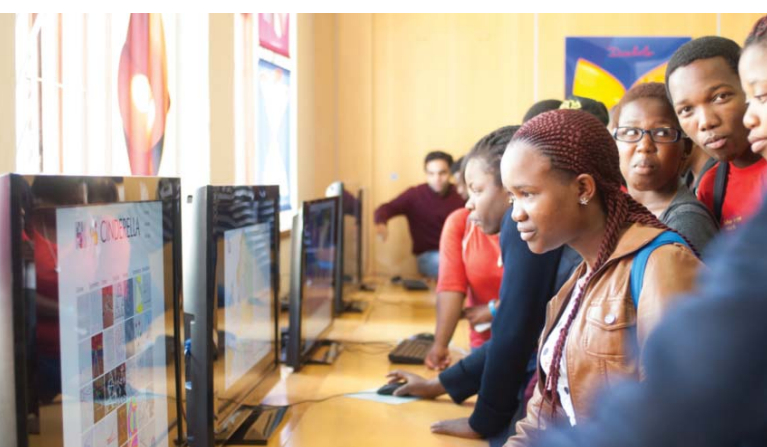
Imaginary Exhibition and Workshop

The first ever IMAGINARY Exhibition-Workshop held in Africa from 5-7 November 2014, was hosted at AIMS South Africa in Muizenberg. The event was organized by AIMS-NEL, IMAGINARY and the Mathematisches Forschungsinstitut Oberwolfach in Germany.



Attendees at the workshop.

IMAGINARY is an interactive travelling exhibition, presenting visualisations, interactive installations, virtual realities, 3D objects and their theoretical background in algebraic geometry and singularity theory, in an attractive and understandable manner. Demonstrations for all audiences provide insights into the theoretical background. ●



AIMS Tanzania

The Tanzanian Minister of Education and Vocational Training, Dr Shukuru Kawambwa, visited AIMS Tanzania on 23 October 2015. Dr Kawambwa said he looked forward to welcoming AIMS Tanzania when it moved to its permanent campus in his constituency of Bagamoyo. Prof. Mark Roberts, AIMS Tanzania Rector, outlined AIMS Tanzania's plans to establish research and teacher training centres and emphasized its ambition to set new standards in Bagamoyo for the development of historically important sites. ●

AIMS Ghana



Prof. Farai Nyabadza from Stellenbosch University visited AIMS Ghana on 21 January 2015. He gave a talk during the research centre's journal club meeting on the topic; "On the power of Mathematical Models: Examples from Epidemic Models". The talk was focused on how mathematical models have changed the landscape of diseases and epidemic management trends, monitoring interventions and determination of general dynamics. Work on several epidemic models was presented and summarized.

AIMS Ghana, with sponsorship from the Bluedawn Foundation, embarked on an outreach campaign at the University of Abomey-Calavi from 2-4 December 2014. The purpose of the visit was to introduce AIMS to the university communities, encourage student interest in studying the mathematical sciences and encourage young talented Africans who are vital to Africa's development to apply to AIMS. ●



AIMS Cameroon

From 17-18 November 2014, a delegation of academics including Prof. David Simo from the University of Yaounde I (Cameroon), Prof. Jens Gebauer from the Phine Waal University (Germany), Dr Heather-Marco from the University of Cape Town, Prof. Ernst Uken from Cape Peninsula University of Technology and a representative of the Humboldt Foundation visited AIMS Cameroon and discussed the establishment of the German Chair sponsored by the Humboldt Foundation. ●

AIMS-NEI expands to North America

Beginning in July 2014, AIMS began renewed efforts to establish an AIMS chapter in Toronto, Canada.

This chapter will have a double purpose: it will act as the AIMS-NEI Global Network's representative in North America where it will promote the achievements of AIMS, the value of math and science as a means of development; and act as a point for partnership development in North America. The transfer of the administrative and financial functions are underway, shifting these responsibilities from the Perimeter Institute to AIMS Canada. •



AIMS United Kingdom

In November 2014, AIMS UK was invited to the Planet Earth Institute's Science in Africa, Big Data #unconference in London. The event was chaired by RT. Hon. Lord Paul Boateng, and in attendance were a wide range of PEI partner institutes working towards achieving the scientific independence of Africa. Also included on the panel was former AIMS Board member Romain Murenzi.

AIMS Germany

On 20 October 2014, Christian Gruenler from the Germany chapter gave a talk at ETH Zurich along with Prince Osei, a researcher from AIMS Ghana.

ETH has 18,000 students and is one of Europe's elite universities in the area of science and engineering. Further discussions were held in a meeting in February to foster closer cooperation between ETH and AIMS. •

AIMS Public Engagement

Dr Nyambi speaks at World Bank Town Hall Meeting on Stem in Africa

The Constituency for Africa (CFA), in collaboration with the Africa Region Office of the World Bank (AFR), hosted the Africa Town Hall Meeting on the theme: Strengthening U.S.-Africa Multilateral Cooperation in the Promotion of the Development of Science, Technology, Engineering and Mathematics (STEM) in Africa on 30 September 2014.

The Town Hall brought together key stakeholders and decision makers in government, business, civil society and academia from Africa, the United States and the African Diaspora, to discuss the importance and opportunities for investing in STEM in Africa. Dr Dorothy Nyambi, Executive Vice President, AIMS-NEI represented AIMS as a panellist.

View the Town Hall here:

<http://live.worldbank.org/stem-research-sub-saharan-africa> •



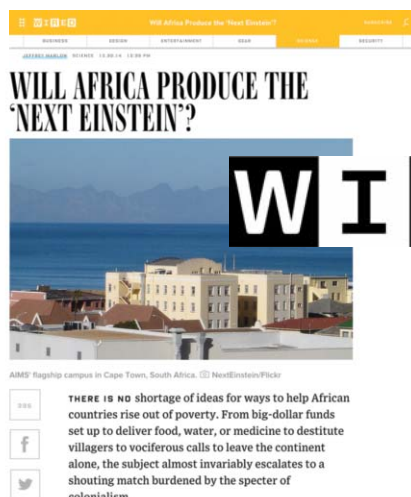
AIMS model showcased at Falling Walls Conference

The Falling Walls Conference was held from 8-10 November 2014, in Berlin, Germany, to celebrate the 25th anniversary of the fall of the Berlin Wall.

A number of high profile speakers gave presentations from the world of science and technology. AIMS-NEI President and CEO Thierry Zomahoun also presented on "Breaking the walls to untapped genius: How capacity building in mathematics lays the foundation for scientific excellence." In his presentation, he explained how AIMS-NEI can promote the transformation of Africa through cutting-edge postgraduate training and research which results in technological progress and scientific discoveries which might benefit the whole of society.

Watch his presentation here: <http://www.falling-walls.com/videos/Thierry-Zomahoun-4203>





Will Africa Produce the 'Next Einstein'?

Wired/Jeffrey Marlow/30 December 2014

EXCERPT: "There are three formal AIMS undertakings: a master's degree program in Mathematical Sciences, research, and teacher training. The master's program offers free tuition to accepted students and trains them in both general principles – problem formulation, the scientific method, communication – and cutting-edge math in subjects including computer science, biomathematics, and financial mathematics. Research will allow for international collaborations and advanced student training.

"The good thing about mathematical sciences is that it doesn't require heavy infrastructure," Zomahoun says. "It's cheap – you just need a pen, paper, and then you can do it."

Of course, you also need promising talent and inspiring teachers, and Zomahoun is scouring the continent for precocious youth in an effort he's calling the Next Einstein Initiative. "AIMS is training Africa's brightest students," he says, "and we're trying to provide solutions to the critical issues that the continent is facing."

Read the full article:

<http://www.wired.com/2014/12/will-africa-produce-next-einstein/>

Two stand-out models of physics education and outreach in South Africa

PhysicsToday/Adriana Marais, Kazage J. Christophe Utuje and Amirhossein Sajadi/February 2015

EXCERPT: One model aims to address socioeconomic disparities; the other brings students and distinguished regional and international lecturers together for an advanced, intense training program.

Physics education got its chance on center stage at the 6th annual Inter-Continental Advanced Materials and Photonics Summer School (I-CAMP), held 15–29 June 2014. South Africa hosted this, the first I-CAMP on the continent; previous host locations included Beijing, China; Boulder, Colorado; Buenos Aires, Argentina; Cambridge, UK; and Sydney, Australia.

Read the full article: <http://scitation.aip.org/content/aip/magazine/physicstoday/news/10.1063/PT.5.2024>

Africa: Inter-African Research Links Rare Below the Sahara

All Africa/Puneet Kollipara/27 October 2014

EXCERPT: Most research in Sub-Saharan Africa (SSA) is produced alongside scientists from outside the region, with collaborations within Africa sorely lacking, says a report, which also found that the region's research capacity is too small to keep up with development ambitions.

For example, 70 per cent of research in east Africa and 79 per cent in southern Africa was produced through non-SSA collaboration in 2012, said the report, issued by the World Bank and academic publisher Elsevier at a forum last month (30 September) in Washington DC, United States.

Read the full article: <http://allafrica.com/stories/201410272729.html>

STEM courses crucial to nation's technological advancement

The Guardian/Eno-Abasi Sunday/29 January 2015

EXCERPT: Daily, groups and individuals continue to reiterate that unless Science, Technology, Engineering and Mathematics (STEM) education was given the deserved attention, society's development will not happen at the pace and depth it should. As this call for action gathers steam, contemporary schools are continuously searching for the best solutions to make teaching and learning not only fun, but also impactful on their students, as well as help prepare them for the rigours of higher learning. STEM courses, experts say have proven to be very crucial to the nation's technological advancement and mathematics, which has historically been seen by students as an unattractive subject is a key component of STEM education.

Read the full article: <http://www.ngrguardiannews.com/features/education/195721-stem-courses-crucial-to-nation-s-technological-advancement.html>

I'm making science in Africa a numbers game

New Scientist/Catherine de Lange/08 December 2014/Magazine Issue 2998

EXCERPT: "Africa must take its place on the global science stage", says Thierry Zomahoun, president of the African Institute for Mathematical Sciences

You say Africa has a PR problem. Why is maths the answer?

If we want Africa to be respected as a global player, it has to show that it doesn't need charity to handle its own problems. To be able to do that we need science, and in particular mathematical sciences, which are the backbone of every modern society. Plus, maths is free to share, it's not culturally bound, and it doesn't require heavy infrastructure. You just need paper and a pencil and you are good to go.

Read the full article:

<http://www.newscientist.com/article/mg22429982.200#.V0csGyuUe2E>

Upcoming Events

- AIMS is attending the Africa Higher Education Summit 10-12 March 2015 in Dakar, Sénégal
- NEF will hold its 3rd International Steering Committee Meeting on 13 March 2015 in Dakar, Sénégal