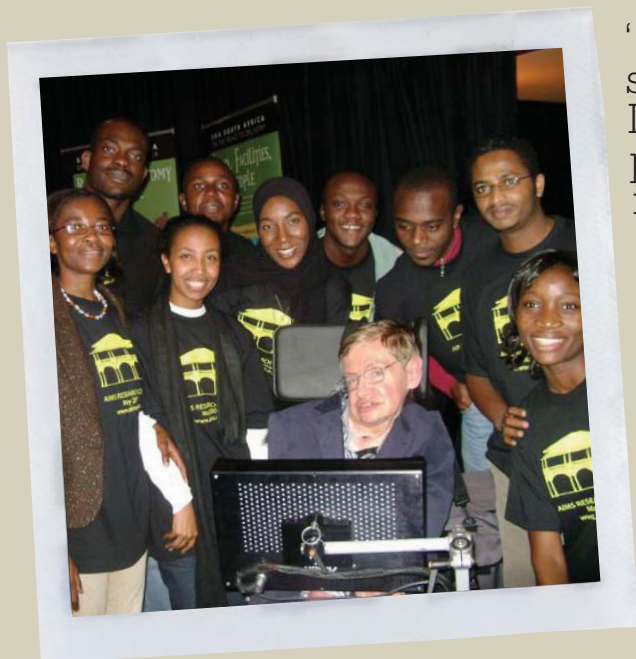




next
einstein
INITIATIVE

let Africa
shine



“This institute will bring Africa to the cutting edge of science. Those were my words five years ago, when I learned of the ambitious plan to create AIMS. The progress made since then has been startling. AIMS is now generating a stream of well-prepared students entering many advanced areas of science. The Next Einstein plan, to create AIMS Centres all over Africa, is even more exciting. Its implementation will have a major impact on Africa’s development. Not only will this be vital for the continent, I believe it will be important for the future of science because science needs Africa’s talent. I am keenly looking forward to meeting prospective young Einsteins from Africa.”

—Stephen W. Hawking,
renowned cosmologist

next
EINSTEIN
INITIATIVE
let Africa
shine

in brief

The AIMS Next Einstein Initiative (NEI) seeks to unlock and nurture scientific talent across Africa. Our dream is to celebrate an African Einstein within our lifetime. Our plan is to create a pan-African network of mathematical sciences centres working together to train outstanding graduates, and to connect mathematicians and scientists in Africa to each other and to the world.



Why mathematical sciences? Mathematical science drives the 21st century global economy and is of critical importance for Africa. The Next Einstein Initiative builds on the experience and proven **track record of the African Institute for Mathematical Sciences (AIMS) in Cape Town**, which provides a successful working prototype. In its first five years, AIMS has graduated 210 students from 30 African countries. Over 25% are women.

Why AIMS-NEI and why now? Because high-level maths and science skills are vital for Africa's continuing economic emergence. Unprecedented opportunities exist for creating a highly skilled community capable of playing a major role in the continent's development.

The AIMS-NEI concept: its structure and governance, programme features, and its integration into the global scientific community comprise an innovative model that ensures local autonomy and international support.

The AIMS-NEI plan is to proceed in phases. In the first phase we will establish 3-4 centres. Based on this experience, we will work to build a network of 15 centres over the next decade. Preliminary groundwork is already underway in 14 countries. Each centre will cost around US\$500,000 to establish and US\$500,000 per year to run. AIMS-NEI plans to build an endowment of US\$150 million providing permanent funding for 50 student bursaries at each of the AIMS centres. Our commitment is to ensure that within a decade, AIMS-NEI is contributing at least 500 well-prepared graduates per year to a highly skilled alumni network of brilliant African minds working on some of the continent's most important challenges.

Who are we?

AIMS-NEI will work with many **partners** to achieve its vision - those who have generously supported us in the past, and those who will join the next stage of the AIMS-NEI journey.

5

7

9

11

17

26

27



talent

vision

A highly-skilled community working together energetically for the economic, political and educational self-sufficiency of Africa.



imagine...

The people

Outstanding graduates from all over Africa learning maths and science together, in excellent centres distributed across the continent. Their shared passion for science bridges cultural and national divides and builds a joint commitment to an improved future for Africa. Most gain strong Masters and PhDs in fields relevant to African development. Some follow academic careers, helping to build teaching and research capabilities in African Universities. Others proceed to leadership roles in government, industry and society.

The centres

The centres are beacons which attract leading lecturers and researchers, including African diaspora, from all over the world. They foster world-class, cutting-edge teaching, creating a community of confident, creative thinkers and problem solvers.

The outcome

A highly-skilled community, working together energetically for the economic, political and educational self-sufficiency of Africa. A platform for the emergence of people of rare creative genius, capable of revolutionary advances in various fields of human endeavour.

our plan...

Based on the experience and proven success of the African Institute for Mathematical Sciences (AIMS) in Cape Town, South Africa, we aim to create 15 AIMS centres all over Africa, within the next ten years.

our wish...

That you will help us unlock and nurture scientific talent across Africa.

our dream...

To celebrate an African Einstein within our lifetime.

why mathematical sciences?

Mathematics is at the heart of the 21st century economy worldwide.

From aeronautics to weather forecasting, mathematics forms the invisible backbone of new knowledge generation. Galileo said, "Mathematics is the language the Universe is written in." It is also the language that allows business to produce better products, and to deliver them faster and more reliably, than ever before.

Our world is full of examples where pure research has produced revolutionary advances in industry and the economy. The laser, when invented, was called a solution without a problem. Now it is a ubiquitous feature in every home with a music player. The Internet itself is a product of CERN, the main European home of nuclear and high energy physics experimental research. Other important examples of the importance of mathematical science today include:



- **Encryption** - Without sophisticated mathematical algorithms, the long-distance secure transactions underlying e-commerce would be impossible. Worldwide e-commerce is a multi-billion dollar industry and is still growing strongly.
- **Weather forecasting and disaster prediction** - Without the use of super computers, solving the complex mathematical equations of fluid dynamics for weather forecasting and disaster prediction would be impossible.
- **International telecommunications** - Satellites launched and controlled using sophisticated computation relay vast amounts of information that have been compressed using advanced mathematical methods to service the needs of the world for more and more information.
- **Engineering** - from football stadiums to spacecraft, from medical equipment to electric cars, mathematical modelling forms the basis for almost all new engineering projects.

The list is endless. Mathematics lies at the core of modern business and technology development.

Maths Icons in Industry

The success of Google, the world's largest internet-based company, lies in its ability to give you better and more relevant search results than its competitors. That success is rooted in advanced mathematics. Sergey Brin and Larry Page founded Google in 1998 when they were graduate students in computer science at Stanford. It was their academic research and collaboration, together with their entrepreneurial skills and enlightened venture capital support that led to Google.

James Simons is head of the top-performing hedge fund in the world, Renaissance Technologies Corporation. He started life as a pure research mathematician and was awarded the Veblen Prize for work now used extensively in pure gravity and string theory research. When asked how his billion-dollar company selects employees, he replied:

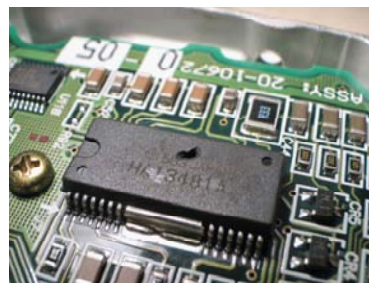
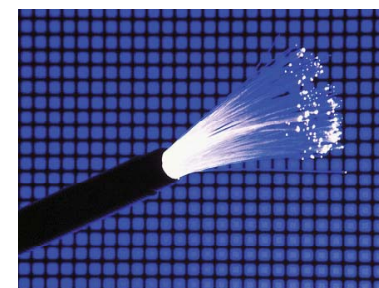
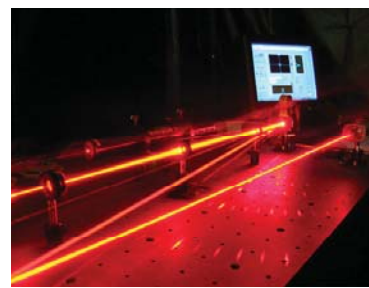
“ We look for people who have demonstrated the ability to do first-class research.”

and

“First and foremost, we look for people capable of doing good science, on the research side, or they are excellent computer scientists in architecting good programs.”

Simons is an example of how high-level mathematical training can impart flexible and economically useful skills.

Nelson Mandela said “Education is the most powerful weapon which you can use to change the world.” Mathematical problem-solving skills are a key tool for driving development in the 21st century. Educating Africa’s brightest graduates in these skills, and empowering them to innovate in science, technology, industry and government, will help unlock the prosperity Africa urgently needs.



building on the AIMS track record and team

The Next Einstein Initiative is built upon the success of the AIMS Centre in Cape Town. AIMS was established in September 2003 to recruit and train Africa's brightest maths and science graduates, in Africa. It is a unique, collaborative project of the Universities of Cambridge, Cape Town, Oxford, Paris Sud XI, Stellenbosch and the Western Cape.



AIMS offers a post-graduate diploma in Mathematical Sciences, teaching widely applicable maths and computing skills and providing exposure to many cutting-edge areas of importance and utility in Africa. The AIMS model is a proven prototype ready to be replicated across Africa.

Quality students:

There is overwhelming demand for AIMS places - more than 6 applications are received for every place on the course. The outcomes are impressive: 96% of last year's class are now placed in strong Masters or PhD programmes.

Teaching strength:

We provide outstanding quality of instruction. Lecturers come from leading institutions on every continent. Last year, 22 international lecturers were selected from a pool of over 400 willing academics, including the African diaspora.

Diverse pan-African community:

AIMS has created an inclusive and inspiring pan-African community culture. Students have been accepted from over 30 countries; the 2008/09 class is 38% female; and there is already a 210-strong alumni network, with some now returning to AIMS as tutors.

Professional team:

The AIMS team provides safe, clean premises for students from diverse backgrounds, and operates in a cost-effective manner with strong financial and academic oversight.

Local academic support:

Local South African University partners support AIMS in Cape Town with admissions, advisors and lecturers.



"I have been delighted to see the progress of the African Institute for Mathematical Sciences (AIMS). In record time it has built a reputation for excellence, innovation and a true spirit of pan-Africanism. The global recognition it has earned is well-deserved, and I consider it a model for the development of mathematics and science in Africa. The Next Einstein Initiative, which seeks to establish AIMS Centres all over Africa, is an inspirational programme, which I strongly support. This simply must happen."

—His Excellency
Paul Kagame,
President of Rwanda

"AIMS is a remarkable achievement and an example of what can be done. I strongly support the plan to create many AIMS Centres across Africa."

—Mark Shuttleworth,
first African in space and
free software pioneer





30

number of countries
students have come from

210

number of AIMS alumni

267

number of applications
for 2008/09 class

50

number admitted
for 2008/09 class

38%

women in 2008/09 class

96%

of 2007-08 graduates
are now in Masters or
PhD programmes

22

international lecturers
in 2007/08 year



why AIMS-NEI? why now?

“I am proud to be a supporter of AIMS since its inception, in 2003. Its progress since then has been simply astonishing. AIMS is now a proven model of how talented young Africans can be enabled to become successful researchers, contributing at the cutting edge of science and technology, in Africa. The Next Einstein Initiative is a visionary plan, which deserves support at the very highest level. If implemented, it will have a major impact, not just on maths and sciences, but on African development in general.”

—Hon. Mosibudi Mangena,
Minister of Science and
Technology of South Africa

There is a vast pool of human talent in Africa but a severe shortage of the scientific and technical training institutions needed to develop it. Africa faces some of the toughest challenges in the world, with AIDS, malaria, poverty, hunger and war still blighting many people's everyday lives.

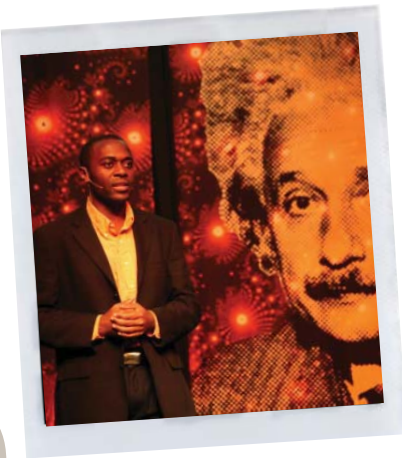
For the first time in history, Africa is turning the tide. Progress towards democracy and increased pan-African cooperation through initiatives like the African Union (AU) are bringing improved security and trade; GDP growth in sub-Saharan Africa is now over 5%. Africa is on the cusp of its renaissance. Across the continent, promising programmes are underway for education and economic development.

The Next Einstein Initiative will help this rising tide by building a highly skilled community of maths and science graduates who will contribute their fresh thinking, problem solving skills and modern analytical capabilities to many facets of African development.

The Next Einstein Initiative focuses on high-level technical education, which is acknowledged to be one of the key factors for economic development:

- The impressive growth of China, India, and South Korea would not have been possible without major investment in higher education
- The UN recognises the importance of education and its effect on poverty in its Millenium Development goals
- Significant positive correlations have been proven between tertiary enrolment and good governance indicators, such as a reduction in corruption, abuse of authority, and risk of expropriation.

With its partners across Africa, AIMS has developed the African Mathematical Institutes Network (AMI-Net), which has won recognition from the New Partnership for Africa's Development (NEPAD) and the African Union (AU) as one of five flagship programmes in Africa's Consolidated Plan of Action for Science and Technology. The AIMS-NEI plan is to support the growth of AMI-Net nodes into AIMS centres. The plan is being developed in the context of growing African economic, social, and political integration and will contribute to this trend.



The Next Einstein Initiative will train students in Africa, whereas currently, many of Africa's most able students study overseas and do not return:

- In 2004, approximately 150,000 African students studied in universities overseas
- Of mathematicians gaining PhDs outside Africa, over 90 percent did not return.

AIMS-NEI will be designed to draw many brilliant young Africans into mathematics and science at a high level, giving them knowledge, skills and the self-confidence to enable them to contribute to their continent's future self-sufficiency. By creating a network of innovative centres and partnerships, the Next Einstein Initiative will develop opportunities for Africans to study, teach and work at home in Africa.

The time for AIMS-NEI is now.

The internet has provided rapid communication right across Africa, allowing for recruitment of students, the exchange of ideas and materials, and the development of collaborative partnerships.

There is global interest and goodwill towards African development, especially among the world's scientific community.

The African Union and other pan-African organisations are encouraging peaceful collaboration and development partnerships across Africa, like AMI-Net.

It is time to invest in empowering Africa's most capable young people by providing centres where they can flourish, so that Africans themselves can respond to Africa's challenges and opportunities, and help develop their continent.

THE CAPE OF GOOD HOPE

NETWORKS FOR AFRICA

ADVANCING SCIENCE IN AFRICA

$$\int_a^b f(x) dx = F(b) - F(a)$$
$$\{r\}(t) = x(t)\{i\} + y(t)\{j\}$$

AIMS-NEI concept: structure and governance

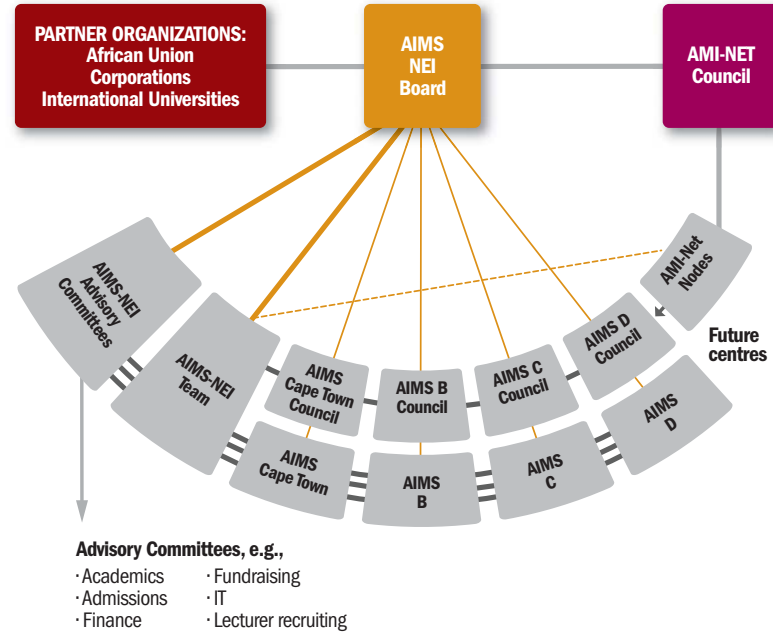
We aspire to create an interconnected web of AIMS

Centres, working with a network of partners across Africa.

AIMS Centres will be fully accountable for the support they receive to the AIMS-NEI board but autonomous in their operations, so they have the flexibility to adapt to local needs and opportunities.

AIMS Centres will share:

- A coordinated admissions process, selecting a diverse, pan-African student body
- A centrally recruited international lecturer pool
- High academic standards with a common core programme focused on problem-based learning, team work and continuous assessment
- A self-contained and secure environment, fostering a community that extends beyond graduation
- Integrated IT systems and transparent financial reporting
- Strong international partnerships.



AIMS Centres will develop local and international partnerships to ensure:

- Strong collaborative relations with surrounding institutions within the host country to promote local teaching and research efforts, and to maximise the opportunities available locally for the AIMS students
- Ties with businesses, NGOs and government in order to create a wide range of career opportunities for graduates
- Committed international partners to assist with fundraising, increase visibility, and encourage international lecturers to visit.

These partners will all help local AIMS teams tailor the programme appropriately. For example, preliminary teams are already developing proposals for 2-year Masters programmes at AIMS Centres to be located in Ghana and Senegal.

Overall performance of the AIMS-NEI network will be monitored by the AIMS-NEI Board consisting of highly respected figures drawn from pan-African organisations, and the African and international academic, business and non-profit communities.

- Like AIMS in Cape Town, each new AIMS Centre will be governed by its own Council consisting of representatives from local Universities, international partner institutions, and industry
- The AIMS-NEI Board and team will help build the African Mathematical Institutes Network (AMI-Net), for which AIMS acts as the Secretariat, and which has already gained recognition from NEPAD and the African Union. AMI-Net nodes will be encouraged to develop proposals for new AIMS Centres.

Together with the Advisory Boards, the AIMS-NEI team will monitor and evaluate the centres based on set qualitative and quantitative metrics. The AIMS-NEI team will also be responsible for supporting the establishment of new AIMS Centres.

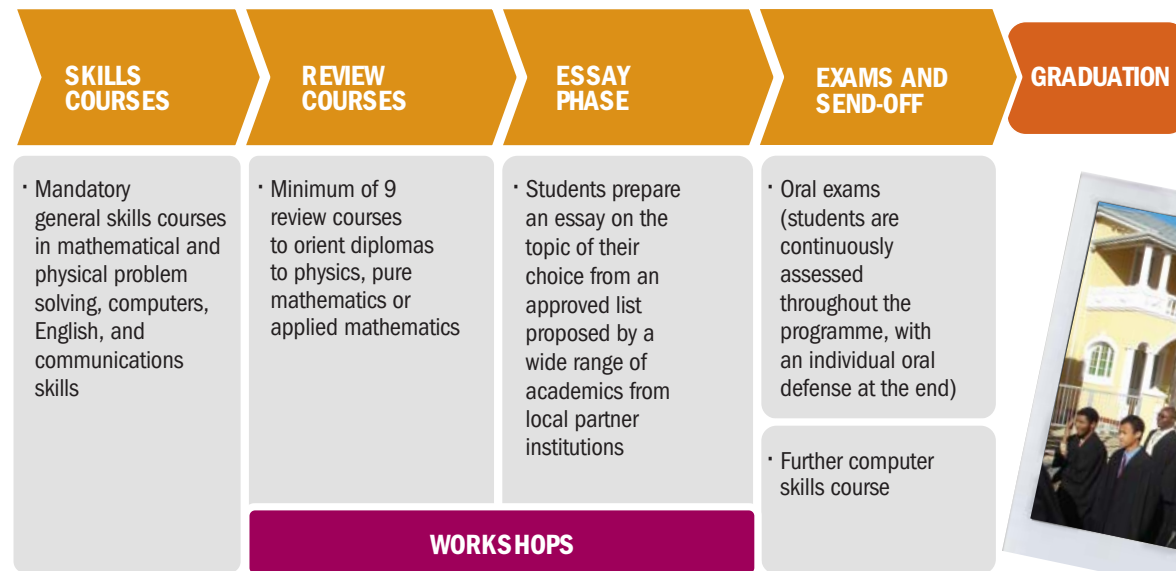
"I am from a small village called Agew Gimijabdet. My family works in a government elementary school. I am currently working on my MSc in applied Mathematics specialising in Epidemiology at SACEMA, Stellenbosch University, South Africa. It is really interesting to understand real physical phenomena by formulating models using mathematical techniques. For my project, I am working on understanding the dynamics of tuberculosis. I am very happy to see AIMS spread all over Africa. Africa needs science. A little contribution makes a difference so let's contribute a little and make a difference."

—Bewketu, Ethiopia,
AIMS alumnus





sample programme: sept-june



"AIMS, with its body of students from all over Africa offered me the chance to share the knowledge I had acquired in theoretical physics in Paris. Working as a tutor, I enjoyed a wonderful time confronting ideas, discussing opinions, addressing (sometimes even solving!) math and physics conundrums with passionate and generous students. Many of them are now good friends, whom I long to meet again in Africa or elsewhere. Now that I have come back home, I no longer hope that Africa can rise and shine someday - I know it can."

—Matteo, France,
Tutor at AIMS in 2006/07

programme features

PROBLEM-SOLVING APPROACH:

Learning is focused on solving real-world problems

GROUP WORK:

Students are encouraged to work in teams

TUTOR SUPPORTED

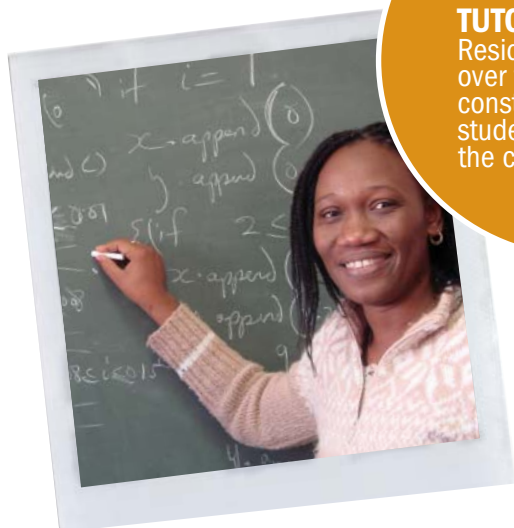
Resident tutors from all over the world provide constant support to students throughout the course

“Here there are many tutors to help us at all times and we all have access to computers. Another advantage is that we live close to the lecturers, which breaks the boundaries between us.”

—Christine, Togo,
current AIMS student

“There have been many nice experiences at AIMS in the last 3 months, but I feel the one that has impacted me the most is the different cultures of the students, lecturers and staff. This has shown me that though we come from different countries, we are still able to live and interact harmoniously, for as long as we respect each other's way of life, the differences in our cultures are very small indeed.”

—Brian, Zambia,
current AIMS student



the heart of a scientific network

AIMS Centres will benefit strongly by involving scientists from the region and the world.



International scientific community

- AIMS Centres will form hubs of exciting activities and lively exchange of ideas between students and local and international lecturers. Aside from the core programme, the Cape Town AIMS Centre hosts short courses, workshops, and seminars given by visiting scientists
- A further arena for international scientific exchange is the AIMS Research Centre, which launched in May 2008 in Cape Town. The centre focuses on mathematical modeling in a multi-disciplinary context. Institutions like the AIMS Research Centre generate interest amongst the international scientific community in African projects and initiatives.

Pan-African network

- Exchanges between AIMS Centres will help to build a pan-African network of mathematical scientists. AIMS has helped lay the foundations by creating the African Mathematical Institutes Network, AMI-Net, which links mathematical centres across Africa, many of which aspire to create AIMS Centres. Additionally, the already 210-strong AIMS alumni network forms an increasingly important community of scientists and mathematicians across the continent.

Local network

- AIMS Centres will also promote science and mathematics within the local community. In Cape Town, the African Institute for Mathematical Sciences Schools Enrichment Centre (AIMSSEC) has introduced new skills into the teaching of mathematics in South African schools through a series of residential programmes for teachers, online resources and training of subject leaders.

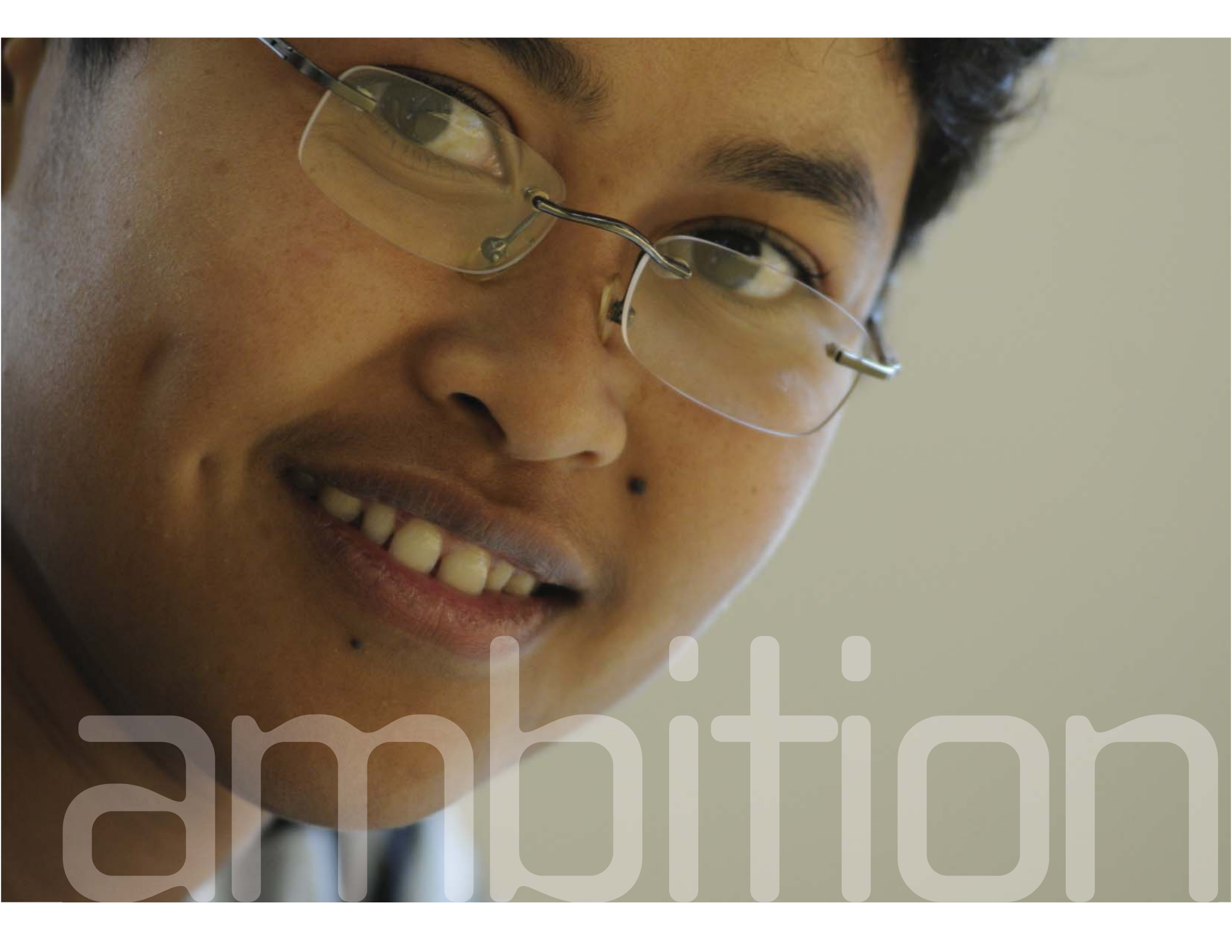
INTERNATIONAL LECTURER

"I chose to come and teach at AIMS because I was interested in meeting all these students from very different backgrounds and witnessing the African Renaissance first hand. AIMS is special because of the extreme dedication that AIMS students have to their work and their wonderful generosity in sharing their different expertise with each other. It is, of course, a truly international environment, more so than anywhere else I have been in the world."

—Pedro Ferreira,
Professor of Astrophysics,
University of Oxford, UK,
lecturer at AIMS

LIST OF AIMS SEMINARS/VISITORS IN 2007-08

SPEAKER	TITLE
Prof. Nigel Bishop (Research Centre in Computational Relativity and Astrophysics and Cosmology, Unisa)	Gravitational Radiation
Prof. A.E Krzesinski (Mathematics Department, USB)	Mapping the African Internet
Dr. Olaniyi Maliki (Department of Mathematics and Computer Science, University Abakaliki, Nigeria)	A Gentle Introduction to Quantum Geometry
Prof. Robert J. Elliott (RBC Financial Group Professor of Finance)	Mathematical Modelling in Finance
Robina Rakotonjalna	Explicit Class Field Theory for Rational Function Field
	What do Martingales have to do with Markets?



ambition

AIMS-NEI plan

phasing

Our target is a network of **15 AIMS Centres** within the next decade, together contributing **at least 500 graduates** each year.



17

CURRENT SITUATION

We have initiated discussions with teams in many potential host countries. Fifteen initial proposals were submitted and eight site visits have taken place. In four cases, more detailed business plans for AIMS Centres have been produced. The AIMS (Abuja) Centre in Nigeria has already been launched, on the campus of the new African University for Science and Technology.

Once the AIMS-NEI team and Board are established, we shall implement a systematic process for selecting AIMS Centres:

Initial discussions

Pre-proposals are submitted and the AIMS-NEI team meets with interested groups to explore the possibility of a new AIMS Centre.

We are in discussions with 10 potential host countries...

- | | |
|--|--|
|  Benin |  Morocco |
|  Botswana |  Mozambique |
|  Egypt |  Rwanda |
|  Ethiopia |  Senegal |
|  Malawi |  Tanzania |

Proposals and site visits

Potential locations submit detailed business plans describing their objectives, curriculum and scientific specialisation, management and partnership plans, estimated budget and impact ... and the AIMS-NEI team conducts site visits to help refine the plans.

Currently we have 4 locations in the proposal phase...

-  Ghana
-  Madagascar
-  Sudan
-  Uganda



FUTURE

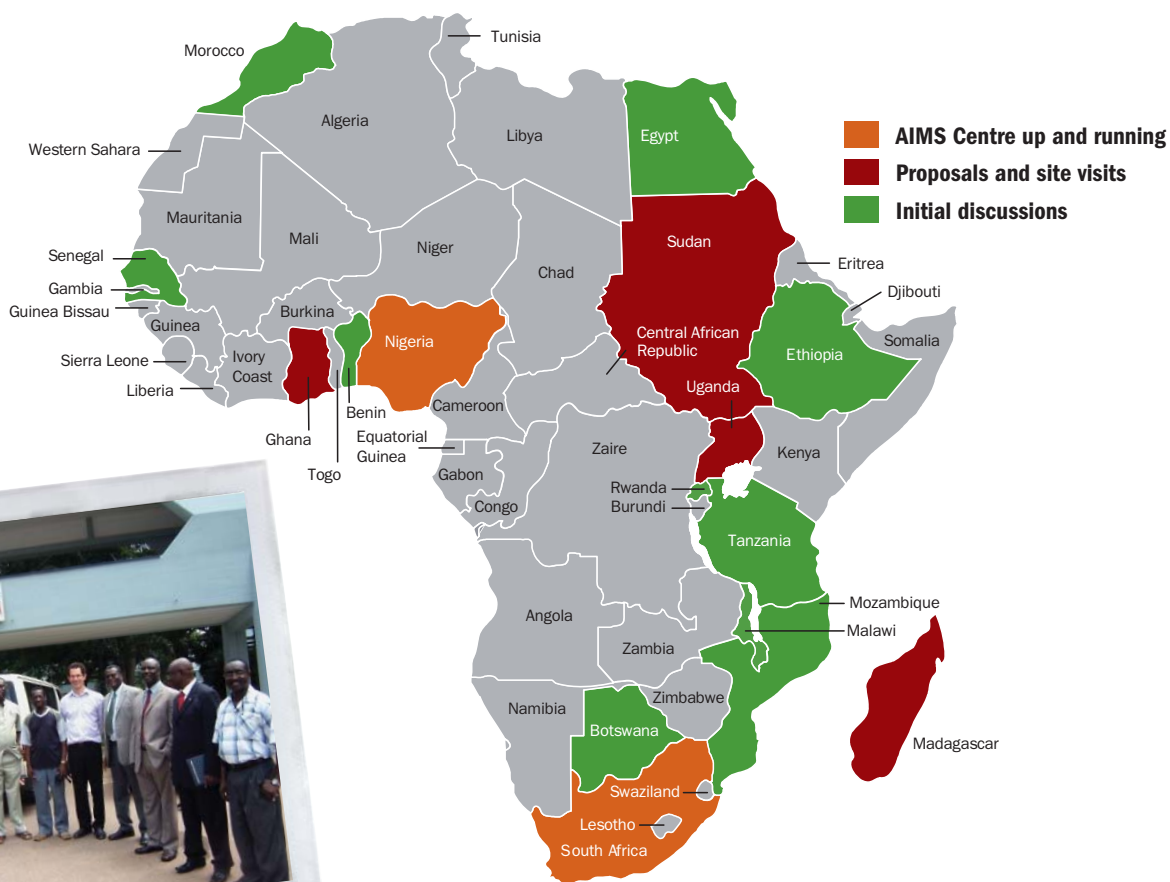
Phase 1 Launch: We will select a small number of the most promising sites for new AIMS Centres. We are aware of the urgent need for development of many potential centres but we believe that by focusing on a select set in the first phase we will also be able to refine the governance, infrastructure and staff needed for the network as a whole.

- Once the AIMS-NEI Board approves the proposals and adequate funds are received, the Phase 1 centres will develop detailed implementation plans. They will be supported by the AIMS-NEI team throughout their start-up phase.

Review: After these centres have graduated one class, we will conduct a critical review to ensure that each centre is functioning properly and that the linkages between centres are working well.

Phase 2 Launch: Our experience from Phase 1 will guide us as we select and establish further centres. We will strive for implementation as rapidly as is possible, while maintaining the high quality of each new AIMS Centre and of the network as a whole.

CURRENT STATUS OF AIMS CENTRES



“... when discouragement looms large, a glance at the picture of the AIMS students is the best remedy. AIMS was a dream that became real. Let's continue it together.”

—Vincent Rivasseau, Professor of Mathematical Physics, Université Paris-Sud XI, France; member of the AIMS Council, lecturer, and currently working on the creation of an AIMS Centre in Senegal

“I have gained so much knowledge and so many skills from AIMS and am grateful for it. However, if I can not share what I have learned then my knowledge will not make a difference. Having an AIMS Madagascar in the country would be a great way for me to share my skills and knowledge.”

—Dimbinirina (Madagascar), AIMS Alumna

financial overview

AIMS-NEI is looking for sponsors to fund start-up costs and to build an endowment to cover student bursaries. National governments of countries hosting AIMS centres will be encouraged to support the running costs. Additional support will be sought from private enterprises, NGOs, and individuals.

START-UP COSTS

Autonomous centres are a prerequisite for AIMS-NEI's success and will be either newly built or refurbished. To be able to offer the type of education that AIMS-NEI envisions, new computers, a solid IT network, and a broadband internet connection need to be installed. Other necessary equipment includes air conditioning, projectors, and, in some countries, an emergency generator. Centres will need a library and a minibus for excursions and domestic travel. AIMS will expect a supporting contribution from the local government. **The estimated start-up costs for an average new AIMS Centre are US\$500,000 depending upon the starting state of the facilities.**

BILL OF MATERIALS

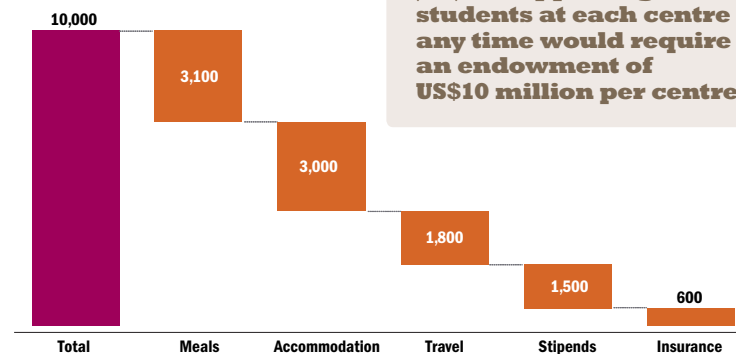
Building	₺ 300,000
50 computers and network equipment	₺ 85,000
2 beamers, 1 photocopier	₺ 10,000
Air conditioning	₺ 40,000
Emergency generator	₺ 10,000
Security system	₺ 25,000
Minibus	₺ 20,000
Network cables and adaptors	₺ 5,000
Other electronics	₺ 5,000
TOTAL	₺ 500,000

STUDENT BURSARIES

AIMS-NEI will offer fully-inclusive post-graduate programmes to generate very intense, but energising interaction between students and teachers. AIMS Centres will provide food and lodging for the students, one return trip and basic collective healthcare insurance. Supplemental stipends enable the students to cover incidental expenses, including clothing or other personal costs. A small budget supporting domestic transport is available for excursions. A full student bursary can be offered for only US\$10,000 per student per year. **Supporting 50 students at each centre at any time would require an endowment of US\$10 million per centre.**

STUDENT BURSARIES

Annual cost, US\$





RUNNING COSTS

Each centre needs a core staff of a Director, an IT Manager, a Facility Manager, and an Administrative Coordinator. AIMS Centres will cover the costs of travel and room and board for visiting lecturers, as well as for tutors. AIMS Centres will strive for at least 10 overseas lecturers and 2 overseas tutors every year. **Running costs are estimated to be US\$500,000 per centre per year, most of which should be locally supported. The AIMS-NEI team will assist with centre launches, and oversee quality and coordination.**

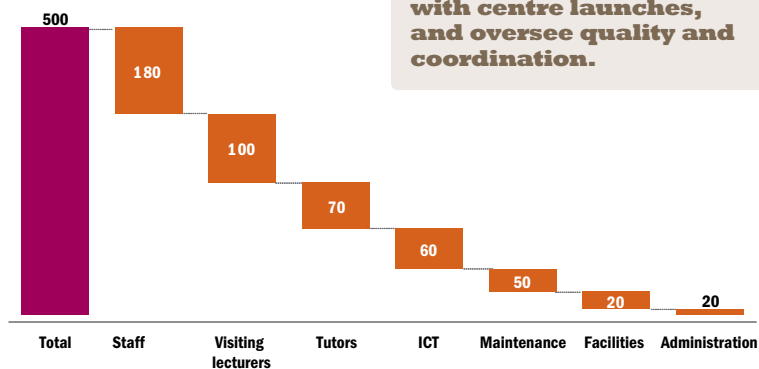


“These flagship institutes could help kick-start a scientific boom in Africa and are an extraordinarily cost-effective means towards achieving this goal.”

Lord Martin Rees,
Master of Trinity College,
Cambridge,
Astronomer Royal
and President of the
Royal Society, UK

RUNNING COSTS

Annual cost, US\$ 1,000

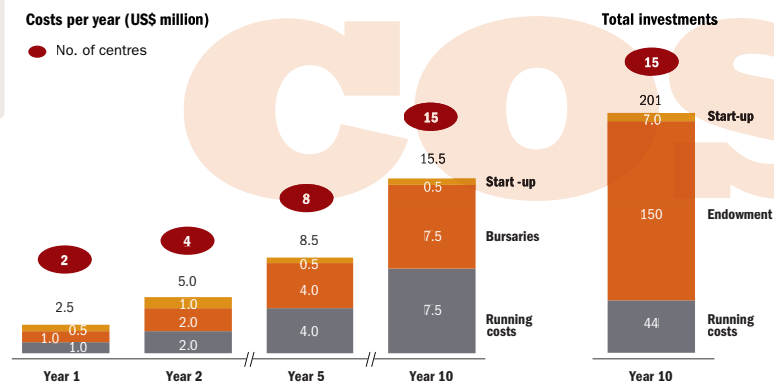


IT costs include computer and peripheral equipment renewal, and other maintenance on the network. Water, electric, and municipal and other taxes are included in facilities. Administration expenses cover copying, printing, postage and stationery.

TOTAL COSTS

Costs per year (US\$ million)

● No. of centres



cost

impact

AIMS-NEI will within a decade contribute at least 500 well-prepared graduates per year, forming a highly skilled pan-African network of alumni in academia, NGOs and corporations, who will work on Africa's most important challenges and opportunities.



"I know that AIMS will give me an opportunity to continue with my postgraduate studies."

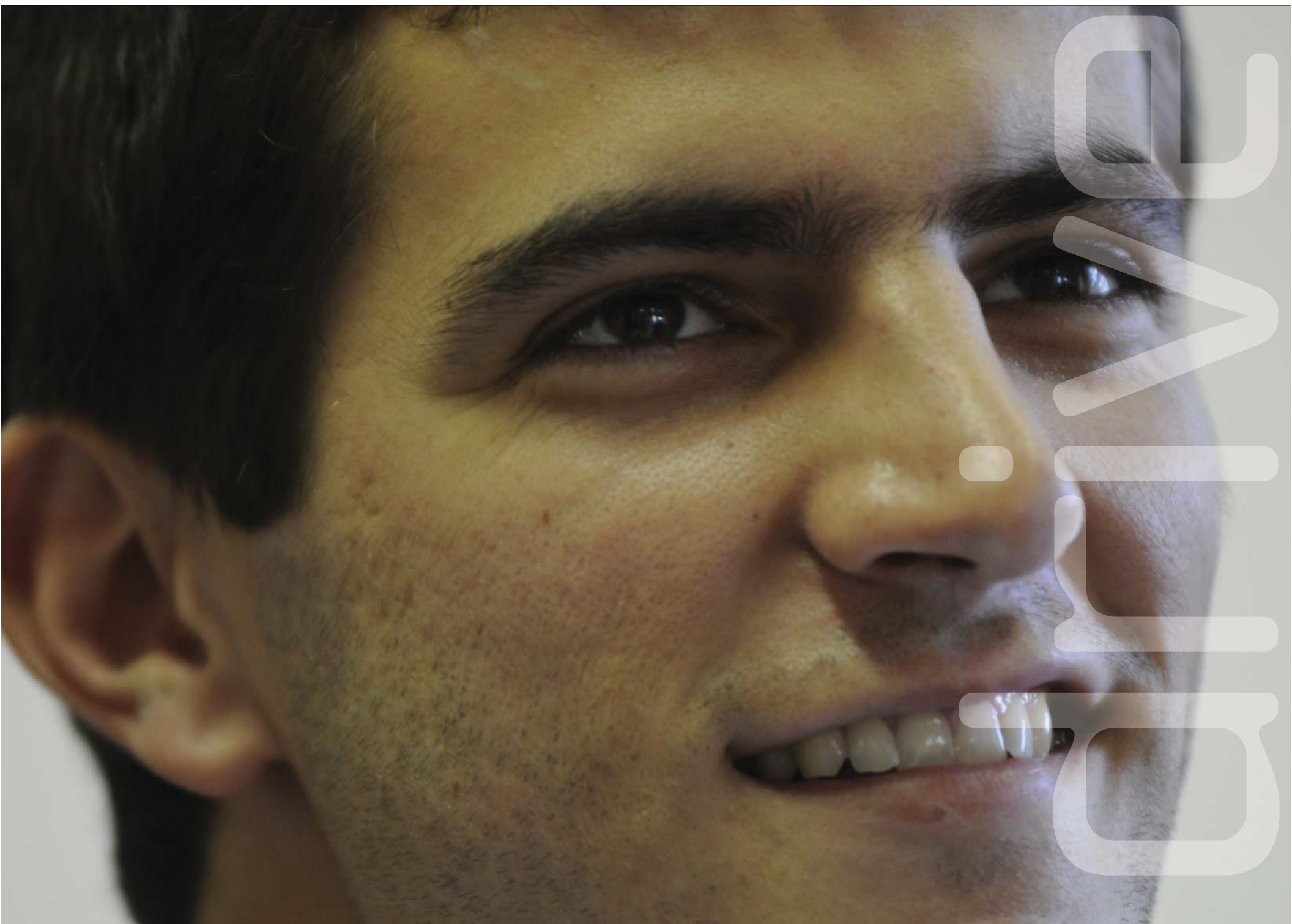
—Hussam, Sudan, current AIMS student

"Implementation of this plan would, I believe, have a transformational effect on science and technology capacity in Africa and on African development more widely. I believe this initiative to be fully in accord with the goals and spirit of the African Union and in particular of those of the Department of Human Resources, Science and Technology."

—HE Professor Jean-Pierre Ezin, Commissioner for Human Resources, Science & Technology, African Union

"Studying at AIMS is the goal of every student in the department of Mathematics in my country. Someone from AIMS said, 'AIMS changed my destiny,' and I agree with him. Surely, I will bring something good from AIMS to develop my country and maybe the rest of the world."

—Faniry, Madagascar, current AIMS student



FAQs and challenges

1) Why do you focus on maths, and not on materials science, IT, biosciences or other more obviously applicable fields?

Mathematical skills underlie modern science and technology. Well-trained graduates with broadly applicable skills such as problem formulation, problem solving, modeling, computation and data analysis are highly sought after in every area of science and engineering, as well as in government, industry and finance. It is especially important to give students confidence in applying mathematical tools to new situations, for themselves and in handling both the quantitative and qualitative aspects of a problem. The structured problem-solving methods taught at AIMS are applicable in a wide variety of fields, from epidemiology to water management.

2) Will the network of AIMS Centres be sustainable?

Our proposal for sustainability is based on our experience at AIMS in South Africa, which is funded through a combination of donor and government funds. We seek to build, over the next decade, an endowment of US\$150 million, which will permanently provide for 50 student bursaries at each of the 15 AIMS Centres. This investment represents less than 0.05 percent of the international aid budget currently given to Africa. Several expressions of interest have been received so far from African governments eager to host an AIMS Centre. We are optimistic that each host government will quickly recognise the benefits and be willing to cover the running costs, just as the Department of Education of South Africa does for AIMS in Cape Town. In this way, each AIMS Centre will become a source of pride for the country, and be locally "owned." The combined endowment/government funding partnership scheme we propose will, we believe, lead to long-term sustainability for every AIMS Centre.

3) Why do we need more graduates when we already have a large number of unhappy and underemployed graduates in Africa? What will all these people do?

The emphasis of AIMS Centres will be on creating graduates with a high level of initiative, independence and problem-solving skills. A criticism of conventional Universities which is frequently raised by companies and other employers is that graduates have learned how to pass exams, but not to think for themselves and solve real-world problems. As well as converting students from "exam-passing" to "problem-solving" young scientists and technologists, every AIMS Centre will work to create a network of opportunities for its graduates. These opportunities will not be limited to positions at African Universities and new AIMS Centres. The centres will actively support students in becoming employees within companies, NGOs or governments, or in becoming entrepreneurs and forming start-up companies.

Many AIMS graduates have already proceeded to employment outside academia, for example in IT companies and United Nations programmes. Due to the growing reputation and networking of AIMS alumni, we believe success achieved in one country will be transferred to many others.

We are also developing plans to supplement the current AIMS curriculum with courses in entrepreneurship, governance and leadership, for those students with potential and interest in pursuing these career paths.

4) **How can we be confident in the quality and effectiveness of an institution operating in 15 different African countries?**

What we are attempting to create is a new type of pan-African institution, and there will certainly be many challenges to overcome. It is not unusual for companies to have franchises, or NGOs to have branches, spread across Africa, but this is relatively novel for an educational organisation. We want to replicate the key features of the prototype established at AIMS in Cape Town, in many sites across Africa. Upon start up local teams, together with the local Councils, will commit to the common AIMS denominator, such as the common admissions and international lecturer recruitment process, core curriculum components, high-quality IT and rigorous financial management. The AIMS-NEI team will support and oversee the launch of individual centres and provide ongoing quality assurance regarding the core AIMS Centre characteristics. The AIMS-NEI Board, consisting of academic, corporate,

and institutional leaders who are respected within Africa and across the world will provide overall governance of the centres, and make funding decisions.

5) **Can a pan-African organisation really work?**

It is essential for Africans to cooperate across the continent in order to build a critical mass of scientists working in important fields, and to gain visibility within the global science community. By combining forces to form an excellent pan-African institution, scientists in Africa will gain higher prominence, and better connections, than they could through purely country-based initiatives. The experience of creating a pan-African community of students at AIMS in Cape Town has shown how Africa's diversity can be a powerful source of strength, and how easily a common interest in maths and science can overcome cultural and language barriers. Advances in communication, including the internet and mobile phones, and cheaper international travel now make the operation of a pan-African institution feasible for the first time. Such an institution will serve

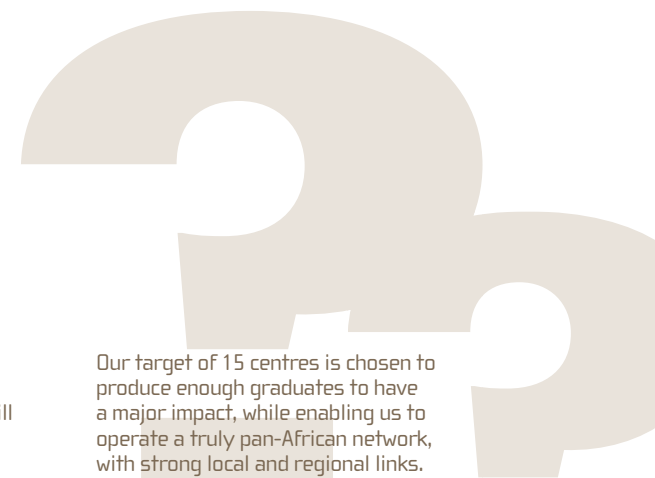
as a model, encouraging peaceful cooperation, trade and exchange between African nations, which will be essential to Africa's long-term self-sufficiency.

6) **Do you need 15 centres? Why not 3 regional ones?**

Many hundreds of highly skilled graduates are needed to significantly raise the capacity of government, business and industry across Africa. We believe that a network of small institutes is desirable for two reasons. First, it will distribute centres of learning across the continent, countering the "brain drain" within Africa. Second, small centres like AIMS in Cape Town, with 70-100 students at most, can create an intimate, supportive "family atmosphere" within which students drawn from disadvantaged backgrounds gain the confidence to excel. Local centres can also help strengthen existing Universities (by involving local academics as project advisors, by bringing international lecturers to the region, etc.) and companies (by strengthening recruitment, by hosting workshops and seminars, etc.) in the host countries and their neighbours.

7) **Why the need for a broad core curriculum?**

Above all, Africa needs people with the confidence and skills to drive research programmes, which are relevant to Africa. A broad background is essential to gaining a proper perspective on the opportunities and prospects available for pursuing cutting edge research in Africa. AIMS seeks to create self-confident, generalist scientists who have the tools they need to help with Africa's wide range of opportunities and challenges from disease management to infrastructure development to natural resource planning. Specialists are also needed, but it is important for the students' careers that they are exposed to a variety of fields, enabling them to make informed choices about their final specialisation.





who we are



African Institute for Mathematical Sciences (AIMS)

AIMS is a pan-African centre for postgraduate training and research located in Cape Town, South Africa. AIMS opened in September 2003, and is governed by a Council consisting of representatives of each of the six partner universities: Jan van Bever Donker (Western Cape), Hendrick Geyer (Stellenbosch), Keith Moffatt (Cambridge), Daya Reddy (Cape Town), Graham Richards (Oxford), Vincent Rivasseau (Paris-Sud XI), Neil Turok (AIMS, chair), Philippe Mawoko (NEPAD), and Fritz Hahne (AIMS Institute Director).

AIMS has been recognised as a Centre of Excellence by the African Ministerial Conference on Science and Technology (AMCOST) and the African Union. The AIMS project is a concrete attempt to implement the New Partnership for Africa's Development (NEPAD – see www.nepadst.org), launched by former South African President Thabo Mbeki and other African leaders. See www.aims.ac.za.

African Mathematical Institutes Network (AMI-Net)

Constituted in October 2005, AMI-Net is a network of African mathematical science centres which aims to build capacity across the continent. AIMS acts as the AMI-Net Hub and Secretariat, providing technical support to AMI-Net Nodes. The AMI-Net Council is: Manar E. Adbel-Rahman, University of Khartoum, Sudan; Francis K. Allotey, Institute of Mathematical Sciences, Ghana; Berhanu B. Belayneh, Addis Ababa University, Ethiopia; Khalil Ezzinbi, Cadi Ayyad University, Morocco; Sarifa Fagilde, Ministry of Science and Technology, Mozambique; Fritz Hahne, AIMS; John Mango, University of Makerere, Uganda; Philippe K. Mawoko, NEPAD Office of Science and Technology; Jamal Mimouni, Mentouri University of Constantine, Algeria; Keith Moffatt, University of Cambridge, UK; Hilaire Nkounkou, Marien Nguabi University, Republic of Congo; Gerard Razafimanantsoa, University of Antananarivo, Madagascar; Vincent Rivasseau, University of Paris-Sud XI, France; Mamadou Sanghare, University Cheikh Anta Diop of Dakar, Senegal; Joël Tossa, Institut de Mathématiques et de Sciences Physiques (IMSP), Benin; and Neil Turok, AIMS (chair).

Next Einstein Initiative (NEI)

Inspired by the vision that only Africans will solve Africa's problems, NEI was launched at the February 2008 TED Conference in Monterey, California, by the founder of AIMS and chair of the AIMS and AMI-Net Councils, Neil Turok. See www.ted.com and www.nexteinstein.org.

Professor John Mugabe, University of Pretoria and formerly head of the NEPAD office of Science and Technology, has recently been appointed as international consultant responsible for coordinating the establishment of AIMS-NEI.



AIMS Council



AMI-Net Council

our partners



We seek to build an endowment to fully and permanently support 50 students per year at each of the 15 AIMS Centres. The endowment will be centrally managed and invested with its income drawn on and distributed as student bursaries.

current AIMS and Next Einstein Initiative supporters

corporate partners

The following corporate partners are supporting the Next Einstein Initiative through direct funding and services:

- Avenue A
- Barclays/ABSA
- Cambridge University Press
- New Star Investments
- Sun Microsystems
- SanDisk

philanthropic foundations, scientific societies and individuals

The following philanthropic foundations, scientific societies and individuals have all made recent commitments to the Next Einstein Initiative:

- Ford Foundation
- Vodafone Foundation
- Nokia Foundation (Africa)
- London Mathematical Society
- Arcadia
- Victor Rothschild Memorial Fund
- Paul G. Allen Family Foundation
- Institute of Physics (UK)
- Brook and Shawn Byers
- Dennis Avery and Sally Wong-Avery
- Peter Kellner, in honour of Paul Kellner
- Google.org
- TED

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www.nexteinstein.org



current and past sponsors of AIMS include:

- Department of Education, South Africa
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- Vodacom Foundation
- Institute of Physics
- The London Mathematical Society
- Canon Collins Educational Trust for Southern Africa
- Africa Science Programme, Institut des Hautes Etudes Scientifiques, France
- The Andrew W. Mellon Foundation
- Trinity College, Cambridge
- PetroSA, South Africa
- Isle of Man Overseas Aid Committee
- The David and Elaine Potter Charitable Foundation
- The International Council of Scientific Unions (ICSU), with UNESCO and the US State Department
- The International Union of Theoretical and Applied Mechanics (IUTAM)
- Seardel Investment Corporation Limited, South Africa
- Cheryl Grunbock and Martin King
- National Research Foundation
- The University of Stellenbosch
- The University of Cambridge Local Examination Syndicate
- The Daniel Iagolnitzer Foundation (Fondation de France)
- The Muizenberg Millenium Education Trust
- The Go Open Source Campaign
- SUN Microsystems
- Hyper-Interactive Teaching Technology
- The Victor Rothschild Memorial Fund
- The Ellison Medical Foundation
- Fred Turok
- Stella Innes
- OpenOffice
- British Airways, South Africa Office
- Chicago State University
- European Mathematical Society Committee for Developing Countries
- Jonathan Leake, Sunday Times
- Anglo American Chairman's Fund
- Jussi Westergren
- Barclays
- Nokia
- DAAD
- The Gatsby Charitable Foundation, UK
- New Star
- Sheridan Lorenz
- Perry Lorenz
- George Mitchell

aims

let africa shine



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“Setting an example is not the main means
of influencing others; it is the only means.”

—Albert Einstein

