AIMS

African Institute for Mathematical Sciences

# A BRIGHT FUTURE

## For Science in Africa

www.aims.ac.za

# Muizenberg, South Africa

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# Background

AIMS

- Africa is the second largest continent
- About 12% of all people live in Africa
- The GDP of Africa is about 2% of that of the world
- Only a few states fall in the middle income group, among them: South Africa
- Most are in the poor to very poor group
- In the developed world, education in mathematics and science underpin the economy and are taken for granted.

# An African Issue

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- Mathematical sciences are essential to innovation and development
  - Information / communication/ engineering / transport
  - Food and power production / medical research
- Africa is dependent on the developed world
- Will remain poor unless it develops own talent
- Education is key to leveling the playing field
- “In the final analysis it is basically mastery and utilization of modern science and technology that distinguishes the South from the North” – Abdus Salam

# A Beacon

AIMS

- An African Institute for Mathematical Sciences
- Latest pedagogical techniques, outstanding international lecturers
- A bridging course preparing postgraduates for research and development
- Problem-solving skills emphasized, hands-on approach, exposure to many exciting fields
- Gateway to opportunities
  - Raising awareness of science and technology
  - Demonstrating the value of scientific training
  - Cascading down into school and university choices
  - Alumni  will be a  catalyst for progress in Africa

# Groundwork

AIMS

- Location: Muizenberg
- Old  hotel (4 floors) refurbished
- Nine month multi/inter-disciplinary diploma
- Integration with postgraduate programs
- Stellenbosch, UWC, UCT
- Cambridge, Oxford, Paris-Sud
- Launched on 18/19 September 2003
- 30 students in Sept 2003, 40 in Sept 2004
- Planning for maximum of 45 annually in future

# Progress & Location

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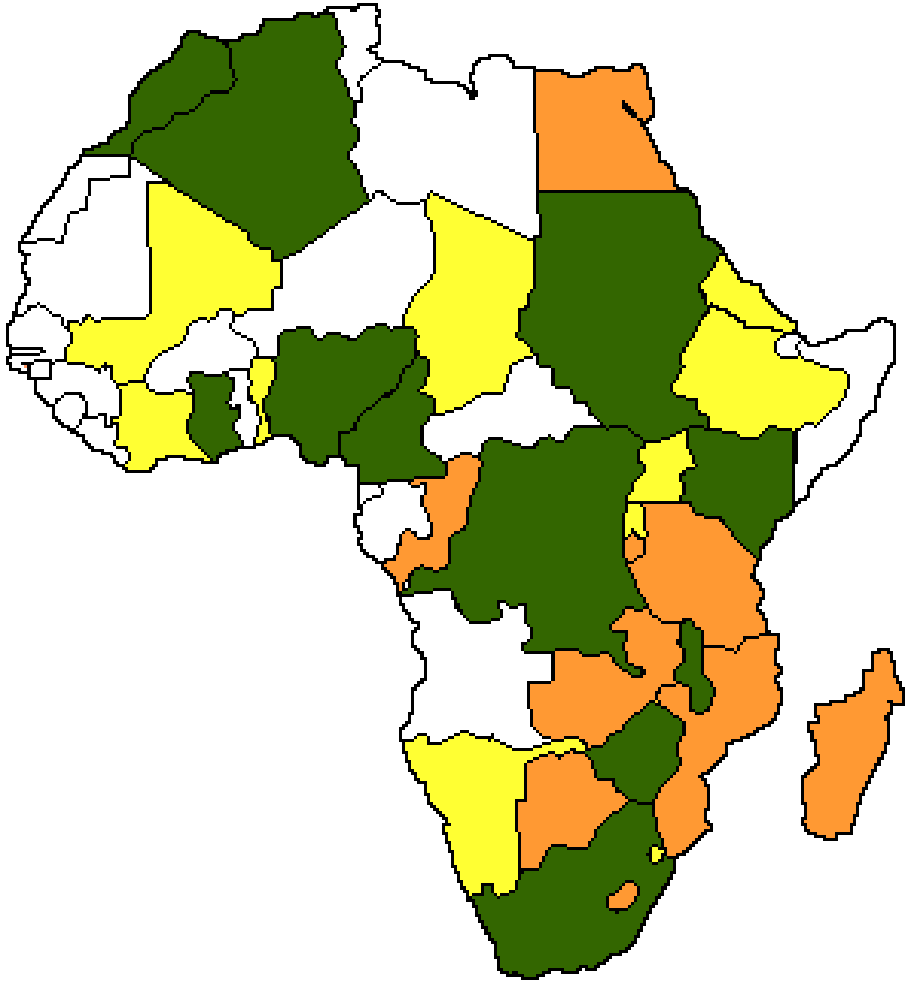

# Members of Council

AIMS

- **Prof Hendrik Geyer, Stellenbosch University**
- **Prof. Fritz Hahne, frmr Dean of Science, Stellenbosch**
- **Prof. Daya Reddy, Dean of Science, UCT**
- **Prof. Jan Van Bever Donker, Dean of Science, UWC**
- **Prof. Keith Moffatt, Cambridge**
- **Prof. Graham Richards, Oxford**
- **Prof. Vincent Rivasseau, Paris-Sud**
- **Prof. James Turner Jr, Florida State**
- **Prof. Neil Turok, Cambridge (Chair)**

# Supporters (in brief)

AIMS

- Nelson Mandela
- Kader Asmal
- Ben Ngubane
- Rob Adam
- Mosibudi Mangena
- Patricia Whitelock
- Sir David King
- Prof. David Gross
- Philip W. Anderson (Nobel physics 1977)
- Joseph Taylor (Nobel physics 1997)
- Sir Michael Berry
- Stephen Hawking
- Sir Martin Rees
- Sir John Sulston (Nobel medicine 2002)

# Delivering the vision

AIMS

- **Funding:**

Gatsby Charitable Foundation (UK); Vodafone; Ford Foundation; Mellon Foundation; Vodacom Foundation (SA); Department of Science and Technology (SA); Chicago State University; Cambridge University Press; David and Elaine Potter Charitable Foundation; University of Stellenbosch; PetroSA; International Council for Scientific Unions (ICSU) ; International Union of Theoretical and Applied Mechanics (IUTAM) ; Martin King;l Seardel Investment Corporation; Canon Collins Educational Trust for Southern Africa; London Mathematical Society; University of Cambridge Local Examinations Syndicate; Daniel Iagolnitzer Foundation (Fondation De France); Muizenberg Millenium Education Trust; SUN Microsystems; Hyper-Interactive Teaching Technology; Victor Rothschild Memorial Fund; Ellison Medical Foundation; Fred Turok; Stella Innes; British Airways (SA); European Mathematical Society Committee for Developing Countries; Jonathan Leake, Sunday Times.

# Future

AIMS

- Life opportunities for African students
- Need to find or create follow-up programs
- Maths and science as a birthright for Africans
- Partner institutions across Africa
- Web-based, replicable institutes
- Network of AIMS Alumni: in commerce, industry, education, research, government
- Postdoctoral program at AIMS

# Students 2003-4

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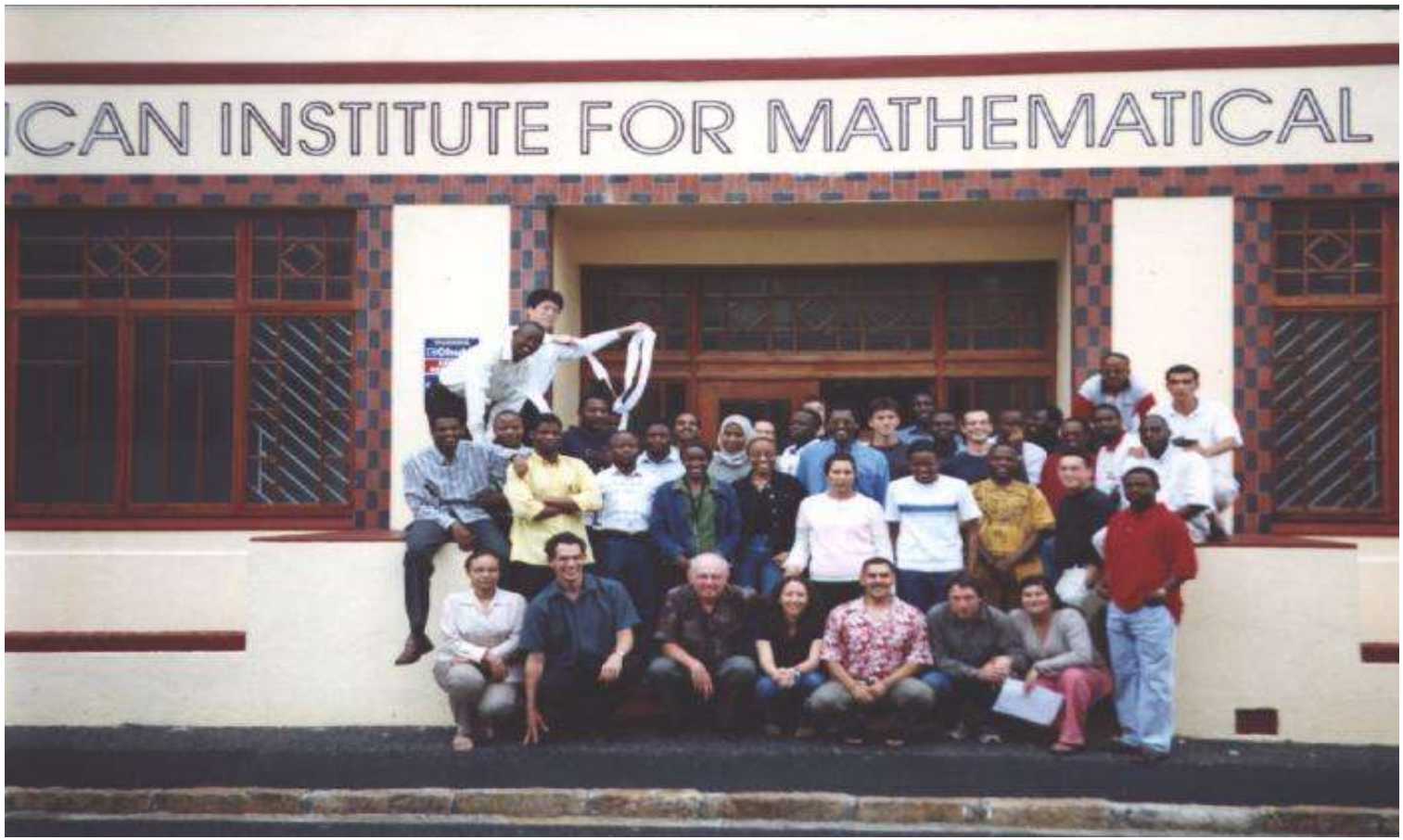

# Future

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- Workshops, symposia and short courses
- Research projects
- African Mathematical Institutes Network (AMI-Net)
- In-service training courses (Linux, open source, teaching, special topics)
- Schools Enrichment Centre : AIMS-SEC

# Students 2004-5

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# Associated initiatives

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- Stellenbosch Institute for Advanced Study (STIAS) www.stias.ac.za
- African Theoretical Physics Program – Post-doc program (capacity building)
- SA Centre for Epidemiological Modelling and Analysis (SACEMA) www.aims.ac.za/sacema
- Chris Engelbrecht Summer School in Theoretical Physics
- National Astrophysics and Space Science Program (NASSP)
- AMMSI
- More to come

# The AIMS Course

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- **Review Courses** (Topology and geometry/ Astrophysics and cosmology/ Mathematical finance/ Random walks and polymers/ Critical phenomena/ Fluid dynamics/ Metabolic pathways/ Numerical analysis/ Quantum mechanics)
- **Skills Courses** ( Mathematical problem solving/ Art of approximation/ Mathematical methods/ Differential equations/ Mathematical modelling/ Inference and information theory/ Epidemiology)
- **Computing Projects** (Free and open source software/ practicals related to the courses/ optional Linux administration)
- **Essay** (Various topics in Epidemiology/ Mathematical finance/ Fluid dynamics/ Number theory/ Approximation theory/ Chaos/ Optics/ Particle physics/ etc)

# Teaching approach

AIMS

- Interactive teaching
- Rather teach less but much better
- Students (and lecturers) teach one another
- Many tutorials and many projects
- Students give talks on their projects
- Don’t destroy enthusiasm for subject by conventional set exams
- Various forms of continual assessment
- Students are self-motivated and super-motivated

# How can you be involved?

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- Teaching and sharing courses (3 weeks)
- Encourage students to study  at AIMS
- Get them (and more) back after nine months
- Supervise Essays
- Participate in research and post-doc exchange
- Visit AIMS and become part of it
- And become R I C H , i.e.

- Work on Relevant topics, be Innovative, Cost-effective and seek Highest quality

# Thank you

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