African Institute for Mathematical Sciences
Annual Report 2005/6

Executive Summary

This report covers the third year of full operation of the African Institute for Mathematical Sciences (AIMS). In June 2006, forty students from fourteen different African countries were awarded the Postgraduate Diploma in the Mathematical Sciences (PDMS) after having completed an intensive course for nine months. The modules were taught by twenty-seven lecturers from South Africa, Botswana, and abroad. The knowledge and confidence of the students far exceeds that which is normally achieved. More than thirty of the students have been accepted for research degrees at the following South African Universities: University of Stellenbosch (8), University of the Witwatersrand (10), University of Cape Town (8), University of the Western Cape (3) and University of KwaZulu-Natal (2). Other students are finalising their arrangements to study further and AIMS has selected fifty-five students for the next intake in September 2006.

In an effort to enrol more South African students, AIMS developed a fast track honours-level programme to prepare local students for the Diploma Course. Although students who complete the course do very well in the AIMS Diploma, the programme has not been able to attract the anticipated number of applicants. Only two students enrolled on this course in February 2005.

AIMS is increasingly involved in various research projects in which African scientists participate. Eight researchers from different African countries were hosted at AIMS during the course of this year, during which time they made presentations at AIMS and at South African Universities. They were all given opportunities to network with other experts in their fields of interest.

At the end of October 2005, a workshop was held at AIMS to discuss the proposed African Mathematical Institutes Network (AMI-Net). The establishment of the AMI-Net will involve setting up 15 AIMS-like nodes across Africa. Leading mathematical scientists from all over Africa attended the workshop, and signed a memorandum of understanding supporting the establishment of AMI-Net. This initiative has the full support of the Science and Technology secretariat of NEPAD. Further details are to be found in this report, and on the AIMS web site[1].

The continuing growth of AIMS necessitated the acquisition of another vehicle to help with transport to the local universities and to collect visitors from the airport. As the staff complement increases, more office space will be required. Stellenbosch University continues to handle most of the financial, legal and administrative aspects of the running of AIMS, and this assistance is gratefully acknowledged.

Several sponsors have granted significant support to AIMS and they are listed in the report. Some of the initial sponsorships granted for the first three–year phase came to an end, and AIMS has had to review its financial situation and look for new funding sources.

[1] www.aims.ac.za

Contents

1. Introduction

The African Institute for Mathematical Sciences (AIMS) is an educational centre in Cape Town, South Africa. The goals of AIMS are:

- To promote mathematics and science in Africa.
- To recruit and train talented students and teachers.
- To build capacity for African initiatives in education, research, and technology.

The Institute is focussed around a nine-month, postgraduate course which covers many of the most exciting areas of modern science and is taught by outstanding African and international lecturers. The course develops strong mathematical and computing problem-solving skills and leads to a post-graduate diploma in the Mathematical Sciences, formally accredited by the three partner South African Universities, and taught in association with the Faculty of Mathematics at the University of Cambridge, the Division of Physical Sciences at the University of Oxford and the University of Paris-Sud. Students with good mathematics, science or engineering degrees are invited to apply and will be supported on bursaries where needed. AIMS is a concrete attempt to implement the New Partnership for Africa's Development (NEPAD) – the vision of South African President Thabo Mbeki and other African leaders.

AIMS has emerged from its first three–year phase of existence as a firmly established organisation. The sceptics, who viewed it as a short-lived beautiful flower, have come to realise that it is here to stay and grow. During its initial phase, AIMS was fortunate to be supported by major three–year sponsorships, some of which are being renewed while others are being replaced by new ones. All the sponsorships are gratefully acknowledged in section 4.3 of this report and an overview of AIMS's financial position is provided in section 4.

During its first phase, AIMS developed a reputation for excellent teaching. AIMS is now well-known across Africa and increasingly supported by students from all over the continent. To date, students from 35 African countries have applied to study at AIMS. During this year, 261 students from 31 countries applied, although AIMS only has capacity for about 50. The quality of the students who are accepted for the diploma course, is higher with each new intake.

Of the 40 students who graduated in June 2006, more than 30 will continue with research masters and PhDs in South Africa and a few will study abroad. In order for these students to promote science and technology through teaching, research and general application, they need to return home to an acceptable level of infrastructure. For this reason, AIMS has initiated a project to develop a network of AIMS-like institutions across Africa. It is called the African Mathematical Institutes Network (AMI-Net) and it is fully supported by the NEPAD Science and Technology Secretariat.[1]. AMI-Net will also help to meet the huge demand for student places on the AIMS course. The implementation of this project, is one of the goals of the second phase of AIMS.

Excellent lecturers from the international community and from Africa have volunteered to teach at AIMS. They have developed an exciting academic programme using a unique and interactive problem-solving approach. Foremost researchers from the local universities proposed interesting essay topics in a variety of fields, and students were able to select from these. The same scientists supervised the students' essay work. In this way, students are led towards various interesting research fields, and education at AIMS has developed a multi-disciplinary nature.

[1] www.nepadst.org/platforms/mathsci.shtml

As part of its research programme, AIMS has also invited scientists from all over Africa to persue their research in the Institute. This programme is still being developed; and another goal of the second phase of AIMS, is to fully conceptualise and implement this aspect of the Institute's work.

One of the most challenging goals of phase 2, is to enrol more South African students at AIMS. Although AIMS developed a special programme for this purpose -The Advanced Mathematical Science Programme - few South African students enrol on it and proceed to the Diploma level. This phenomenon needs to be understood in the context of a general lack of students (particularly black students) in the mathematical sciences and engineering in South Africa, and the poor state of mathematics in South African schools. Many projects, including AIMSSEC, have been initiated to remedy the situation in schools; however, a concerted effort is also required at the postgraduate level, where academia and industry are both recruiting young scientists from a very small pool. AIMS would like to tackle this challenge in collaboration with industry. The AIMS programme is flexible enough to include a number of industry-specific modules within its suite of courses which are already characterised by a strong focus on problem solving. Developing links with industry for this purpose, constitutes the third goal of AIMS's second phase.

In this document, we report on all the operations of AIMS for the academic year 2005/6. The University of Stellenbosch, which handles the financial accounting and auditing of AIMS, prepared the income and expenditure accounts according to their financial year (calendar). These are presented and discussed in this report. The report also includes a broader look at AIMS's past, and presents some of its plans for the future.

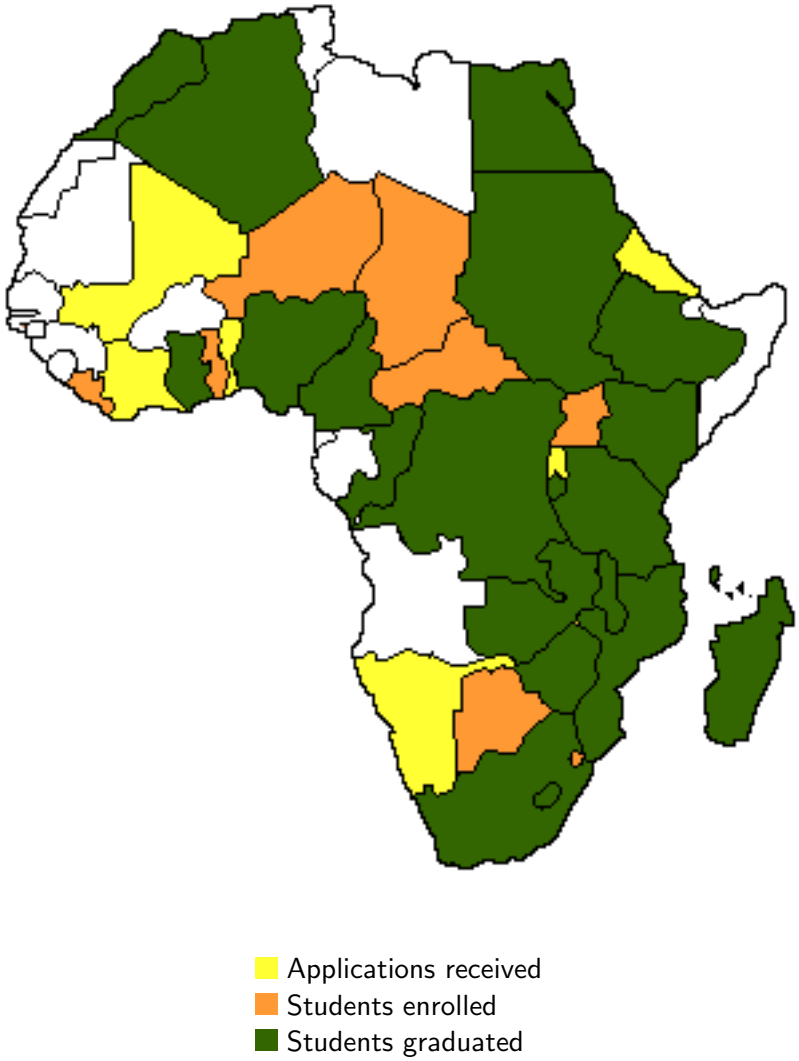
2. Academic Programmes

During the past year AIMS' activities expanded in size and in variety. A brief report on the main activities follows.

2.1 AIMS Diploma

The Postgraduate Diploma in Mathematical Sciences is a nine month course consisting of three parts: skills courses, review courses and essay writing.

The map below shows where AIMS diploma students have come from. AIMS has drawn students from most parts of Africa, but there are still some areas (particularly the far-western part of Africa) where this unique learning experience has not been made available. Our goal is to turn the map green!



2.1.1 Skills Courses

During the first part of the AIMS diploma course from September to November, students acquire general skills in mathematical and physical problem solving. They learn to use computers effectively and some standard skills are discussed in new ways. Students also learn to communicate better by improving their skills in the English language. All the following courses are compulsory:

- Introduction to the Computational Facilities at AIMS: GNU/Linux — Mike Pickles and Carl Scheffler (AIMS)
- Mathematical Problem Solving — Alan Beardon (Cambridge)
- Physical Problem Solving — David MacKay (Cambridge)
- Mathematical Methods — Alan Macfarlane (Cambridge)
- Python Programming — Carl Scheffler (AIMS)
- Electromagnetic Theory and Special Relativity — Robert de Mello Koch (Witwatersrand) and Neil Turok (Cambridge)
- Differential Equations — Bernd Schroers (Heriot-Watt)
- English and Communication Skills—Anahita New (AIMS)

Our new resident English teacher, Anahita New, taught both General English and Scientific Writing classes to the 2005-6 AIMS intake. General English classes, streamed by level, were provided in English as a Foreign Language for those who needed them. These classes were based on a proportional model where the focus shifted from the communication of meaning, to a greater concentration on form. This met the dual needs of the students by initially easing access to the AIMS community, and subsequently providing the skills necessary for precision in the essay phase. In the Scientific Writing classes, the emphasis throughout the year was on preparing students for the final essay. This was achieved using a mixture of process and product approaches. During the essay phase itself, the students had the opportunity for individualised feedback on their writing. Plans for the next year include integrating the writing component with the mathematical content lectures.

Anahita New is concurrently researching the writing classes, under the supervision of Christa van der Walt of Stellenbosch University. This study should be complete by the end of 2007.

2.1.2 Review Courses

During the second part of the diploma course – from December 2005 to the beginning of April 2006 – thirteen different review courses were presented by excellent international lecturers. Each student could select their own combination of at least nine courses and in so doing, include more mathematical, biological or physical content. A list of the courses and lecturers follows:

Alan Beardon and AIMS student Bolaji Adesokan.

- Epidemiological Modelling — Kimber Gross (Cambridge) and Edward Lungu (Botswana)
- Topics in Computational Algebra and Applications — Barry Green (Stellenbosch)
- Inference and Information Theory — David MacKay (Cambridge)
- Topology — Tadashi Tokieda (Cambridge)
- Fluids — Grae Worster (Cambridge) and Keith Moffatt (Cambridge)
- Finite Groups and Representation Theory — Jamshid Moori (KwaZulu-Natal)
- Biomathematics — Pierre Auger (IRD)
- Data-mining and Biology — Wiesner Vos (Cape Town) and Ludger Evers (Oxford)
- Cosmology — Pedro Ferreira (Oxford) and Kavilan Moodley (KwaZulu-Natal)
- Advanced Mathematical Methods — Vincent Rivasseau (Paris-Sud)
- Numerical Analysis — Peter Olver (Minnesota)
- Environmental Modelling — Elizabeth Moyer (Harvard)
- Wavelets — Johan de Villiers (Stellenbosch) and Romaine Murenzi (Rwanda)
- Quantum Mechanics — Nick Dorey (Cambridge)
- Program Evaluation — Lina Maslanka (York College)

AIMS students Cho Kabadula and Evidence Matangi making an electric motor during the Electromagnetic Theory and special Relativity course.

2.1.3 Essay Phase

In the third part of the diploma programme, the students prepare an essay on a topic of their choice. They can select from a range of topics proposed by researchers from various universities and research institutions. The topics cover the fields of pure mathematics, mathematical models in biology, experimental and theoretical physics, computer science and a variety of other applications of mathematics. In many cases, these essays provide an introduction to further work on similar topics which the students undertake after completing the AIMS diploma. During the essay phase, much attention is also given to good scientific writing. A list of the topics chosen by each student and the names of the supervisors follows:

Student	**Essay Title**	**Supervisor**
Adam Mohamed	Real Characters and Quadratic Reciprocity	A Keet
Ambrose Chongo	The Fundamental Theorem of Asset Pricing	E Kopp
Ayoub Basheer Mohammed Basheer	Representation Theory of Finite Groups	J Moori
Bolaji James Adesokan	Numerical Integration Based on Rational Functions	D P Laurie
Chodziwadziwa Whiteson Kabudula	Overview of Tools for Microarray Data Analysis and Comparison Analysis	V B Bajic & O Hofmann
Coffart Mogale	Bandwidth Reallocation in Telecommunication Networks	A E Krzesinski
Daphney Singo	Superdeformed Bands in Nuclei	D Aschman & S Mullins
Biniam Zerai Tedlla	Superdeformed Bands in Nuclei	D Aschman & S Mullins

Student	Essay Title	Supervisor
Attah Doom-Null Unwuchola	Baryonic Electro Production Studied Via Omega Meson Decay	S H Connell & P Bosted
Emmanuel Naziga	The Physics of Some Macromolecules in Biology	K Mueller-Nedebock
Evidence Matangi	Processing of Microarray Data	V B Bajic & O Hofmann
Alfred Yenwong-Fai	Atomic Level Stress Tensors around Defects	DT Britton & M Harting
Fabrice Talla Nobibon	Foundation and Optimization Problems in Stochastic Interval Programming	R Guo
Olufemi Olusola Odegbile	The Binomial Option Pricing Model	J C Ndogmo
Franck Tchitembo Goma	Optical Stability of Nanoparticulate Silicon	M Harting & D T Britton
Georgie Mbianda Njencheu	Mesonic Electro-Production and Duality	S H Connell & P Bosted
Henry Osita Mbah	Construction of MRI images	M W Swanepoel & J Nieto-Camero
Herbert Hove	Bayesian Estimate of Parameters for Protea Atlas Data	H Laurie & E Perrier
Hind Ali Mohmmed Ahmed	Deposition and Characterisation of Nanoparticulate Silicon Layers	M Hrting & D T Britton
Isaac Olukunle Abiodun	Dubuc-Deslauriers Interpolation Wavelets	J M de Villiers & B M Herbst
Felicien Jeje Muamba Mukanya	Survey of Language Identification (LID) Technology	T Niesler
Joel Ravelomanantsoa-Ratsimihah	Redundant Representations of Numbers	H Prodinger
Kelvin Muzundu	Linking Structures Using Duality	I Rewitzky
Laurent Tchoualag	Theoretical and Computational Aspects of Classical and Extended Models of Elasto-Plasticity	D Reddy & F Ebobisse
Emmanuel Kengni Ncheuguim	Theoretical and Computational Aspects of Classical and Extended Models in Elasto-Plasticity	D Reddy & F Ebobisse
Lucien Nzuzi Mbenza	A Study of the Theory of Nonlinear Optics with Application to Second Harmonic Generation	C Steenkamp
Maissoun Abdalla Khalil Mahmoud	Construction of computed tomographic (CT) images	M W Swanepoel & J Symons
Matlotlo Justice Matli	Prediction of Response Elements of Nuclear Hormone Receptors	V B Bajic & O Hofmann
Onyekwelu Uzodinma Okeke	Relativistic Quantum Molecular Dynamics	A Muronga
Sorel Platini Ewake	Second harmonic generation	E Rohwer
Mohamed Ahmed Mohamed Saeed Taha	The Computational Complexity of Groebner Bases	B van der Merwe
Sara Mkango	Mixture Models for Distinguishing Between Subspecies of Blue Whales	T A Branch & E Plaganyi
Eman Mohamed Nasr Abubaker	Mixture Models for Distinguishing Between Subspecies of Blue Whales	T A Branch & E Plaganyi
Mohamed Elshazli Sirelakhatim Abdelwahab	Energy extraction from a Black Hole?	P Dunsby
Tahina Rakotoniaina	The Arithmetic of Function Fields	F Breuer

Student	Essay Title	Supervisor
Thabo Sylvester Moretlo	Calculating Character Tables of Some Group Extensions	R L Fray
Theresia Marijani	A Model for Malaria with Malaria Preventive Therapy	E M Lungu
Inambao Wakwinji	In Vivo Dynamics of HIV Infection	A Welte
Mokhantso Maria Phoolo	Monte Carlo Markov Chain Methods in Cosmology	P Ferreira & M Pickles
Adewunmi Gideon Fareo	Single Phase Drag in a Typical Breakwater	G P J Diedericks & P du Plessis

2.1.4 Assessment and Oral Examination

During the courses students were continuously given assignments to complete, and these were marked by the lecturers and tutors. Assignments were assessed in the broad categories of distinction, upper pass and lower pass. Overall, the students work well and diligently; in 2005/6, no courses were failed. After completing their essays, the students defended their work in front of a panel of examiners. The panel consisted of the student's supervisor, an external examiner, the student's tutor and the director of the Institute. The two external examiners were Andries van der Walt and Dieter Heiss. After the oral examination, a final assessment was made of each student by taking their full performance throughout the year into account.

2.1.5 Graduation

The students were awarded their diplomas by their respective universities on 23 June 2006. The ceremony was held at AIMS in Muizenberg and was conducted by Martin Hall for the University of Cape Town, Chris Brink for Stellenbosch University and Brian O'Connell for the University of the Western Cape. The Minister of Science and Technology, the Honourable Mosibudi Mangena was the guest of Honour and the main speaker.

Neil Turok (centre back) with some of the AIMS students on their graduation day.

2.1.6 Post-AIMS study

Through a grant of the Mellon Foundation, 10 partial bursaries were again made available for students to continue with MSc research degrees. The Department of Science and Technology made a further 16 such bursaries available, and all of these were taken up by the graduates. Other funding is being sought to extend the total number of bursaries awarded to beyond 30. The destination of the students is as follows:

Name	Country	University	Supervisor
Abdelwahab, Mohamed Elshazli Sirelakhatim	Sudan	University of Cape Town	Peter Dunsby
Ahmed, Hind Ali Mohmmed	Sudan	University of Cape Town	Craig M Comrie
Basheer, Ayoub Basheer Mohammed	Sudan	University of KwaZulu-Natal	Jamshid Moori
Chongo, Ambrose Chomba	Zambia	University of Stellenbosch	Alet Roux
Ewake, Sorel Platini	Congo	University of Stellenbosch	Erich Rohwer
Fareo, Adewunmi Gideon	Nigeria	University of the Witwatersrand	D P Mason
Hove, Herbert	Zimbabwe	University of the Witwatersrand	Jacky Galpin
Kabudula, Chodziwadziwa Whiteson	Malawi	University of the Western Cape	Henry V Doctor
Mahmoud, Maissoun Abdalla Khalil	Sudan	University of Cape Town	Ernesta M Meintjes
Mbah, Henry Osita	Nigeria	University of Cape Town	Ernesta M Meintjes
Mbianda, Njencheu Georgie	Cameroon	University of the Witwatersrand	Simon H Connell
Mogale, Kobodi Coffart	South Africa	University of Stellenbosch	A E Krzesinski
Moretlo, Thabo Sylvester	South Africa	University of the Western Cape	R L Ray
Mkango, Sara Beatus	Tanzania	University of Cape Town	Doug Butterworth & Eva Plaganyi
Mohamed, Adam	Comores	University of Stellenbosch	Arnold Keet
Muamba, Mukanya Felicien Jeje	DR Congo	University of Stellenbosch	Thomas Niesler
Muzundu, Kelvin	Zambia	University of Stellenbosch	Sonja Mouton
Naziga, Emmanuel Baribefe	Nigeria	University of the Witwatersrand	Daniel Joubert
Okeke, Onyekwelu Uzodinma	Nigeria	University of the Witwatersrand	Ted Lowther
Phoolo Mokhantso Mary	Lesotho	University of KwaZulu-Natal	Kavilan Moodley
Rakotoniaina, Tahina	Madagascar	University of Stellenbosch	Florian Breuer

Name	Country	University	Supervisor
Ravelomanantsoa-Ratsimihah, Joel	Madagascar	University of Cape Town	Vasco Brattka
Singo, Thifhelimbilu Daphney	South Africa	University of Cape Town	David Aschman
Taha, Mohamed Ahmed Mohamed Saeed	Sudan	University of Stellenbosch	Brink van der Merwe
Talla, Nobibon Fabrice	Cameroon	University of the Witwatersrand	Montaz Ali
Tchitembo, Goma Franck	Congo	University of the Witwatersrand	Daniel Joubert
Tchoualag, Laurent	Cameroon	University of Cape Town	Daya Reddy
Unwuchol,a Attah Doomnull	Nigeria	University of the Witwatersrand	Simon H Connell
Wakwinji, Inambao	Zambia	University of the Witwatersrand	Alex Welte
Yenwong-Fai, Alfred Sevidzem	Cameroon	University of the Witwatersrand	Arthur Every

The following students have returned home and some of them are negotiating other placements: Isaac Olukunle Abiodun, Eman Mohamed Nasr Abubaker, Bolaji James Adesokan, Emmanuel Kengni Ncheuguim, Olufemi Olusola Odegbile and Biniam Zeria Tedlla.

Theresia Marijani, Evidence Simbarashe Matangi, Matlotlo Justice Matli and Lucien Nzuzi Mbenza are currently negotiating for bursaries and student places in South Africa.

2.1.7 Destination of Previous Students (2004-2005)

The following list summarises the destination of the students of the previous year, many of whom were partially supported by AIMS for research study at South African universities:

Name	Country	University	Programme
Abbas, Reem Abubaker	Sudan		
Abdelgadir, Omnia Khalifa	Sudan		
Adetula, Bolade Adewale	Nigeria	University of Cape Town	Masters
Ajibesin, Adeyemi Abel	Nigeria	University of Cape Town	Masters
Akinola, Richard Olatokunbo	Nigeria	University of Stellenbosch	Masters
Amin, Bayan Hamdi Kamil	Sudan		
Andrianjafinandrasana, Misaina Navaloniaina	Madagascar	University of the Witwatersrand	Masters
Baruani, Atumbe Jules	DR Congo	University of Stellenbosch	Masters
Bello, Iyabo Ann	Nigeria	Heriot Watt University, Scotland	PhD
Chikwasha, Vasco	Zimbabwe		
Chishwashwa, Nyumbu	Zambia	University of the Western Cape	Masters

Name	Country	University	Programme
Fath Elrahman, Tayseer Mirghani	Sudan	University of Stellenbosch	Masters
Gabere, Musa Nur	Kenia	University of the Witwatersrand	Masters
Guenda, Kenza	Algeria	University of Stellenbosch	Masters
Hamdouni, Yamen	Algeria	University of KwaZulu-Natal	PhD
Hassan, Mai Mahdi	Sudan		
Kamga Pene, Morgan Magloire	Cameroon	University of the Witwatersrand	Masters
Kivyiro, Pendo Teresia	Tanzania		
Lusilao-Zodi, Guy Alain	DR Congo	University of Stellenbosch	Masters
Lutambi, Angelina	Tanzania	University of Stellenbosch	Masters
Malm, James	Ghana		
Kuzamunu Mazandu, Gaston	DR Congo	University of Stellenbosch	Masters
Mberi Kimpolo, Charles Lebon	Congo	University of the Witwatersrand	Masters
Mohamed, Lina Mahgoub Yahya	Sudan	University of Cape Town	PhD
Mohammed-Salih, Lubna Abd Elazeem	Sudan	University of Stellenbosch	Masters
Mpiana Mulamba, Florimond	DR Congo	University of Stellenbosch	Masters
Muka, Kingsley Obiajulu	Nigeria	University of Benin, Nigeria	PhD & Lecturing
Muya Kasanda, Simon	DR Congo	University of KwaZulu-Natal	Masters
Mwanga, Gasper	Tanzania	University of the Witwatersrand	Masters
Nassar, Ali Mohammed Ali Mohammed	Egypt	ICTP Trieste, Italy	Diploma
Ndeffo Mbah, Martial Loth	Cameroon	University of Cambridge, UK	Part III
Nhanala, Joaquim	Mozambique		
Nsio Nzundu, Tony	DR Congo	University of Stellenbosch	Masters
Nyamuda, Gibson	Zimbabwe	University of Stellenbosch	Masters
Nyandwi, Venant	Burundi		
Okito Lokake, Jean-Andre	DR Congo	University of Stellenbosch	Masters
Osunmakinde, Isaac Olusegun	Nigeria	University of Cape Town	Masters
Ramanantoanina, Andriamihaja	Madagascar	University of the Witwatersrand	Masters
Salih, Rana Mustafa Abd Elmagied	Sudan		

Name	Country	University	Programme
Semegni, Yves	Cameroon	University of Stellenbosch	Masters
Siluyele, Ian John	Zambia	University of the Western Cape	Masters

2.2 Advanced Mathematical Sciences Programme (AMSP) 2006

Five South African students were shortlisted (from a list of nine applicants) for the honours-level Advanced Mathematical Sciences Programme . Three of these withdrew shortly before the start of the course which meant that only two enrolled in February 2006. They were: Alfred Tswinyane Mahlangu with a B.Sc. in Computer Science (Math.2) from the University of Cape Town, and Irwin Mosimanegape Montshiwa with a B.Sc.(Mathematics and Electronics) from the University of the North.

The course was taught by Wesley Kotzé and Michal Branicki. Wesley Kotze covering the following topics in Mathematics: Advanced Calculus, Ordinary Differential Equations, Fourier Series, Complex Analysis. Michal Branicki taught physics (mostly Newtonian) and computational skills including LaTeX. These students performed very well, and have been accepted for the AIMS Diploma programme 2006-7.

This project is difficult to sustain as South African students are in high demand and short supply, and AIMS does not have the resources to compete in this market. AIMS would like to collaborate with South African industry to devise a programme which simultaneously incorporates the many favourable aspects of the AIMS programme, and addresses the specific needs of industry. AIMS plans to develop this for implementation in 2007-8, and an invitation to participate in this endeavour will be extended shortly.

2.3 Research Programme

AIMS is steadily building up its research programme in order to expand its teaching capabilities. A strong and visible research programme will stimulate further interest in AIMS's work. Research is undertaken by visiting international scientists, and African scientists are encouraged to participate.

2.3.1 Pedro Ferreira

Pedro Ferreira was on sabbatical at AIMS from January to April of 2006. In addition to teaching a three week course on Astrophysics and Cosmology and mentoring some of the students, he worked on his own research in the fields of:

- Measurement of the polarisation of the Cosmic Microwave Background.
- Modified theories of gravity that do away with the need for dark matter.

Together with a visiting researcher, Musongela Lubo, he began to look at how an "Aether" might modify the vortical modes of cosmological inhomogeneities and whether these might have a clear observational signature.

Two of Pedro Ferreira's papers published in this year clearly stated AIMS affiliations:

"Large scale structure in Bekenstein's theory of relativistic MOND", Constantinos Skordis (Oxford U.), D.F. Mota (Inst. Theor. Astrophys., Oslo), P.G. Ferreira (Oxford U. & African Inst. Math. Sci., Cape Town), C. Boehm (CERN & Annecy, LAPTH). May 2005; Published in Phys.Rev.Lett.96, 011301, 2006, e-Print Archive: astro-ph/0505519.

"Measuring the geometry of the Universe in the presence of isocurvature modes", Joanna Dunkley (Oxford U.), M. Bucher (Orsay), P.G. Ferreira (Oxford U. & African Inst. Math. Sci., Cape Town), K. Moodley (KwaZulu Natal U. & African Inst. Math. Sci., Cape Town), C. Skordis (Oxford U.). Jul 2005; Published in Phys.Rev.Lett, 95, 261303, 2005, e-Print Archive: astro-ph/0507473.

2.3.2 Fellowships During 2006

The following eight fellows were supported by the Ford Foundation or Victor Rothschild Memorial Fund. They were selected from about 20 applicants. Each of them stayed for a period of two months, during which time each presented a colloquium talk at AIMS.

1. A.K. Olapade from Nigeria has Probability and Distribution Theory as his principal interests. AIMS put him in contact with the University of Cape Town (Tunde Ojumu), the University of the Western Cape (Gabriel Tati) and the library of the University of Stellenbosch.

2. Musa Lubo from the DR of Congo with Quantum Theory as his main interest. He made contact with researchers at the University of the Witwatersrand.

3. Laure Gouba from Burkina-Faso with Quantum Field Theory and Spinor Abelian Gauge Theories as main interests. She attended several courses which were running at AIMS and made contact with theoretical physicists at both UCT and Stellenbosch. (At the latter she gave two talks).

4. Uguette Flore Ndongmouo Taffoti from the Cameroon continued with her calculations on the growth and decay kinetics of metastable states (nanofacets) on metal surfaces via Molecular Dynamics and Monte Carlo simulation tools.

5. Gerard Razafimanantsoa from Madagascar (University of Antananarivo) specialises in Computational Algebra and attended seminars on this topic with Barry Green's research group at Stellenbosch. We also put him in contact with P.H. Potgieter of UNISA (Dept. of Sciences Decision).

6. Johnson Oladele Fatokun from Nigeria (Nasarawa State University) specialises in Numerical Analysis. He interacted with Peter Olver at AIMS and gave talks at UCT, UWC, Stellenbosch and the University of Pretoria. He also presented a paper at the conference of the South African Society of Numerical Analysis and Applied Mathematics (SANUM) at Stellenbosch (3-5 April).

7. Monday Ikhile from Nigeria (University of Benin) is a Numerical Analyst (simultaneous determination of the zeros of a polynomial) and presented talks at the SANUM conference and at the University of Stellenbosch.

8. H.G.Enjieu Kadji from the Benin is a Ph.D. student at the Institut de Mathematiques et de Sciences Physiques in Port-Novo. He completed 3 joint papers whilst at AIMS and gave talks at UCT and Stellenbosch on Synchronization Dynamics of self-sustained systems.

All of these fellows left detailed reports on their stay at AIMS. Their attention was drawn to the fellowship programme of the Institut des Hautes Etudes Scientifiques in Bures-sur-Yvette and some intend to apply there.

The fellowship programme generates an enormous positive influence on the continent. It is also of great benefit to the AIMS students to see active young researchers at work.

2.3.3 Research on Epidemiological Modelling

A graduate from the 2004/5 group, Angelina Lutambi from Tanzania, is undertaking research towards her science masters degree. She is studying the properties of models for populations with HIV/AIDS. She is enrolled at Stellenbosch University and is expected to submit her thesis during October. Tendai Mugwagwa a Zimbabwean graduate from the 2003/4 group, completed her masters while working at AIMS. She was enrolled at the University of Cape Town and her research dealt with HIV/AIDS at the cellular level. She has subsequently left for the Netherlands to undertake research towards her doctorate.

2.4 African Mathematical Institutes Network (AMI-Net)

AIMS invited leading mathematical scientists from across Africa to a meeting from 28–30 October 2006 to discuss further steps to be taken in establishing the African Mathematical Institutes Network (AMI-Net). [1]

The following scientists attended this meeting:

- Wandera Ogana (Kenya)
- Fouad Lahlou (Morocco)
- Habatwa Mweene (Zambia)
- Francis Allotey (Ghana)
- Jean—Pierre Ezin - Benin
- Phillipe Badibanga (DR Congo)
- Manar El Sheikh Abdelrahman (Sudan)
- Estomih Massawe (Tanzania)
- Guy Martial Nkiet (Gabon)
- Hilaire Nkounkou (Congo)
- Gerard Razafimanantsoa (Madagascar)
- Saliou Toure (Ivory Coast)

[1] A summary of the project is available on www.aims.ac.za and on www.nepadst.org.

A number of other scientists submitted apologies but expressed their support for the proposed project. At the meeting, the delegates agreed on many of the details for the future operation of AMI-Net. A memorandum of understanding was drawn up and signed by 12 African scientists. Letters of support were later received from leading scientists in 15 African countries; and from Wandera Ogana, who supported the project on behalf of AMMSI. A council for the governance of AMI-Net was established. The appointed council members are representative of the northern, eastern, western, southern and central regions of Africa:

Southern Africa

- Gerard Razafimanantsoa (Madagascar)
- Habatwa Mweene (Zambia)

Central Africa

- Phillipe Badibanga (DR Congo)
- Guy Martial Nkiet (Gabon)

Eastern Africa

- Manar Elsheikh Abdel-Rahman (Sudan)
- Estomih Massawe (Tanzania)

Western Africa

- Francis Allotey (Ghana)
- Jean-Pierre Ezin (Benin)

Northern Africa

- Faoud Lahlou (Morocco)
- Jamal Mimouni (Algeria)

AIMS

- Neil Turok (Chair, AIMS)

In addition, Wandera Ogana (Kenya) was co-opted onto the AMI-Net Council to represent AMMSI.

AIMS will initially act as the secretariat of AMI-Net. Some seed funding has already been made available, and the project is about to commence. The AMI-NET project received further support when official recognition for the mathematical sciences as a platform within the science and technology framework of NEPAD, was obtained through the office of John Mugabe. This occurred at the meeting of the African Ministerial Council on Science and Technology (AMCOST) in Dakar, Senegal during September 2005. AIMS and AMI-Net were subsequently given the task to develop this platform on behalf of NEPAD.

2.5 AIMS/INASP/TENET Workshop on Institutional Web Caches

A workshop on institutional level web caches was held in July 2006 and this paved the way for future workshops to train system administrators for AMI-Net. This workshop was organised and funded by AIMS, INASP (International Network for the Availability of Scientific Publications[2]), and TENET (Tertiary Education Network [3]). Thirty-six system and network administrators from several African universities attended a Linux refresher course and learnt how to run an institutional level web cache using the Free Software proxy called Squid. The AIMS system administrator Jan Groenewald, and Andy Rabagliati who taught in last year's winter school, led the Linux Refresher while Guy Halse of Rhodes University and Richard Stubbs of the University of KwaZulu-Natal presented the main course. An AIMS alumnus, Atumbe Jules Baruani from the Democratic Republic of Congo, assisted as tutor. All the participants felt that the workshop was a great success.

2.6 NASSP/AIMS Workshop

AIMS hosted a workshop organised by the South African Astronomical Observatory (SAAO) and the National Astrophysics and Space Science Programme (NASSP) on the 10th November 2005. The workshop formed part of the inauguration of the South African Large Telescope (SALT) in Sutherland and international lecturers were invited to provide overviews on a wide variety of interesting topics:

- Brian Schmidt (Mount Stromlo and Siding Spring Observatory, Australia) presented "Stellar Evolution and Supernovae";
- Gibor Basri (University of California and the Keck Telescopes, USA) presented "Extra-solar planets and brown dwarfs";
- Andreas Quirrenbach (University of Leiden, Netherlands) presented "Adaptive Optics";
- Jerry Sellwood (Rutgers, the State University of New Jersey, USA) presented "Cosmology and Dark Matter";
- Jay Gallagher (University of Wisconsin, Madison USA) presented "Galaxies and Galactic Structure".

Most of the AIMS students, and a further 45 students and established scientists participated in the workshop which was held over four days. Some of the guests were accommodated overnight in the AIMS building and the meals were served there as well. On the 10th of November many of the participants and AIMS students travelled by bus to the inauguration in Sutherland.

2.7 Conference and Workshop Attendance

Fritz Hahne, Director of AIMS, attended the International Workshop on African Research and Education Networking at CERN in Geneva from 25–27 September 2005. He gave a presentation on AIMS and the plans for AMI-Net. The workshop focused primarily on computer networking, but the human side of people networking through computers was also stressed.

[2] www.inasp.info
[3] www.tenet.ac.za

Fritz Hahne also attended a meeting of SAMSA 05 held in Blantyre, Malawi, during November 2005. He presented a paper at this conference on 30 November 2005, entitled: "AIMS — a new approach to postgraduate teaching in Africa".

2.8 African Institute for Mathematical Sciences Schools Enrichment Centre (AIMSSEC)

AIMSSEC conducted four ten-day residential professional development courses for teachers entitled: "Mathematical Thinking, Problem Solving and Technology in Teaching and Learning Mathematics" (July 2005 and January, June and July 2006). The first two courses were sponsored by Oxford and Cambridge Colleges and the University of Cambridge Local Examination Syndicate. The courses in the winter school holiday in 2006 were commissioned by the Western Cape Education Department for teachers from the specially designated Mathematics, Science and Technology and Dinaledi schools. The lecturers came from Australia, New Zealand, the USA, Brunei, Denmark and the the United Kingdom. Each course was taught by six university lecturers who worked on an expenses only basis, and shared the school hostel accommodation in collegiate style with the teachers. The courses were attended by 147 teachers (82 men, 65 women; 79 from the Western Cape, 22 from the Eastern Cape, 16 from KwaZulu-Natal, 18 from the Northern Province, 4 from Mpumalanga 5 from North West Province and 3 from Gauteng). The courses are followed by assignments for completion and three months of e-learning. There are 235 applicants on file for future courses, and the University of Stellenbosch is seeking funding to extend this course to two years, for teachers who show potential to be subject leaders. After completing this course, the participants would run workshops for teachers in their areas.

Evaluations were very positive. Two teachers who had first been introduced to probability and statistics on AIMSSEC courses were awarded prizes for their teaching of this subject, which is new in the South African Curriculum. They each won a trip to Brazil to attend a teachers' conference. Messages, similar to the following, were also received from teachers in KwaZulu Natal and the Eastern Cape: "All my 29 learners passed matric. I had 5 distinctions. Their average was 62.9 which was beyond the national average. This positions my school at number 21 amongst 350 schools in the Free State. This is all because of your valuable course."

Schools in the Western Cape and the UK worked together on the following AIMSSEC Motivate video-conference lessons: Measurement (Grade 4), Experiments with Gravity (Grade 5), Discovering Maths and Science (Grades 8 and 9), Energy - the Sun and the Earth (Grade 10), and 101 Uses of a Quadratic Equation (Grade 11). The resources for learning were provided online for the schools. The programme was sponsored by the Actuarial Society of South Africa. School twinning has been set up; two teachers visited South Africa from the United Kingdom, and 15 teachers from South Africa visited the United Kingdom.

AIMSSEC has arranged for 2000 school books (donated by schools in the UK) to be shipped free of charge by CUP and Exclusive Books to historically disadvantaged schools in the Eastern Cape. From there they will be distributed in consultation with the provincial government. AIMSSEC has run mathematics classes for learners from township schools. AIMS graduates respond to mathematical questions on the Ask AIMS answering service and assist as volunteer tutors in some of the township schools. All the work of AIMSSEC, including administration, is carried out by unpaid volunteers.

For more information see the AIMSSEC website[4].

[4] www.aims.ac.za/aimssec

2.9 Fabrication Laboratory FabLab

AIMS has received some equipment for the installation of a Fabrication Laboratory (FabLab) where devices which were designed by computer can be fabricated. The lab will enable the low cost construction of devices; in this way exposing AIMS students to high technology, and the practical application of their mathematical and programming knowledge. The lab could be a prototype for labs which could in time be installed in similar institutes across Africa. Unfortunately, the only staff member involved with this project has departed.

2.10 Other Activities

Some of the AIMS students joined one of the lecturers, Kimber Gross when she tutored mathematics learners at a local school in Hout Bay.

Lecturer Kimber Gross with Hout Bay pupils.

3. Infrastructure

3.1 Governance

3.1.1 Council

The AIMS Council includes representatives from each of the six participating universities:

- Jan van Bever Donker, University of the Western Cape;
- Hendrik Geyer, University of Stellenbosch;
- Fritz Hahne, AIMS Institute Director;
- Keith Moffatt, University of Cambridge;
- Daya Reddy, University of Cape Town;
- Graham Richards, University of Oxford;
- Neil Turok, University of Cambridge (Chair);
- Vincent Rivasseau, University of Paris-Sud-XI.

The following council members are also Trustees of the AIMS Trust, a registered tax-exempt charitable trust in South Africa: Jan von Bever Donker, Fritz Hahne, Keith Moffat, Daya Reddy and Neil Turok.

3.1.2 Advisory Board

The Advisory Board advises on all aspects of the AIMS programme, particularly its integration with existing courses and research projects in South African and other African universities. The members of the Advisory Board are:

- Chris Brink, University of Stellenbosch (Chair);
- Jacek Banasiak, University of KwaZulu-Natal;
- Nigel Bishop, University of South Africa;
- Barry Green, University of Stellenbosch;
- Edward Lungu, University of Botswana;
- Sizwe Mabizela, Rhodes University;
- Harm Moraal, Northwest University;
- David Sherwell, University of the Witwatersrand;
- Sibusiso Sibisi, Council for Scientific and Industrial Research, SA;
- Patricia Whitelock, South African Astronomical Observatory.

3.1.3 Executive Team

The Executive Team, chaired by the Institute Director, Fritz Hahne, is responsible for the links with the local universities and ensures that the AIMS project fits into their various structures. Members of the team include:

- Francis Benyah, University of the Western Cape;
- Kristian Müller-Nedebock, University of Stellenbosch;
- Vasco Brattka, University of Cape Town.

3.2 Staff

The director, Fritz Hahne, is assisted by the following staff:

- The Facility Manager, Igsaan Kamalie;
- Assistant to the Facility Manager, Emmanuel Kongolo;
- The Computer Officer, Jan Groenewald;
- The Administrative Officer, Mirjam Miske.

It is clear to everyone that the AIMS staff are very stretched. This has also been noted by a number of visitors. The Institute is growing at a rapid pace and existing staff continually take on additional responsibilities and tasks. It is a matter of concern that the expansion of AIMS is highly dependent on the good health and availability of the few staff members. For this reason, another computer officer and a senior project officer are to be appointed soon. AIMS will also require more lecturing and research staff.

3.2.1 Tutors

Seven tutors assisted during the year, some of them for part of the year only. They were: Ilhem Benzaoui, Archie Karumbidza, Antony Millner, Tendai Mugwagwa, Anahita New, Nneoma Ogbonna, and Mike Pickles. Four of these tutors were AIMS alumni.

3.3 Physical Facilities

Managing the AIMS facility involves co-ordinating many activities in a culturally diverse environment. Proper consultation, thorough planning and high levels of commitment from staff ensure that all activities run smoothly. Constructive criticism from students and visitors is welcomed and acted upon. Many new challenges arose with the growth of the organisation over the past year. The following list describes some of the changes which were introduced: a second vehicle was purchased, changes were made to the menus, African dinners for the students were introduced on the first Saturday of every second month, a cultural fund was set up to subsidise students' extra mural activities, cable television has been installed and the FabLab was established.

The AIMS building in Melrose Road.

3.3.1 Melrose Road

The building is now filled to capacity and further space close by is required. Apart from the old plumbing system which is being redone, the building is still in a good state. Renovations of a neighbouring beachfront building in Melrose road have started. This development will dramatically uplift the whole area, and has already improved security around the main AIMS building.

3.3.2 Watson Road

Three of the four flats in the Watson Road building are being used as accommodation for visiting lecturers and tutors. Renovation on the fourth flat is expected to begin soon. Emmanuel Kongolo and his family are accommodated in the building, and he acts as its care-taker.

3.3.3 Future Renovations

The work which is being undertaken to launch AMI-Net will require office space very soon. When the AMI-Net project is fully operational, further office space will be required. Major extensions to the AIMS building are necessary for which significant additional sponsorship is required.

3.3.4 Meals

AIMS is continuing to contract Kagiso Khulani Supervision (Compass Group Southern Africa Pty Ltd) for general meals and catering services. The menu has been improved after AIMS obtained constructive feedback from students and guests, and met with the caterers to discuss the concerns raised.

3.3.5 Transport

Four AIMS staff members have acquired professional driving permits (PDPs), which allow them to drive the 16 seater minibus. AIMS has also acquired a small second-hand car which is used to transport smaller groups. The number of students expected for the next cohort may necessitate the purchase of a larger minibus.

3.4 Library

The library is constantly being expanded through donations from lecturers and visitors. AIMS currently asks lecturers, tutors, and students to make suggestions for acquisitions. The library is spacious enough to cater for the current rate of acquisitions for some time. Improvements have been made to the existing catalogue which is based on the U.S. Library of Congress system, but it is envisaged that alternative systems that are more user- and maintenance-friendly will be investigated.

All students and lecturers use their University of Stellenbosch student numbers to access electronic journals. The University of Stellenbosch is working towards having all journal databases available off-campus.

3.5 ICT

3.5.1 Software

AIMS stays committed to Free and Open Source software as part of its commitment to build capacity to support African initiatives in technology. The Ubuntu Linux software allows alumni to easily acquire user skills and the software itself at no additional cost. When there is sufficient time in the highly pressurised time table, the students are shown how to install Ubuntu Linux and add the necessary scientific software tools. The current IT officer provides comprehensive support to all visiting researchers. This support ranges from teaching them to install Linux, add scientific software, to working on their specific codes and problems. The IT officer also assist students with programming of scientific problems during courses, and during the essay phase.

AIMS is now teaching the popular programming language Python as a base skill in modelling, and as a front end to various scientific tools. It allows for exceptionally clean and fast development and is a good tool for teaching as well. Visiting lecturers are also introduced to Python.

South African student Thabo Moretlo in the computer laboratory.

The AIMS software is up to date and visitors have been impressed with the system. Keeping the system current requires significant staff time and resources, both of which are often constrained.

3.5.2 Hardware

During 2005/6 a further 20 desktops were acquired to cope with expansion, and memory and hard drives were added to the servers. A new printer will be acquired before the next academic year.

3.5.3 Bandwidth

AIMS is still running on the same bandwidth, and it is now planned to increase it by 30%.

3.5.4 Future IT projects

Many technologies such as videoconferencing and VOIP, clustering and grid, advanced library services, advanced web interfaces and services are being investigated but the implementation of these will require the appointment of additional staff.

3.5.5 IT Training

The system administrator, Jan Groenewald, who is also studying postgraduate mathematical sciences, attended training on Web Caches (hosted by AIMS), wireless technologies (ICTP), and DNS

(AfriNIC) during the last year. The need for additional IT support staff at AIMS was highlighted during his absence.

3.6 Administration

All administration is handled by one part-time administrative officer at AIMS, Mirjam Miske, with support of the administrative infrastructure of the University of Stellenbosch. Many sections of the University of Stellenbosch's administration render AIMS excellent service, and this is gratefully acknowledged. Funds have now become available to appoint a senior administrative / project officer.

4. Financial Report

4.1 Official Statement

STELLENBOSCH UNIVERSITY

AIMS

Financial Statement for the year ended	31/12/2005	31/12/2004
INCOME	**4,026,741.66**	**11,714,094.63**
Abdussalam	-	7,632.15
All Souls College	8,611.04	-
Andrew W Mellon Foundation	-	4,099,890.00
Balliol College	988.88	-
Becker	6,000.00	-
Bgirton College	1,534.28	-
Cambridge University	-	121,899.00
Cambridge University Press	-	161,750.00
Canon Collins Educational	110,000.00	88,000.00
Chicago State University	-	980,946.24
Christ's College	-	1,007.23
Churchill College	1,529.30	-
CSIR	100,000.00	-
Department of Science & Technology	602,000.00	-
Ford Foundation	-	818,684.06
Foundation de France	-	(40,784.22)
Gatsby Charitable Foundation	841,787.88	692,071.86
Interest Received	388,607.76	397,264.51
IUTAM	-	718,577.29
KAY	20,000.00	-
King	-	220,890.00
London Mathemetical Society	-	56,414.01
Mathematical Association	-	4,174.70
Miscellaneous Income	52,838.72	2,192.11
National Assembly	5,000.00	-
Newnham College	-	1,010.04
NRF	280,000.00	120,000.00
Ramsay, Son & Parker	-	3,000.00
Seardel Group	-	200,000.00
Spreckley Partners	-	31,773.30
St Johns College	2,621.80	-
Stellenbosch University	450,000.00	450,000.00
Trinity College	-	570,465.05
UCT	-	450,000.00
Victor Rothschild	66,687.00	69,049.80
Vodacom	500,000.00	-
Vodafone Group	588,535.00	1,488,187.50
EXPENDITURES	**6,668,674.79**	**7,871,733.52**
Advertising	61,503.02	18,248.89
Affiliation and Registration	59,953.39	5,200.00
AIMSSEC Transfer	130,243.21	-
Books	16,133.46	24,179.78
Building, Building refurbishment costs, Equipment and Furniture	550,280.31	3,214,417.28
Bursaries	612,677.95	315,480.00
Catering	1,134,606.39	754,746.94
Consultation Fees and Services	30,972.09	179,144.55
Consumables	56,303.47	56,096.62
Copying and Printing	43,278.35	30,941.12
Courses	173,146.15	55,573.89
Flowers and Gifts	144.25	-
General Office Expenses	143,687.65	83,703.69
Insurance	39,814.84	34,039.88
Internet	149,842.35	173,318.15
Maintenance of Equipment	4,839.06	9,735.70
Medical Expenses	144,555.91	150,071.47
Municipal Expenses	186,142.04	135,097.64
Postage	3,271.54	6,706.95
Regional Services Council Levy	-	2,694.96
Remuneration	1,531,679.43	987,282.23
Rent of Equipment	424.33	-
Skills Development Levy	-	9,326.83
Stationery	22,842.13	31,872.24
Stipendia	418,590.00	274,500.00
Telephone	43,978.83	34,869.63
Travel Expenses	1,109,764.64	1,284,485.28
NET SURPLUS/(DEFICIT) FOR THE YEAR	**(2,641,933.13)**	**3,842,361.11**
ACCUMULATED FUNDS ON 01/01/2005	**7,546,385.60**	**3,704,561.74**
ACCUMULATED FUNDS ON 31/12/2005	**4,904,452.47**	**7,546,922.85**
LESS BALANCE SHEET ITEMS	**(181,888.36)**	**(1,872.00)**
Creditors	(181,888.36)	-
Provision for Leave	-	(1,872.00)
FUNDS AVAILABLE ON 31/12/2005	**5,086,340.83**	**7,548,794.85**

SIGNED..... DATE 10/02/06

Ms F Mallet
Head: Financial Services

4.2 Notes on the Financial Report

4.2.1 Notes on Income

1. The amounts received from All Souls College, Balliol College, Brighton College, Churchill College and St Johns College were donated to AIMSSEC and these formed part of the amount which was transferred to the new separate account of AIMSSEC.

2. The amount from Cambridge University Press contributes to student support.

3. The amount received from the CSIR was used for the Winter School, which focussed on training in Linux and free and open source software.

4. The amount received from the Department of Science and Technology was provided for post-AIMS partial bursaries and for teaching within the AMSP courses.

5. The amount received from Gatsby is part of a three-year grant to support student accommodation, meals and other expenses.

6. The amount received from the NRF was for support of students on the AMSP, South African researchers and continuing study of South African AIMS alumni.

7. The amount from Stellenbosch University represents an annual contribution in lieu of the subsidy. Amounts equal to this and intended for the same period were transferred by the Universities of Cape Town and Western Cape after the end of the financial year.

8. An annual amount was received for the Victor Rothschild bursaries.

9. The amount received from Vodacom was earmarked for research in epidemiological modelling.

10. The amount received by Vodafone was part of the three-year grant to establish AIMS.

4.2.2 Notes on Expenditures

1. In the past funds for AIMSSEC were kept in the AIMS account and handled as special earmarked funds. These have now been transferred to a separate account. They are thus shown as an expenditure.

2. The amount shown under bursaries were spent mainly on post-AIMS students support.

3. The amount shown under catering is mainly used for meals for the students, lecturers, researchers and visitors.

4. Medical expenses shown represent medical insurance for the students, researchers from African countries and tutors.

5. Remuneration costs are shown for staff, tutors, lecturers and researchers.

6. The item “Stipendia” refers to amounts paid to AIMS students for out of pocket expenses.

7. The travel expenses are shown for students from their home countries to AIMS, for lectures, tutors and for researchers who come to AIMS. In most cases return tickets are bought.

4.3 Sponsors

AIMS has been made possible through the generous support of the following organisations and individuals

- The Gatsby Charitable Foundation, UK;
- The Vodafone Group Foundation, UK;
- The Andrew W. Mellon Foundation;
- The Ford Foundation;
- The Vodacom Foundation, South Africa;
- PetroSA, South Africa;
- Department of Science and Technology, South Africa;
- Chicago State University;
- Trinity College, Cambridge University;
- Cambridge University Press;
- The David and Elaine Potter Charitable Foundation;
- The University of Stellenbosch;
- 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;
- Canon Collins Educational Trust for Southern Africa;
- The London Mathematical Society;
- Africa Science Program, Institut des Hautes Etudes Scientifiques, France;
- The University of Cambridge Local Examinations 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, for the donation of the remarkable mathematical research library of her late husband Evan Innes;
- British Airways, South Africa Office;
- European Mathematical Society Committee for Developing Countries;
- Jonathan Leake, Sunday Times.

5. Future Plans and Funding

The funding of AIMS throughout its initial three-year phase (2002–2005) was secured through large grants from sources listed in section 4.3. The Vodafone Group Foundation, which was the first large sponsor, PetroSA, the Department of Science and Technology and US Aid (through the Chicago State University) were primarily responsible for the funds required to set up AIMS. Their grants enabled the refurbishment and furnishing of the Melrose Road building, and the purchase of the necessary equipment. Salaries were made available for a small number of staff. The Gatsby Charitable Foundation made a large grant available for student support, while the Andrew W Mellon Foundation funded a considerable part of the academic programme (including funding for tutors and lecturers). As well as contributing to the abovementioned expenses, many of the other grants listed in section 4.3 covered specific projects. The Ford Foundation for example, made a grant available to support young African researchers who spend time at AIMS.

This well-balanced suite of grants is now coming to an end. The Gatsby Charitable Foundation is not renewing its sponsorship, having made a strategic decision to withdraw from South Africa for reasons not connected to AIMS. The Vodafone Group has renewed its sponsorship but the new grant will focus on new initiatives associated with AMI-Net and more generally with the tasks required for phase 2 of AIMS.

A favourable development is a grant by the Department of Education for over R3 000 000 per annum for the next 3 years. This will cover a large part of the costs of the academic programme. AIMS wishes to express its gratitude to all who have contributed so positively to this arrangement.

Funding for student bursaries during the AIMS year as well as the post-AIMS period still needs to be secured. The Ford Foundation has decided to grant a sizable amount for this purpose for the next two years. Together with funds from the Institute of Physics (UK) and Cambridge University Press, bursaries for about 30 students have been made available. Further bursaries will become available through a large donation by Dennis Avery for the coming year.

One of the remaining financial challenges is the funding of student bursaries. Many of the very bright students come from very poor families, and AIMS is committed to making the opportunity to study here available to all students who are selected, including those who do not have the financial means.

The South African Department of Science and Technology has granted seed money to AIMS to enable the start of projects within phase 2. Establishing AMI-Net requires more administrative, managerial and IT staff. It also requires funds for travelling within Africa. Support for this was secured from Vodafone. The Science and Technology secretariat of NEPAD is also working closely with AIMS and supporting our efforts.

AIMS would like to develop a stronger research programme. Viable research areas – where AIMS can draw South African, African and international researchers together to make a real difference – will be carefully selected. Various fields of biology, commerce, finance, engineering and science which are relevant to development in Africa, and in which modelling is important, are seen as good candidates. Some of the essay topics of the students present examples of directions that could be followed (see section 2.1.3). Some of these research topics would be best developed together with industrial partners. Industry also needs well-trained problem-solvers skilled in mathematics, physics and computational methods, and AIMS is an ideal place to develop such expertise. Funding for this purpose could be provided through the various schemes supported by the South African government and industry.

Appendix A. Contact Details

AIMS can be contacted through its website at www.aims.ac.za/english/contact.php, by sending an email to info@aims.ac.za, or by using the physical address below:

Administrative Officer
African Institute for Mathematical Sciences
6-8 Melrose Road
Muizenberg 7945
South Africa

Tel: +27 (21) 787 9320
Fax: +27 (21) 787 9321

To keep abreast of developments and opportunities at AIMS join the AIMS-announce mailing list at www.aims.ac.za/cgi-bin/mailman/listinfo.

AIMS student Herbert Hove on Muizenberg beach.