CONTENTS

FACULTY OF SCIENCE

Dean’s Introduction 1
Centre for Marine Studies 3
Department of Archaeology 6
Department of Astronomy 12
Department of Biochemistry 16
Department of Botany 21
Department of Chemistry 29
Department of Computer Science 38
Department of Environmental and Geographical Science 43
Department of Geological Sciences 51
Department of Mathematics and Applied Mathematics 58
Department of Microbiology 71
Department of Oceanography 75
Department of Physics 79
Department of Statistical Sciences 84
Department of Zoology 95
Office of the Dean of Science 112
FACULTY OF SCIENCE

The Faculty of Science at UCT prides itself on the high quality of its research. Various measures confirm the Faculty’s research stature: for example, it has the largest proportions of NRF A- and B-rated scientists in the country. Furthermore, it boasts an exceptional publication output of around 3.5 journal articles per academic staff member, on average.

The information summarised in this report provides further evidence of the impact made globally by our scientists, through publication in the international peer-reviewed literature and participation in international conferences. In addition, much of the research output recorded in this report is directed, with considerable success, towards problems of relevance to the economic and social well-being of South Africans.

Details of some particular research-related achievements of members of the Science Faculty follow.

The Innovation Fund, administered by the Department of Arts, Culture, Science and Technology, is a programme of support that addresses problems “serious enough to impede socio-economic development or affect our ability to compete …”. The funds are intended for large-scale projects in which leading-edge research is carried out. During 1999 four such grants were awarded to UCT projects, all of which included members of the Science Faculty. In 2000 a further Innovation Fund Grant was awarded, to Professor Edwin Blake for work in the area of human-computer interaction.

Dr Jackie King of the Freshwater Research Unit was Project Leader of a multi-million Rand project, involving an international team of 27 specialists, the aim of which was to advise on environmental flows for the Lesotho Highlands Water Project.

The Cape Action Plan for the Environment, or the CAPE Project as it is commonly known, is a project developed in partnership with the Global Environment Facility. Its aim is to secure the future of the Cape Floral Kingdom. Various groups from the Science Faculty - Professor Richard Cowling and Dr David Richardson of Institute for Plant Conservation, Professor Charles Griffiths of the Marine Biology Research Institute, and Dr Jenny Day and colleagues from the Freshwater Research Unit, served as specialist consultants in the development of the proposal. In addition, a number of scientists from the Faculty were involved as subconsultants.

Professor Brian Davies, with two co-editors, has launched a substantial new book “Global Perspectives on River Conservation: Science, Policy and Practice”, which contains contributions by 61 scientists from around the world. The chief aim of the work is to encourage strategic river planning.

In June 2000, an iron ore freighter, the Treasure, sank near one of the largest breeding colonies of the African Penguin, at Dassen and Robben Islands. A mammoth operation, aimed at saving the colonies, was mounted. This included the removal of penguins to Port Elizabeth, whence they could swim home while the oil was being mopped up. The operation gave UCT scientists at the Avian Demography Unit, led by Professor Les Underhill, a unique opportunity to ring large numbers of penguins, and three were fitted with satellite trackers. The opportunity to monitor their swim received worldwide attention, and serves as a fine example of the close relationship between good scientific research and outreach work.

The Fourth International Abalone Symposium was held at UCT in February 2000, and was attended by over 200 delegates from 18 countries. Professor Peter Cook of the Zoology Department was elected the new President of the International Abalone Society at the Symposium.

Scientists at UCT are actively involved in taking Science to the broader public, both in South Africa and abroad. Professor Maarten de Wit was a consultant and participant in the acclaimed BBC television series Earth Story, which was also aired on SABC in 2000.

Professor Jennifer Thomson has been a strong protagonist for genetically modified organisms, and has been actively sought after as an expert. She participated in a panel debate on the subject at the World Economic Forum in Davos, Switzerland.
Despite a rapidly growing petroleum and gas exploration industry, there is a distinct lack of training and research activity in this area at South African universities. This situation is set to change, with the establishment of the South African Petroleum Studies Programme, a partnership between UCT, Stellenbosch and UWC. At UCT the effort is spearheaded by Mr George Smith, who heads the Applied Geophysics programme in the Department of Geological Sciences. The programme is set to expand with the introduction of a course in Petroleum Engineering in 2001.

The journal Classical and Quantum Gravity published a special millennium issue, containing invited articles by researchers who have made key contributions to the understanding of gravity in recent decades. Singled out for special mention by the Editors was the article "83 Years of general relativity and cosmology: progress and problems" by Professor George Ellis.

Research in the Faculty of Science would not be possible without the substantial support that is received from a range of institutions. The financial support of the National Research Foundation, the Department of Arts, Culture, Science and Technology, as well as funding received from a host of private and public donors, are acknowledged with thanks.

Professor B.D. Reddy
Dean, Faculty of Science
CENTRE FOR MARINE STUDIES

DIRECTOR - Professor Geoff B. Brundrit

MANAGER - Mr Emlyn Balarin

UNIT CONTACT DETAILS

Postal address: Centre for Marine Studies
University of Cape Town
Private Bag
Rondebosch
7701
South Africa

Telephone: SA (21) 650-3283/3278
Fax: SA (21) 650-3283
Email: cms@physci.uct.ac.za
Web address: http://www.sea.uct.ac.za/cms

UNIT PROFILE

The Centre for Marine Studies is a centre of marine expertise at the University of Cape Town. The Centre is a co-ordinator and facilitator of multidisciplinary projects and workshops, and promotes marine, maritime and coastal studies and job creation in southern Africa. Furthermore, the Centre offers a consultancy service that draws on the diverse resource of highly skilled specialists in marine and coastal sciences amongst the University’s teaching and research staff. The Centre is controlled by a Board and a Steering Committee and run by a full-time manager.

The CMS offers personal consultations prior to any contract to define the service required and a clearly drawn-up contract of agreement. Contracts are supervised by senior academic staff supervising the employment of students who thus gain both by receiving practical training and by obtaining funds to help finance their studies. The CMS guarantees prompt delivery of the required product and all reports undergo independent expert evaluation to ensure a high standard of scientific reporting. The areas of expertise available from the Centre include, but are not limited to: meteorology, law, microbiology, ornithology, botany, remote sensing, chemistry, surveying, oceanography, biology, geology, mariculture, diving, statistics, resource assessment, management and conservation, environmental evaluations and cultural resource management.

Past clients of the CMS have included government, non-government, commercial and industrial organisations within southern Africa, and international and national funding agencies and donors.

UNIT STATISTICS 2000

<table>
<thead>
<tr>
<th>PERMANENT AND LONG TERM CONTRACT STAFF</th>
<th>AFFILIATED STAFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations Manager</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Board 14
Steering Committee 7
TOTAL 21


---

**RESEARCH OUTPUTS**

**UNIVERSITY PUBLICATIONS AND PUBLICATIONS OF A POPULAR NATURE**


**UNPUBLISHED RESEARCH / TECHNICAL / POLICY DOCUMENTS**


**CONSULTANCY AND OTHER ACTIVITIES BASED ON EXPERTISE DEVELOPED IN RESEARCH**

During 2000 the CMS undertook a total of ten contracts and two short courses:

**Forest Oil**
Specialist input into Lease-Specific Environmental Management Programme Reports (EMPR's) for offshore hydrocarbon exploration in petroleum license blocks 1 and 2.

**Mossgas**
Specialist input into a Lease-Specific Environmental Management Programme Report (EMPR's) for offshore hydrocarbon exploration in petroleum license block 11a.

**Wildevoel Vlei**
Study to analyse the effects of the Wildevoel Vlei outflow on the adjoining coastal waters and mussel beds.

**Pioneer**
Specialist input into Lease-Specific Environmental Management Programme Reports (EMPR's) for seismic surveys and prospect well drilling in petroleum license blocks 7 & 10-14B.

**Mossgas**
Literature review on *Leptocheirus plumulosus* - as initial phase for sediment toxicity study.

**Saldanha Bay Oyster Company (Pty) Ltd**
Weekly nutrient monitoring of water in oyster farming facility.

**Cape Peninsula National Park / World Wildlife Fund for Nature - South Africa**
Stock assessment of exploited subtidal reef species and characterization of habitat types along the coast of the Cape Peninsula National Park.
**MTN Whale Route**  
Development of marine conservation field trip course and long term development of school pupils as 'ambassadors of the sea'.

**Pulles Howard & De Lange**  
Situational analysis of available information on effluent from Umbogitwini industrial complex’s marine pipelines for human health risk assessment.

**Mossgas**  
Biomonitoring of beach and subtidal meiofauna around the outfall of the Mossgas (Pty) Ltd pipelene in Mossel Bay.

**Short Courses**  
Two “Marine Biology as a Career” short courses were run for high school pupils and involved lectures and a field trip.
DEPARTMENT OF ARCHAEOLOGY
(Including the NRF/UCT Research Unit for the Archaeology of Cape Town, the UCT Spatial Archaeology Research Unit, the NRF/UCT Archaeometry Research Unit and the Quaternary Research Centre)

HEAD OF DEPARTMENT -
First Semester: Professor John Parkington
Second Semester: Associate Professor Judith Sealy

DEPARTMENTAL CONTACT DETAILS
Postal address: Department of Archaeology
University of Cape Town
Private Bag Rondebosch 7701
South Africa
Telephone: SA (21) 650-2353
Fax: SA (21) 650-2352
Email: jep@beattie.uct.ac.za
Web address: http://www.uct.ac.za/depts/age/

DEPARTMENTAL PROFILE
The Department of Archaeology is characterised by a diversity of well-established research interests. The Western Cape has a rich archaeological heritage which includes evidence of hunter-gatherer settlement, pastoralist communities and colonial settlers - all are highlighted in ongoing research interests. In addition, the Department is home to archaeometric and materials research, focussing on palaeoanthropology, past environments, early human diets and materials analysis. More recently, the Department of Archaeology has developed an expertise in Cultural Resource Management, working with both government and private sectors to mitigate the effects of development and widen public awareness of the importance of the past.

QUATERNARY RESEARCH CENTRE
DIRECTOR - Associate Professor Julia Lee-Thorp

The Centre provides a forum for researchers from UCT, UWC, the South African Museum and from other institutions in the Western Cape who are working on Quaternary environments and climate change. Activities in 2000 included a programme of seminars, production of two newsletters and a web page, and the hosting of several international visitors.

DEPARTMENTAL STATISTICS 2000

<table>
<thead>
<tr>
<th>PERMANENT AND LONG TERM CONTRACT STAFF</th>
<th>STUDENTS</th>
<th>HONORARY STAFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors</td>
<td>Postdoctoral</td>
<td>Honorary Professors</td>
</tr>
<tr>
<td>Associate Professors</td>
<td>Doctoral</td>
<td>Honorary Research Associates</td>
</tr>
<tr>
<td>Senior Lecturers</td>
<td>Masters</td>
<td>TOTAL</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Honours</td>
<td>9</td>
</tr>
<tr>
<td>Research Staff</td>
<td>Undergraduates</td>
<td>347</td>
</tr>
<tr>
<td>Technical Support Staff</td>
<td>TOTAL</td>
<td></td>
</tr>
<tr>
<td>Administrative and Clerical Staff</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

TOTAL 371
RESEARCH FIELDS

PERMANENT STAFF

Professor John Parkington
    Head of Department; Director, Spatial Archaeology Research Unit; hunter-gatherers; palaeoenvironmental reconstruction and human ecology; prehistoric art; coastal archaeology
Professor Martin Hall
    Director, Research Unit for the Archaeology of Cape Town; archaeology of colonialism; archaeology and education; archaeological theory
Professor Nikolaas J. van der Merwe (in the establishment of the Dean of Science)
    isotopes; palaeodiet; palaeoenvironments; archaeometallurgy
Associate Professor Judith Sealy
    Director, FRD/UCT Archaeometry Research Unit; archaeometry; stable isotopes; prehistoric southern Africa
Associate Professor Andrew Smith
    prehistoric pastoralism; origins of food production; ethnohistory
Associate Professor Lee-Thorp (in the establishment of the Dean of Science)
    Senior Lecturer; human evolution; stable isotope applications to hominid and human diets and past environments; Director of the Quaternary Research Centre
Dr Rebecca Rogers Ackermann
    Lecturer; hominid evolution; variation; morphometrics; visualization and modeling; quantitative methods
Dr Simon Hall
    Lecturer; hunter-gathers and farmers; Stone/Iron Age interaction; landscape sharing

CONTRACT RESEARCH STAFF

Mr David Halkett
    contract archaeology; historical archaeology; prehistory of the southwestern Cape
Mr Tim Hart
    contract archaeology; historical archaeology; prehistory of the southwestern Cape
Mr Tony Manhire
    Senior Scientific Officer; rock art; later Stone Age; prehistory of the southwestern Cape
Dr Duncan Miller
    Principal Research Officer; archaeometallurgy; materials analysis

HONORARY PROFESSOR

Professor T.M. O’C. Maggs
    iron age archaeology in southern Africa

HONORARY RESEARCH ASSOCIATES

Dr Lynne Bell
    Natural History Museum, England; palaeodiet and taphonomy
Dr Yvonne Brink
    interpretation of symbolism and complexity in eighteenth century Cape architecture
Dr A. Jerardino
    coastal archaeology
Mr P. Jolly
    rock art
Dr J. Klose
    historical archaeology; ceramics
Dr Antonia Malan
    archaeology of the colonial period; archives and vernacular architecture
Dr Sharma J. Saitowitz
    ancient glass; glass beads; trade and contact, Indian and Pacific oceans
Dr Bruno Werz
    Maritime archaeology
POST-DOCTORAL FELLOWS

Dr Ian Watts
study of prehistoric pigments and origins; symbolic behaviour

DISTINGUISHED VISITORS

Dr Kofi Agorsah
Portland State University - black studies & international studies

Dr Susan Pfeiffer
University of Toronto - physical anthropology

Dr Carmel Schrire
Rutgers University - historical archaeology

Dr Jean-Philippe Rigaud
Bordeaux – prehistory

Dr Nicholas Conard
University of Tuebingen – prehistory

Dr Margot Winer
St Mary’s College, California – historical archaeology

RESEARCH OUTPUTS

RESEARCH PAPERS AND REFEREED ARTICLES


BOOKS

CHAPTERS IN BOOKS

PATENT

PUBLISHED CONFERENCE PROCEEDINGS

CONFERENCE ABSTRACTS
Lee-Thorp, J. 2000. Understanding fossilisation processes and isotopic signals in calcified tissue minerals: two decades of progress. Address and Session Chair, IV International Bone Diagenesis Meeting, Albarracin, Teruel.


**THESIS PASSED FOR HIGHER DEGREE**


**UNIVERSITY PUBLICATIONS AND WORKS OF A POPULAR NATURE**


**UNPUBLISHED RESEARCH/TECHNICAL/POLICY DOCUMENTS**


DEPARTMENT OF ASTRONOMY

HEAD OF DEPARTMENT: Professor Brian Warner

DEPARTMENTAL CONTACT DETAILS
Postal Address: Department of Astronomy
               University of Cape Town
               Private Bag
               Rondebosch
               7701
               South Africa
Telephone:  SA (21) 650-2391
Fax:  SA (21) 650-3352
Email:  astro@physci.uct.ac.za

DEPARTMENTAL PROFILE
The Department specialises in high speed photometry and spectroscopy of variable stars, in long period
variable stars and Galactic Structure, and in large scale structure of the Universe.

Observational and theoretical studies of rapidly oscillating Ap stars are conducted in collaboration with
astronomers from the SAAO, Belgium, Italy, Austria, Japan, Denmark and India.

Studies of cataclysmic variable stars (exploding stars such as novae) and pulsating white dwarf stars are
of continuing interest.

Studies of large-scale structures in the spatial distribution of galaxies are carried out- in conjunction with
the maintenance of a catalogue of galaxy redshifts. Particular emphasis is given to large-scale structures
of galaxies heavily obscured by the foreground Milky Way.

DEPARTMENTAL STATISTICS 2000

<table>
<thead>
<tr>
<th>PERMANENT AND LONG TERM CONTRACT STAFF</th>
<th>HONORARY STAFF</th>
<th>STUDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors 3</td>
<td>Honorary Professor 1</td>
<td>Doctoral 3</td>
</tr>
<tr>
<td>TOTAL 3</td>
<td>TOTAL 1</td>
<td>Masters 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Undergraduate 57</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TOTAL 65</td>
</tr>
</tbody>
</table>

RESEARCH FIELDS

PERMANENT STAFF
Professor Brian Warner
Head of Department: cataclysmic variable stars; white dwarf stars; history of astronomy

Professor Anthony Fairall
Redshift catalogue: large-scale structures in the universe – observations and analysis

Professor Don Kurtz
Rapidly oscillating Ap stars; δ Scuti stars; RR Lyrae stars

HONORARY PROFESSOR
Honorary Professor M.W. Feast
Stellar evolution; galactic structure; long period variable stars; distance scales
DISTINGUISHED VISITOR
Dr Keith Snedegar
Utah Valley State College- astronomical aspects of traditional African beliefs

RESEARCH OUTPUTS

RESEARCH PAPERS AND REFEREED ARTICLES


BOOK


PUBLISHED CONFERENCE PROCEEDINGS


RESEARCH NOTES


UNIVERSITY PUBLICATIONS AND WORKS OF A POPULAR NATURE


THESIS AND DISSERTATIONS PASSED FOR HIGHER DEGREES

DEPARTMENT OF BIOCHEMISTRY

HEAD OF DEPARTMENT - Associate Professor N. Illing

DEPARTMENTAL CONTACT DETAILS
Postal address: Department of Biochemistry
University of Cape Town
Private Bag
Rondebosch
7701
South Africa
Telephone: SA (21) 650-2402
Fax: SA (21) 685-5931
Email: ethne@molbiol.uct.ac.za
Web address: http://www.bch.uct.ac.za/

DEPARTMENTAL PROFILE

Prof. Klump is interested in uncommon DNA structures - linear or branched double-stranded, triple-stranded or quadruple-stranded helices. He also investigates the thermodynamic features of proteins from hyperthermophilic bacteria in collaboration with the Center of Marine Biotechnology in Baltimore MD, USA.

Assoc. Prof. Lindsey, Assoc. Prof. Brandt and Dr Rodrigues are continuing their work on the molecular basis of desiccation tolerance in plants. They use yeast as a model system to study the role of LEA (late embryogenesis abundant) proteins. There is also ongoing collaboration with Prof. Sue Harrison (Chemical Engineering Department, UCT) on the physiological and mechanical properties of yeast.

Assoc. Prof. Illing is investigating the regulation of gene expression during olfactory neuron development and the regulation of expression of GnRH receptors during development. Her laboratory is also very interested in the regulation of gene expression during dehydration and rehydration in the resurrection plant, Xerophyta humilis.

Assoc. Prof. Patterton investigates the interplay between the packaging of DNA and the regulation of gene expression. He is currently characterising the linker histone from Baker's yeast, and investigating the biochemical role and genomic distribution of this histone.

Assoc. Prof. Farrant conducts research on the physiological and molecular aspects of plant stress tolerance in unique Southern African flora. She also works closely with colleagues from the Stress Ecology Unit, Kirstenbosch and from the University of Natal, Durban, University of Firenze, Italy, Universite de Pierre et Marie Curie, Paris, France and Villanova University, USA.

Dr Denby's research focuses on how plants sense and respond to pathogen and insect attack. For this work molecular and genetic approaches are employed. She is also investigating the role of calcium within the cells of the plant in an ongoing collaboration with Dr Marc Knight (Oxford University, UK).

Dr O'Ryan runs an evolutionary biology research group that has close links with the departments of Botany and Zoology. Her group focuses on the reconstruction of molecular phylogenies, addressing population and conservation-related questions of southern African animal species.
DEPARTMENTAL STATISTICS 2000

PERMANENT AND LONG TERM CONTRACT STAFF

<table>
<thead>
<tr>
<th>Position</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors</td>
<td>1</td>
</tr>
<tr>
<td>Associate Professors</td>
<td>5</td>
</tr>
<tr>
<td>Lecturers</td>
<td>3</td>
</tr>
<tr>
<td>Research Staff</td>
<td>3</td>
</tr>
<tr>
<td>Technical Support Staff</td>
<td>9</td>
</tr>
<tr>
<td>Administrative and Clerical Staff</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>24</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STUDENTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-Doctoral</td>
<td>5</td>
</tr>
<tr>
<td>Doctoral</td>
<td>7</td>
</tr>
<tr>
<td>Masters</td>
<td>15</td>
</tr>
<tr>
<td>Honours</td>
<td>7</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>281</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>315</strong></td>
</tr>
</tbody>
</table>

RESEARCH FIELDS

PERMANENT STAFF

- **Associate Professor Nicola Illing**
  - HoD; molecular biology; developmental neurobiology
- **Professor Horst Klump**
  - physical biochemistry; superstable proteins
- **Associate Professor Wolf Brandt**
  - protein chemistry; chromatin structure; plant desiccation tolerance
- **Associate Professor George Lindsey**
  - protein chemistry; plant desiccation tolerance; chromatin
- **Associate Professor Jill Farrant**
  - desiccation tolerance; resurrection plants; seeds, plant physiology; molecular biology
- **Associate Professor Hugh Patterton**
  - chromatin; transcription; histone; gene expression
- **Dr Jerry Rodrigues**
  - protein chemistry; chromatin structure; plant desiccation tolerance
- **Dr Katherine Denby**
  - plant molecular biology; plant-pathogen interactions; signal transduction; Arabidopsis genetics
- **Dr Colleen O’Ryan**
  - molecular systematics; population genetics; microsatellite DNA

HONORARY STAFF

- **Honorary Professor Eugene Dowdle**
  - immunology
- **Associate Professor Barbara von Wechmar**
  - virology

POST-DOCTORAL STAFF

- **Dr Anne Whittaker**
  - carbohydrate metabolism; enzymology
- **Dr Simon Boa**
  - histone methylation; SET1
- **Dr Laure Jason**
  - Arabidopsis genetics; jasmonic acid
- **Dr Kirrily Peters**
  - plant signal transduction; MAP kinases
- **Dr Neo Makube**
  - triplet DNA repeats; microsatellite DNA
RESEARCH OUTPUTS

RESEARCH PAPERS AND REFEREED ARTICLES


Sales, K., Brandt, W., Rumbak, E., & Lindsey, G. 2000. The LEA-like protein HSP 12 in Saccharomyces cerevisiae has a plasma membrane location and protects membranes against desiccation and ethanol-induced stress. Biochimica et Biophysica Acta 1463:267-278.


CHAPTER IN BOOK


CONFERENCE ABSTRACTS


O'Ryan, C., Wiseman, R. & Harley, E.H. 2000. Microsatellite analysis reveals that the the domestic cat (Felis catus) and Southern African wild cat (F. lybica) are genetically distinct. Paper presented at the Society for Molecular Biology and Evolution Conference and America Genetic Association Congress, Yale, New Hampshire, USA.


Rodrigues, J.A. & O’Connell, M. 2000. Identification of drought-responsive H1 histone genes in plants. Poster presented at the 76th Annual Meeting of the South Western and Rocky Mountain Division of the AAAS, New Mexico State University, Las Cruces, New Mexico, USA.


Schwegmann, A. & Illing, N. 2000. Using the yeast two-hybrid system to identify proteins that interact with brain factor-1. SASBMB Combined Millennium Meeting, Grahamstown.


THESES PASSED FOR HIGHER DEGREES


CONSULTANCY AND OTHER ACTIVITIES BASED ON EXPERTISE DEVELOPED IN RESEARCH

Our department offers extensive services to other universities, institutions and private companies in the field of peptide and protein sequencing, amino acid analysis and DNA and peptide synthesis. We house the only matrix-assisted laser desorption ionisation (MALDI) mass spectrometer in South Africa, for the accurate determination of the molecular weight and identity of pure compounds. The Department runs a Jasco 810 CD-Instrument (Circular Dichroism), which operates as a Western Cape regional Facility. The evolutionary biology and conservation genetics wing in the Department offers a service to conservation managers and biologists. This service takes the form of investigating the genetic diversity and population structure of many mammal and avian species.
DEPARTMENT OF BOTANY
( Including the Bolus Herbarium and the Institute for Plant Conservation)

HEAD OF DEPARTMENT - Associate Professor W.D. Stock

DEPARTMENTAL CONTACT DETAILS
Postal address: Department of Botany
University of Cape Town
Private Bag
Rondebosch
7701
South Africa
Telephone: SA (21) 650-2447
Fax: SA (21) 650-4041
Email: Smuts@botzoo.uct.ac.za
Web address: http://www.uct.ac.za/depts/botany/

DEPARTMENTAL PROFILE
Botany is a vibrant department which strives towards the development of a centre of excellence for research and teaching of the ecology, evolution, physiological ecology and systematics of marine and terrestrial plants of southern Africa. The department includes two research units, the Bolus Herbarium and Leslie Hill Institute for Plant Conservation, and is also home to the Department of Environmental Affairs & Tourism Chief Directorate: Marine & Coastal Management. Research thrusts include plant population, community and reproductive ecology, systematics, floristics, biogeography and evolutionary biology of the unique Cape Floral Kingdom, ecology and economics of marine and freshwater algae, the ecophysiology of plant responses to pollution and global change, the physiology of plant nitrogen-fixing symbioses and molecular and physiological characteristics of seed and vegetative desiccation tolerance in plants. The Institute for Plant Conservation is actively researching the conservation status of the Cape Floristic Region and communicating these results to policy makers and the broader community, while the Bolus Herbarium is researching the taxonomy of and curating a specimen collection of over a third of a million southern African species. Staff are also active on Research Councils, policy making forums and advisory committees.

DEPARTMENTAL STATISTICS 2000

<table>
<thead>
<tr>
<th>PERMANENT AND LONG TERM CONTRACT STAFF</th>
<th>HONORARY STAFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors 2</td>
<td>Honorary Professors 2</td>
</tr>
<tr>
<td>Associate Professors 4</td>
<td>Honorary Research Associates 4</td>
</tr>
<tr>
<td>Senior Lecturers 2</td>
<td>TOTAL 6</td>
</tr>
<tr>
<td>Lecturers 1</td>
<td></td>
</tr>
<tr>
<td>Research Staff 1</td>
<td></td>
</tr>
<tr>
<td>Technical Support Staff 10</td>
<td></td>
</tr>
<tr>
<td>Administrative and Clerical Staff 3</td>
<td></td>
</tr>
<tr>
<td>TOTAL 23</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STUDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postdoctoral 4</td>
</tr>
<tr>
<td>Doctoral 25</td>
</tr>
<tr>
<td>Masters 30</td>
</tr>
<tr>
<td>Honours 10</td>
</tr>
<tr>
<td>Undergraduate 349</td>
</tr>
<tr>
<td>TOTAL 418</td>
</tr>
</tbody>
</table>
RESEARCH FIELDS

PERMANENT STAFF

Associate Professor William Stock
  Head of Department; plant physiological ecology; global change; isotope ecology

Associate Professor John J. Bolton
  phycology; marine and freshwater biology; mariculture

Professor William J. Bond
  plant ecology; evolutionary biology; conservation biology; fire and community dynamics

Associate Professor Felix Dakora
  plant physiology; nitrogen fixation; agricultural biology

Dr Ed February
  Senior Lecturer; palaeoecology; ecophysiology

Dr Terry Hederson
  plant systematics; bryology; molecular systematics; life history traits

Professor Peter Linder
  Keeper of the Bolus Herbarium; systematics; taxonomy; evolutionary biology

Dr Jeremy Midgley
  Senior lecturer; plant ecology; evolutionary biology; forest dynamics

Dr David M. Richardson
  Deputy Director of the IPC; plant ecology; biology of invasive organisms; bioclimatic modelling; restoration ecology

EMERITUS PROFESSOR

Professor OAM Lewis
  plant nitrogen metabolism

EMERITUS ASSOCIATE PROFESSOR

Associate Professor AV Hall
  systematics; taxonomy

HONORARY PROFESSORS

Professor Richard Cowling
  Director of the Leslie Hill Institute for Plant Conservation; plant ecology; conservation biology; community ecology; biodiversity

Professor Brian Huntley
  Director of the National Botanical Institute; landscape ecology

HONORARY RESEARCH ASSOCIATES

Dr PV Bruyns
  systematics

Mrs E Esterhuysen
  taxonomy

Mr SA Hammer
  taxonomy

Mr G Williamson
  taxonomy
RESEARCH OUTPUTS

RESEARCH PAPERS AND REFEREED ARTICLES


BOOKS


CHAPTERS IN BOOKS


PUBLISHED CONFERENCE PROCEEDINGS


CONFERENCE ABSTRACTS


THESES AND DISSERTATIONS PASSED FOR HIGHER DEGREES


UNIVERSITY PUBLICATIONS AND WORKS OF A POPULAR NATURE


UNPUBLISHED RESEARCH/TECHNICAL/POLICY DOCUMENTS

Tronchin, E. 2000. To be Onikusa or to be Gelidium. SANCOR Newsletter 165:15-16.

CONSULTANCY AND OTHER ACTIVITIES BASED ON EXPERTISE DEVELOPED IN RESEARCH

Associate Professor John J. Bolton is a member of the Editorial Board of the journal Botanica Marina, 1999-present. Co-chair of the Organising Committee of the 17th International Seaweed Symposium to be held at UCT in January 2001 (co-hosted by UCT and Marine & Coastal Management). Invited member of the Algal Nomenclature Committee of the International Botanical Association, 1998-present. He is a member of the International Organising Committee of the International Phycological Congress to be held in Thessaloniki, Greece (2001). He is the Representative of Civil Society on the Environmental Advisory Board to the Capricorn Science Park Development, South Peninsula Municipality, 1998-present. He is also a member of the NRF advisory panel for the Mariculture thrust of the Sustainable Environment Programme.
Professor William Bond is a member of the NRF Plant Science Rating Committee, elected Chairperson for 2000. He is a member of the Board of Cape Nature Conservation, 1999-2003. He serves on the Editorial Board of Oecologia, an international, European based ecology journal. He was invited (October 1999) to act on the Editorial Board of Global Ecology and Biogeography (associated with Journal of Biogeography published by Blackwells). IUCN threatened species review panel.
Professor R.M. Cowling is a member of the NRF Core programme Committee for Plant Sciences, the Advisory Board of the South Peninsula Municipality Nature Reserve, the Research Advisory Committee of NBI. He is the President of the International Society of Mediterranean Ecologists; outgoing chair of the NRF Evaluation Committee for Plant Scientists; Chairman of the Biodiversity Sector of the Foresight Project of the Department of Arts, Culture, Science and Technology; and Co-Chairman of the Biodiversity Committee of the Strategic Plan and Investment Program for the Conservation of the Marine and Terrestrial Biodiversity of the Cape Floristic Region. He is also a member of the Council and Flora Conservation Committee of the Botanical Society of South Africa. He is an alternate member of the Steering Committee for the Strategic Plan and Investment Programme for the Conservation of the Marine and Terrestrial Biodiversity of the Cape Floristic Region. He is a Trustee of the Leslie Hill Succulent Karoo Trust; ecological advisor to the Friends of St Francis Nature Areas; environmental ombudsman for Eskom nuclear sites at Groot Hagelkraal and Thyspunt; and Chairman of the Steering Committee for the Kouga Biosphere Reserve. He serves on the editorial boards of Global Ecology and Biogeography Letters, Plant Ecology, Encyclopaedia of Life Support Systems and South African Journal of Environmental Law and Policy.

Associate Professor Dakora serves on the National Committee on Plant Genetic Resources. He is the President of the African Association for Biological Nitrogen Fixation (AABNF). He served as a member of the International Advisory Committee for the organisation of the 12th International Congress on Nitrogen Fixation in Toronto, Canada, in July 2001. He is also a member of the International Advisory Committee for the organisation of the 9th AABNF Congress in Nairobi, Kenya in September 2000.

Dr. Terry Hedderson edits the Bryological Times, the official organ of the International Bryological Association, and is on the editorial board of Lindbergia, an international bryological journal issued in co-operation with Oikos and Ecological Bulletins. He also serves as a consultant to Historic Thatch Management, a UK based-company that, in conjunction with English Heritage, the National Trust and English Nature, promotes the conservation of vernacular architecture.

Professor H.P. Linder serves on the Editorial Board of the Nordic Journal of Botany and Australian Systematic Botany, and is an Associate Editor of Systematic Biology. Also was President of the Southern African Society for Systematic Biology until midyear. He also serves on the NRF Prestigious Bursaries Selection Committee and the Biodiversity Trust of the Environment Theme of the NRF.

Dr Dave Richardson serves on the steering committee of the RDP "Working for Water" project and is a consultant for the Department of Water Affairs and Forestry for the national audit of the programme. He serves on the IUCN's Species Survival Commission “Invasive Species” and conifers Specialist Groups and on the Scientific Advisory Committee for the SCOPE " Global Invasive Species Programme". He is a Secretary of the Executive Committee of the International Association of Mediterranean Ecologists (ISOMED); serves on Steering Committees for the Department of Water Affairs and Forestry's "Working for Water" Programme (Western Cape Programme) and the Water Research Commission-funded programmes on "Impacts of Alien Plants on the Water Resources of South Africa" and "A Technique for Modelling Scenarios for Alien Plant Control". He is also a member of the monitoring group for the "Working for Water" project in the Western Cape. He is Editor-in-Chief of Diversity and Distributions, Deputy Editor of Journal of Biogeography and Global Ecology and Biogeography. He also serves on the Editorial Boards of Biological Invasions and Ecologia Mediterranea.

Associate Professor Stock serves as Associate Editor of Austral Ecology and is a member of the Advisory Editorial Panel of the African Journal of Range and Forage Science. He also serves on the NRF “Conservation and Management of Ecosystems and Biodiversity” evaluation panel and the South African Certification Authority National Moderator for matric level biology.
DEPARTMENT OF CHEMISTRY

HEAD OF DEPARTMENT - Professor John R Moss

DEPARTMENTAL CONTACT DETAILS
Postal address: Department of Chemistry
University of Cape Town
Private Bag
Rondebosch
7701
South Africa
Telephone: SA (21) 650-2446
Fax: SA (21) 689-7499
Email: burke@psipsy.uct.ac.za
Web address: http://www.uct.ac.za/depts/cem/

DEPARTMENTAL PROFILE
The research activities of the department reflect the wide range and scope of the traditional sub-disciplines of inorganic, organic and physical chemistry, sustained by analytical, spectroscopic and computational methodology. The four main research focus areas are medicinal and biological chemistry, supramolecular chemistry, transition metal chemistry as well as biophysical and structural chemistry. Programmes are devoted to fundamental and applied chemical research, and to interdisciplinary studies in which chemistry plays a key role. Synthetic studies are carried out in organic, organometallic and coordination chemistry, in order to develop and apply new methodology, and to prepare biologically active compounds, novel catalysts, components of new materials, tools for analytical and separation science, and models for advanced structural and conformational studies. Molecular structure determination with the aid of spectroscopic and X-ray diffraction techniques are two areas of specialisation in the department. The latter technique is employed extensively in investigations into inclusion compounds, polymorphism and related solid-state phenomena.

During the course of 2000, the Roche award for the best paper in the field of pharmaceutical chemistry was awarded to Professors M.R. Caira, R. Hunter, L.R. Nassimbeni & Ms A.T. Stevens for their paper: Resolution of albuterol acetone. Tetrahedron:Asymmetry 10:2175-2189, 1999. Professor A.L. Rodgers was Chair and organizer of Urolithiasis 2000, the 9th International Symposium on Urolithiasis, in Cape Town over the period 13-17 February. This major international conference, held for the first time in South Africa, was attended by 320 delegates from all around the world.

DEPARTMENTAL STATISTICS 2000

<table>
<thead>
<tr>
<th>PERMANENT AND LONG TERM CONTRACT STAFF</th>
<th>HONORARY STAFF</th>
<th>STUDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors</td>
<td>Emeritus Professors</td>
<td>Post-doctoral</td>
</tr>
<tr>
<td>Associate Professors</td>
<td>Honorary Research Associates</td>
<td>Doctoral</td>
</tr>
<tr>
<td>Senior Lecturers</td>
<td></td>
<td>Masters</td>
</tr>
<tr>
<td>Lecturers</td>
<td></td>
<td>Honours</td>
</tr>
<tr>
<td>Research Staff</td>
<td></td>
<td>Undergraduates</td>
</tr>
<tr>
<td>Technical Support Staff</td>
<td></td>
<td>TOTAL</td>
</tr>
<tr>
<td>Administrative and Clerical Staff</td>
<td></td>
<td>1158</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1092</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TOTAL 54
RESEARCH FIELDS

PERMANENT AND LONG TERM CONTRACT STAFF

Dr Susan A. Bourne
Senior Lecturer; inclusion chemistry; crystallography; thermal analysis

Professor James R. Bull
organic synthesis; steroidal hormones; 19-norsteroids; estrogens; bioactive steroids; predictive design; cycloadition

Associate Professor Mino R. Caira
solid state chemistry; drug polymorphism; drug pseudopolymorphism; drug-cyclodextrin inclusion; drug complexation; co-crystallization; drug enantiomeric separation

Dr Kelly Chibale
Lecturer; organic synthesis; medicinal chemistry; tropical medicine

Dr Bette Davidowitz
Senior Lecturer; chemical education; curriculum design; writing and communication within the discipline

Dr Timothy J. Egan
Senior Lecturer; chemistry of antimalarial drugs

Dr David W. Gammon
Senior Lecturer; natural products chemistry; phytochemical studies on medicinal plants; carbohydrates; heterogeneous catalysis of organic reactions

Associate Professor Roger Hunter
synthesis; indole alkaloids; calixarenes; p-block synthetic methodology

Dr Alan T. Hutton
Senior Lecturer; advanced materials; liquid crystals; organometallic chemistry; co-ordination chemistry; microwave chemistry; electrochemistry

Associate Professor Graham E. Jackson
nuclear magnetic resonance; computer modelling; metal-ion equilibria; design of metal containing drugs; copper and rheumatoid arthritis

Associate Professor Klaus R. Koch
platinum metals chemistry; analytical chemistry of PGMs; co-ordination chemistry; ligand synthesis and design; multinuclear NMR spectroscopy; metal-based anti-cancer compounds; nano-materials; polymeric metal sorbents

Professor John R. Moss
Head of Department; organometallic chemistry; catalysis; inorganic chemistry; synthesis and properties of new materials

Dr Kevin J. Naidoo
Lecturer; computational chemistry; polymers; statistical physics; pharmaceutical drug design

Professor Luigi R. Nassimbeni
physical chemistry; thermal analysis; kinetics; inclusion compounds

Dr Neil Ravenscroft
Lecturer; physicochemical analysis of biologicals; carbohydrates; glycoconjugate and protein vaccines

Professor Allen L. Rodgers
kidney stones; urine chemistry; calcium oxalate crystallization

Dr Eugene Sickle
Lecturer; organic synthesis with applications in medicinal chemistry

HONORARY RESEARCH ASSOCIATES

Dr David J. Robinson
platinum group metal chemistry, hydrometallurgy, analytical chemistry, technology development, separation sciences

Professor Peter E. Spargo
history of chemistry

DISTINGUISHED VISITORS

Professor Reuben Simoyi
Department of Chemistry, University of West Virginia, USA – spectroscopy; kinetics

Professor Sandile P. Songca
Department of Chemistry, University of Transkei, South Africa - photodynamic anti-cancer compounds

EMERITUS PROFESSORS

Professor Peter W. Linder
solution equilibria of cyclodextrin inclusion complexes

Professor Alistair Stephen
carbohydrate chemistry

POST-DOCTORAL FELLOWS

Dr P. Beagley
metal complexes as antimalarial drugs

Dr J. Dauvergne
combinatorial chemistry and parallel synthesis

Dr O Helmer
organic synthesis

Dr G. Klatt
co-ordination and computational chemistry

Dr C. Nkambule
synthesis of mycothiol analogues

Dr F. Ulgieri
design and synthesis of antibiotics as enzyme inhibitors

RESEARCH OUTPUTS

RESEARCH PAPERS AND REFEREED ARTICLES


**BOOKS**


**CHAPTERS IN BOOKS**


**PUBLISHED CONFERENCE PROCEEDINGS**


the 9th International Symposium on Urolithiasis, Cape Town, 113-115. Rondebosch: University of Cape Town.


CONFERENCES ABSTRACTS

Bacsa, J. & Nassimbeni, L.R. 2000. An investigation of crystal structures and thermal behaviour of the adducts 2,2'-bipyridine with 2,2'-dihydroxy-1,1'-binaphthyl and 4,4'-bipyridine with 2,2'-bis(4-hydroxyphenyl)propane and water. Poster presented at 19th European Crystallographic Meeting, Nancy, France.


Mautjana, N.A. & Koch, K.R. 2000. The determination of traces of Pt, Pd and Rh after complexation with \( N,N\text{-dialkyl-N'-acylthioureas} \) by means of RP-HPLC. Poster presented at the 35th Convention of the South African Chemical Institute, Potchefstroom, South Africa.

Mtongana, S. & Koch, K.R. 2000. A multinuclear \( (^{13}\text{C}, ^{31}\text{P} \text{ and } ^{195}\text{Pt}) \) magnetic resonance study of mixed ligand platinum complexes with new \( N,N\text{-dialkyl-N'-acylthioureas} \) and \( N,N\text{-dialkyl-N'-aroylthioureas} \) as ligands. Poster presented at the 35th Convention of the South African Chemical Institute, Potchefstroom, South Africa.


Mtongana, S. & Koch, K.R. 2000. A multinuclear \( (^{13}\text{C}, ^{31}\text{P} \text{ and } ^{195}\text{Pt}) \) magnetic resonance study of mixed ligand platinum complexes with new \( N,N\text{-dialkyl-N'-acylthioureas} \) and \( N,N\text{-dialkyl-N'-aroylthioureas} \) as ligands. Poster presented at the 35th Convention of the South African Chemical Institute, Potchefstroom, South Africa.

Naidoo, K.J., Best, R.B. & Jackson, G.E. 2000. Motional properties of \( \alpha(1\text{-}4) \) and \( \alpha(1\text{-}6) \) linkages from NMR and computer simulations. Paper presented at the 220th Annual Meeting of the American Chemical Society, Washington DC, United States of America.


THESES AND DISSERTATIONS PASSED FOR HIGHER DEGREES


UNPUBLISHED RESEARCH/TECHNICAL/POLICY DOCUMENTS


CONSULTANCY AND OTHER ACTIVITIES BASED ON EXPERTISE DEVELOPED IN RESEARCH

Professor J.R. Bull was the special topic editor of Pure and Applied Chemistry (see Nanostructured Systems, Pure and Applied Chemistry 72:1-331 and Green Chemistry, Pure and Applied Chemistry 72:1207-1403). He was also a contributor and participant in the IUPAC Strategy Round Table on ‘Representations of Molecular Structure: Nomenclature and its Alternatives’ held at the National Academy of Sciences in Washington.

Dr A.T. Hutton is a consultant to Amplats on applications of microwave technology to chemical problems, and to Schümann-Sasol on the oxidation of waxes. He is a Titular Member of the IUPAC Commission on Nomenclature of Inorganic Chemistry, and he participated in a Commission meeting in Dublin, Ireland.
DEPARTMENT OF COMPUTER SCIENCE

HEAD OF DEPARTMENT - Professor Kenneth MacGregor

DEPARTMENTAL CONTACT DETAILS

Postal address: Department of Computer Science
University of Cape Town
Private Bag
Rondebosch
7701
South Africa
Telephone: SA (21) 650-2663
Fax: SA (21) 689-9465
Email: ken@cs.uct.ac.za
Web address: http://www.cs.uct.ac.za

DEPARTMENTAL PROFILE

The research activities in the Department are informally organized into three research laboratories. These are: Collaborative Visual Computing (coordinator: Associate Professor Edwin Blake), Data Network Architectures (coordinator: Professor Pieter Kritzinger), and Databases (coordinator: Associate Professor Sonia Berman). Researchers in these laboratories cooperate on major research projects. Currently three such projects are funded by the National Research Foundation (NRF) under its Competitive Industry Programme in the Information Technology and Telecommunications section. The projects are in cooperative data visualization, formal methods and ATM networks, and persistent object systems. The Department also attracts substantial other industrial and foreign funds. The Contemporary African Music and Arts (CAMA) archive, a multi-media database for the arts and vernacular culture, is hosted by the Department. Together with UWC and others at UCT, the Department is supported by Telkom, Siemens and THRIP (the Technology and Human Resources for Industry Programme) as a Centre of Excellence in ATM and broadband networks and their applications.

DEPARTMENTAL STATISTICS 2000

PERMANENT STAFF

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors</td>
<td>2</td>
</tr>
<tr>
<td>Associate Professors</td>
<td>2</td>
</tr>
<tr>
<td>Senior Lecturers</td>
<td>4</td>
</tr>
<tr>
<td>Lecturers</td>
<td>2</td>
</tr>
<tr>
<td>Technical Support Staff</td>
<td>2</td>
</tr>
<tr>
<td>Administrative and Clerical Staff</td>
<td>4</td>
</tr>
<tr>
<td>TOTAL</td>
<td>16</td>
</tr>
</tbody>
</table>

STUDENTS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctoral</td>
<td>4</td>
</tr>
<tr>
<td>Masters</td>
<td>26</td>
</tr>
<tr>
<td>Honours</td>
<td>19</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>1205</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1254</td>
</tr>
</tbody>
</table>

RESEARCH FIELDS

PERMANENT STAFF

Professor Kenneth MacGregor
   Head of Department; client server; object technology
Professor Pieter Kritzinger
   design, specification, analysis and implementation of discrete, reactive systems
Associate Professor Edwin Blake  
human-computer interaction cooperative visualization; computer graphics

Associate Professor Sonia Berman  
Senior Lecturer; databases; conceptual modelling; persistent programming languages; object-oriented databases

Dr Mike Linck  
Senior Lecturer; parallel processing and software development to aid the educational process; neural networks

Mr Donald Cook  
Lecturer; computer-supported education; computer-supported collaborative work

Ms Katherine Malan  
Lecturer; computer science academic development; information visualization; geographic information systems

Dr Patrick Marais  
Senior Lecturer; image compression; shape representation; image segmentation; medical imaging

Dr Gary Marsden  
Senior Lecturer; human computer interaction, visual programming languages and mobile computing applications

Dr James Gain  
Senior Lecturer; computer graphics, virtual reality; human computer interaction

RESEARCH OUTPUTS

RESEARCH PAPERS AND REFEREED ARTICLES


PUBLISHED CONFERENCE PROCEEDINGS

Azbel, I. & Berman, S. 2000. An epistemic model as the basis for a corporate memory. INAP 2000, 13th international conference on applications of Prolog, Waseda University, Tokyo, Japan, 71-76.


Nelte, M. & Hutchison, A.C.M. 2000. Enhancing the security of E-Commerce with fingerprint technology while preserving privacy. 4th International conference on security in information systems (SIS2000) Zurich, Switzerland.


CONFERENCE ABSTRACTS


THESES AND DISSERTATIONS PASSED FOR HIGHER DEGREES


UNIVERSITY PUBLICATIONS AND WORKS OF A POPULAR NATURE


UNPUBLISHED RESEARCH/TECHNICAL/POLICY DOCUMENTS


DEPARTMENT OF ENVIRONMENTAL AND GEOGRAPHICAL SCIENCE
( Including the Environmental Evaluation Unit and the Disaster Mitigation for Sustainable Livelihood Project)

HEAD OF DEPARTMENT - Professor Richard Fuggle

DEPARTMENTAL CONTACT DETAILS
Postal address: Department of Environmental and Geographical Science
University of Cape Town
Private Bag
Rondebosch
7701
South Africa
Telephone: SA (21) 650-2873/4
Fax: SA (21) 650-3791
Email: adams@enviro.uct.ac.za
Web address: www.egs.uct.ac.za

DEPARTMENTAL PROFILE
The interaction between humans and their environment and the variability of this environment is a common theme in the department's research initiatives. Details of the particular foci are given below.

The department has ongoing research initiatives with numerous overseas institutions. These include: the Centre of Earth Sciences of the University of Pennsylvania; the University of Iowa, the University of British Columbia, the University of Melbourne, the University of Northern British Columbia, Oregon State University, the Department of African Studies of the University of Mainz; the Departments of Geography at the University of Brighton, University of Sheffield and the University of Oxford in the UK; the Departments of Geography at the University of Paris X Nanterre and the University of Paris IV Sorbonne in France. There are also links with the United Kingdom Meteorological Office, the Scripps Oceanographic Institute in California and the CSIRO Atmospheric Research and Marine Research in Australia.

The Environmental Evaluation Unit offers professional environmental training, research and management services. The Unit offers short courses in environmental management. The EIA projects are many and varied and are listed under Unpublished Research/Technical/Policy Documents.

The Disaster Mitigation for Sustainable Livelihoods Programme (DiMP) has been active at UCT since 1998. DiMP undertakes a diverse suite of activities, including focused disaster risk research into small, medium and large disasters in the Cape Metropolitan Area. It also is the secretariat for a southern African disaster risk reduction network called ‘Periperi’ (partners enhancing resilience to people exposed to risks).

DEPARTMENTAL STATISTICS 2000

<table>
<thead>
<tr>
<th></th>
<th>PERMANENT AND LONG TERM CONTRACT STAFF</th>
<th>HONORARY STAFF</th>
<th>STUDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors</td>
<td>1</td>
<td></td>
<td>Post-doctoral 3</td>
</tr>
<tr>
<td>Associate Professors</td>
<td>3</td>
<td></td>
<td>Doctoral 9</td>
</tr>
<tr>
<td>Senior Lecturers</td>
<td>2</td>
<td></td>
<td>Masters 34</td>
</tr>
<tr>
<td>Lecturers</td>
<td>6</td>
<td></td>
<td>Honours 30</td>
</tr>
<tr>
<td>Research Staff</td>
<td>18</td>
<td></td>
<td>Undergraduate 445</td>
</tr>
<tr>
<td>Technical Support Staff</td>
<td>3</td>
<td></td>
<td>TOTAL 521</td>
</tr>
<tr>
<td>Administrative and Clerical Staff</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>39</td>
<td>Honorary Research Fellow 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TOTAL 1</td>
<td></td>
</tr>
</tbody>
</table>
RESEARCH FIELDS

PERMANENT STAFF

Ms Shirley Butcher
   Lecturer; geographic information systems (GIS)
Dr Neil Dewar
   Senior Lecturer; regional development; urban studies
Professor Richard Fuggle
   Head of Department; integrated environmental management; environmental quality assurance
Associate Professor Bruce Hewitson
   atmospheric science; climatology
Mr Richard Hill
   Lecturer; environmental management
Dr Peter Holmes
   Lecturer; geomorphology
Associate Professor Mike Meadows
   Quaternary environmental change
Associate Professor Sue Parnell
   urban studies; historical geography
Dr Chris Reason
   Senior Lecturer; atmospheric science; oceanography
Mr Kevin Winter
   Lecturer; geography education

LONG TERM CONTRACT STAFF

Mr A Barbour
   integrated environmental management; environmental economics
Ms Janet Bodenstein
   integrated environmental management; environmental quality assurance
Dr Ailsa Holloway
   disaster research and advocacy
Dr Debbie Hudson
   Lecturer; climatology
Mr Darryll Kilian
   integrated environmental management; environmental policy; social impact assessment
Ms. Christina Nomdo
   risk reduction research; training and information dissemination
Dr Sophie Oldfield
   Lecturer; political and economic geography
Dr Merle Sowman
   community participation; coastal zone management; Local Agenda 21

CONTRACT RESEARCH STAFF

Mr Lynton Burger
   environmental policy development; integrated environmental management
Ms Loni Drager
   environmental policy development
Ms Vana Gulliver
   Quaternary palaeoecology
Mrs Razia Jeebhay
   integrated environmental management
Mr Peter Johnston
   CSAG project manager
Mr Patrick Kulati
   capacity building LA21
Miss Lynette Kruger
   integrated environmental management; environmental policy; ecological assessment
Miss Kerryn McKune
  risk reduction research
Mr Rashaad Samaai
  integrated environmental management; community participation
Ms Aah Sekhesa
  capacity building and training LA21
Ms Babi Sidzumo
  development of environmental policy and community guidelines
Miss Portia Tsolekile
  capacity building LA21
Mr Monwa Vumazonke
  risk reduction research

DISTINGUISHED VISITORS

Professor William Anderson
  Disaster Management Facility, World Bank, Washington D.C., United States
Professor Costas A. Cassios
  Director Greek EIA Center, Geography and Regional Planning, National Technical University, Athens; integrated environmental management
Dr Robert Crane
  Earth System Science Center, Pennsylvania State University, USA; climate change; climate downscaling; self organizing maps; neural nets
Professor Prem Jain
  Department of Physics, University of Zambia; physics
Professor Greg Knight
  Director of Center for Regional Assessment, Pennsylvania State University, USA; impact assessment
Professor Dennis Mileti
  Natural Hazards Center, University of Colorado, Boulder, Colorado, United States

POST-DOCTORAL FELLOWS

Dr Mark Tadross
  CSAG: climate modelling; seasonal forecasting
Dr D. Jagadeesh
  CSAG climate modelling; regional climate models; downscaling
Dr D. Collins
  CSAG climate modelling; ocean-atmosphere interactions

HONORARY RESEARCH ASSOCIATE

Dr D. M. Avery
  South African Museum; palaeoecology

RESEARCH OUTPUTS

RESEARCH PAPERS AND REFEREED ARTICLES


CHAPTERS IN BOOKS


PUBLISHED CONFERENCE PROCEEDINGS


CONFERENCES ABSTRACTS


THESES AND DISSERTATIONS PASSED FOR HIGHER DEGREES


UNIVERSITY PUBLICATIONS AND WORKS OF A POPULAR NATURE


UNPUBLISHED RESEARCH/TECHNICAL/POLICY DOCUMENTS


CREATIVE WORKS, PERFORMANCES, EXHIBITIONS

CONSULTANCY AND OTHER ACTIVITIES BASED ON EXPERTISE DEVELOPED IN RESEARCH

The Environmental Evaluation Unit was established in 1985 in order that the expertise developed in environmental research could be readily available to the private sector and Government agencies. This unit currently employs twelve people funded solely from these services. Senior staff of the department are also regularly consulted for advice on environmental policy, urban development, climate change and applied geomorphology. The unit is also active in building environmental capacity in southern Africa.

The Disaster Mitigation for Sustainable Livelihoods Programme (DiMP) has been active at UCT since 1998. DiMP undertakes a diverse suite of activities, including focused disaster risk research into small, medium and large disasters in the Cape Metropolitan Area. It also is the secretariat for a southern African disaster risk reduction network called “Periperi” (partners enhancing resilience to people exposed to risks).

Anthony Barbour is the chairperson for the Board of Trustees for the Environmental Monitoring Group (EMG) which is an Environmental NGO.

Lynton Burger serves on the Kommetjie Environmental Action Group.

Shirley Butcher is active in the local Arc Info users’ group and has, with the help of students, undertaken GIS database development and spatial analysis for several agencies. She is the liaison officer for SA-WISE (South African Women in Science and Engineering).

Professor Richard Fuggle serves on the Côte d’Ivoire based Board of Directors of the Network for Environment and Sustainable Development in Africa; he is also environmental consultant to the World Bank’s Inspection Panel. He is a trustee of the Two Oceans Education Trust.

Associate Professor Bruce Hewitson is involved internationally in the Inter-governmental Panel on Climate Change (IPCC) and is co-lead author on the regional projections chapter of the forthcoming IPCC assessment report, as well as a lead author on the IPCC Technical Summary, Summary for Policy Makers, and Synthesis reports. He is a member of the steering committee for the 3-yearly International Meeting on Statistical Climatology, and a council member on the South African Society for Atmospheric Sciences. He has also served on National Research Foundation (NRF) committees, as well as on the science steering committees for two Water Research Commission (WRC) research projects.

Richard Hill served on the organising committee for the October 2000 conference of the South African Affiliate of the International Association for Impact Assessment. As co-convenor of the programme committee, he introduced a review process for papers submitted to the conference. He was a member of the programme committee for the August 2000 conference on Strategies for a Sustainable Built Environment, and acts as a referee for the journal Construction Management and Economics. He chairs the Richtersveld Community Trust that facilitates community development through funds provided by the Richtersveld National Park.

Ailsa Holloway. Sharing information worldwide; regarding international experiences in disasters: linking hazards and sustainability. She gave presentations at the 25th annual Hazards research and applications workshop at the Natural Hazards Center, Boulder, Colorado, United States from 9-12 July, 2000.

Dr Peter Holmes is president of the Southern African Association of Geomorphologists. He is involved on an ongoing basis with various environmental initiatives where specialist applied geomorphological input on physical landscapes and surface processes is required.

Darryll Kilian has served on the Steering Committee set up by the Cape Metropolitan Council to plan and direct the first Cape Metropolitan Festival of the Environment. He serves on the Board of the Southern African Institute of Ecologists and Environmental Scientists (SAIE&ES) and is involved in setting up a system of voluntary certification for environmental impact assessment practitioners in South Africa on behalf of the SAIE&ES. As a member of the Certification Advisory Committee, comprising representatives from all relevant South African Institutes, he is participating in the development of criteria for certification. He is also a member of the Western Cape Branch Committee of the South African Chapter of the International Association for Impact Assessment (IAIAsa).

Patrick Kulati is a Member of the Board of Trustees of Ground Work Trust (a national environmental justice organisation based in Pietermaritzburg). He is a Member of the Executive Committee of FAMSA-Western Cape Chairman of the Langa Seventh Day Adventist Church Youth Society Member of the Interim National Local Agenda 21 Coordinating Committee Involved in the process leading to the development of the National Strategy on Sustainable Development
Participant in the NGO process which looks at the National Environmental Management Act Review Process Participant in SA civil society preparation for the World Summit 2002 to be hosted by South Africa Member of the Cape Metropolitan Interim Working Group on Local Agenda 21

Associate Professor Mike Meadows serves on the International Geographical Union's Commission on Land Degradation. He is Secretary of the Commonwealth Geographical Bureau and President Elect of the Society of South African Geographers, as well as editor of the South African Geographical Journal.

Christina Nomdo is the coordinator for the MANDISA (disaster incident database) research project. She has convened a diverse stakeholder consultation process involving service providers on the Cape Metro and Provincial levels. Christina has been involved in the design of the database software and the web application thereof.

Sophie Oldfield spent the first half of 2000 completing and defending her doctoral dissertation. She also convened the first workshop for the South Africa-India comparative research project. The workshop brought South African, Indian and French researchers to the department, sponsored by the South Africa-French Institute, the Human Science Research Council and the UCT Visiting Scholar’s Fund.

Associate Professor Sue Parnell serves on the board of Mandlovo and the Isandla Institute, two local NGOS involved in community development and policy related research and training. She has advised the South African offices of several aid organisations as well as the Urban Sector Network and several local NGOS on aspects of urban policy and post-apartheid reconstruction. Internationally she has worked on national and city poverty reduction strategies with the many of the large international donors including DFID, CIDA, SIDA, the World Bank, United Nations (Habitat) and the Commonwealth Local Government Programme.

Dr Merle Sowman is a member of the Subsistence Fisheries Task Group appointed to advise the South African government on the future management of subsistence fisheries. She is also involved in an international collaborative research programme on coastal and fisheries co-management which is investigating, through country case studies, conditions under which co-management is likely to succeed.

Dr Chris Reason served on the World Meteorological Organisation/Intergovernmental Oceanographic Commission CLIVAR Sustained Observations for the Climate of the Indian Ocean and Observations for the Southern Ocean panels. He was co-coordinator of the Working Group on the Antarctic Circumpolar Wave and Low frequency variability in the Southern Ocean. He also serves on the steering committees of several Water Research Commission research projects and as part of the assessment process for US NRF and Australian ARC research proposals.

Kevin Winter is the chairperson of the Friends of the Liesbeek, a CBO involved in the management and rehabilitation of the Liesbeek River. He has served on a number of environmental advisory committees relating to developments along the Liesbeek as well as an advisory board appointed by the City Council to deal with future development of the Black River Urban Park. Current research, towards a PhD, is directed towards the evaluation of environmental initiatives in Bettys Bay. The research considers the nature of partnerships and co-management of resources in a coastal zone. Other involvements include membership of the Environmental Education Curriculum Initiative Task Team, the chief examiner for the Independent Development Board Level 4 curriculum (adult education) and coordinator of a task team to implement geography education into the streamlining of Curriculum 2005.
DEPARTMENT OF GEOLOGICAL SCIENCES

HEAD OF DEPARTMENT - Professor A.P. le Roex

DEPARTMENTAL CONTACT DETAILS
Postal address: Department of Geological Sciences
University of Cape Town
Rondebosch
7701
South Africa
Telephone: SA (21) 650-2931
Fax: SA (21) 650-3783
Email: alr@geology.uct.ac.za
Web address: http://www.uct.ac.za/depts/geolsci

DEPARTMENTAL PROFILE
Research in the Department of Geological Sciences covers a wide range of topics. The Department has strengths in geochemistry, structural geology and tectonics, igneous and metamorphic petrology, sedimentology, marine geology, economic geology and petroleum geophysics. General research interests include: global tectonics and geodynamics with emphasis on Gondwana geology; oceanic and continental igneous processes and the geochemical evolution of the underlying mantle; kimberlites and the genesis of diamonds; crustal fluids and ore formation with emphasis on the genesis of Witwatersrand gold; marine geoscience and sedimentary geochemistry; paleoclimate and environmental geochemistry. Analytical facilities include X-ray fluorescence spectrometer, X-ray diffraction, electron microprobe, ion chromatography, fluid inclusion stage, stable isotope extraction lines and access to a stable isotope mass spectrometer, sedigraph for particle size analysis, laser ablation microprobe inductively coupled plasma mass spectrometer, and solid source thermal ionization mass spectrometer and associated clean laboratories.

DEPARTMENTAL STATISTICS 2000

<table>
<thead>
<tr>
<th>PERMANENT AND LONG TERM CONTRACT STAFF</th>
<th>HONORARY STAFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors</td>
<td>5</td>
</tr>
<tr>
<td>Associate Professors</td>
<td>6</td>
</tr>
<tr>
<td>Senior Lecturers</td>
<td>5</td>
</tr>
<tr>
<td>Lecturer</td>
<td>1</td>
</tr>
<tr>
<td>Research Staff</td>
<td>3</td>
</tr>
<tr>
<td>Technical Support Staff</td>
<td>6</td>
</tr>
<tr>
<td>Administrative and Clerical Staff</td>
<td>4</td>
</tr>
<tr>
<td>TOTAL</td>
<td>30</td>
</tr>
</tbody>
</table>

STUDENTS

| Post-doctoral | 7 |
| Doctoral | 16 |
| Masters | 29 |
| Honours | 7 |
| Undergraduate | 302 |
| TOTAL | 361 |
RESEARCH FIELDS

PERMANENT STAFF

Professor Anton le Roex
  Head of Department; igneous geochemistry; analytical geochemistry; mantle evolution
Professor Zvi Ben-Avraham (part-time)
  marine geophysics; plate tectonics; crustal structure
Professor Maarten de Wit
  geodynamics; tectonics; stratigraphy; Gondwana; GIS
Professor John Gurney
  upper mantle; diamonds; exploration
Professor Lawrie Minter
  ancient placer deposits; aeolian and fluvial processes; gold particle morphology and geochemistry
Associate Professor Andy Duncan
  (seconded to AIMS project) igneous petrology and geochemistry; volcanology; analytical geochemistry
Associate Professor Martin Fey
  soil chemistry; soil science; application of geochemical principles to environmental quality
Associate Professor Hartwig Frimmel
  metamorphic petrology; hydrothermal geochemistry; economic geology; crustal fluids
Associate Professor Chris Harris
  stable isotope geochemistry; igneous petrology
Associate Professor Chris Hartnady
  plate tectonics; palaeomagnetism; marine geophysics; rifting; seismotectonics
Associate Professor David Reid
  Precambrian crustal magnetism and metallogeny; carbonatites; isotope geochemistry
Dr John Compton
  Senior Lecturer; low-temperature and sedimentary geochemistry; marine geology
Dr Stephen Richardson
  Senior Lecturer; isotope geochemistry; geochronology; diamonds; continental mantle evolution
Dr John Rogers
  Senior Research Officer; marine sediments; manganese nodules; continental shelf
Mr George Smith
  Senior Lecturer; petroleum geophysics
Dr Marian Tredoux
  Senior Lecturer; platinum; layered igneous complexes; Cretaceous - Tertiary boundary; geoscience education
Dr Giulio Viola
  Lecturer; structural geology, microtectonics

HONORARY RESEARCH ASSOCIATES

Dr Herbie Klinger
  palaeontology
Dr Roger Smith
  palaeontology
Dr Robert Zartman
  U- Th-Pb isotope systems
Dr Harold Annegarn
  atmospheric geochemistry

CONTRACT RESEARCH STAFF

Dr Moctar Doucouré
  geophysical modelling; African cratons; image processing; fractal analysis
Dr Andreas Späth
  igneous geochemistry, plasma mass spectrometry
Ms Eva Ankar
  kimberlites, GIS
RESEARCH OUTPUTS

RESEARCH PAPERS AND REFEREED ARTICLES


CONFERENCE ABSTRACTS


Doucœur, C.M. 2000. Regional geophysics with emphasis on gravity and magnetics: a key role in understanding the mineral exploration setting in Africa. Mali Symposium of Applied Sciences, Mali.


**THESES AND DISSERTATIONS PASSED FOR HIGHER DEGREES**


**UNIVERSITY PUBLICATIONS AND PUBLICATIONS OF A POPULAR NATURE**


CONSULTANCY AND OTHER ACTIVITIES BASED ON EXPERTISE DEVELOPED IN RESEARCH

Staff in the Department are regularly consulted for advice on a wide variety of topics relating to the geological sciences, the minerals industry of southern Africa, analytical geochemistry and issues of environmental concern.

Organisation of conferences
Associate Professor Martin Fey organized the 5th International Symposium on Environmental Geochemistry and related field trips. This international event was held at the University of Cape Town, between 24-29 April 2000.

Course on the theory and practice of X-ray fluorescence spectrometry
The annual two-week course was presented from 17-28 January 2000. The course was directed by Associate Professor James Willis with assistance from Associate Professor Andy Duncan, Professor Anton le Roex, & Dr Andreas Späth.
The course provided an introduction to the principles and practice of modern XRF spectrometry, and was attended by participants from other academic institutions and from industry in South Africa, as well as from Zimbabwe, Mozambique, Canada and the USA.
DEPARTMENT OF MATHEMATICS & APPLIED MATHEMATICS

(Including the General Relativity and Cosmology Research Group, the Laboratory for Formal Aspects and Complexity in Computer Science (FACCS-Lab), the Marine Resource Assessment and Management Group (MARAM), the Rangeland Modelling Group, and the Topology and Category Theory Research Group.)

HEAD OF DEPARTMENT - Associate Professor Brian Hahn

DEPARTMENT CONTACT DETAILS
Postal address: Department of Mathematics & Applied Mathematics
University of Cape Town
Private Bag
Rondebosch
7701
South Africa
Telephone: SA (21) 650-3191
Fax: SA (21) 650-2334
Email: admin@maths.uct.ac.za
Web address: http://www.mth.uct.ac.za

DEPARTMENTAL PROFILE

The Department of Mathematics and Applied Mathematics houses a number of research groups and individual activities, which in total cover a large part of the mathematical spectrum. Examples are: cosmology and relativity, computational and applied mechanics, marine resource management, rangeland modelling, formal aspects of computer science, topology and category theory, nonlinear mathematical physics, functional analysis, and algebra. The Department has active research collaboration with other groups in the country and abroad. We have a strong postgraduate program, with about 70 M.Sc. and Ph.D. students in a variety of fields. Among the staff are three NRF A-rated mathematicians, four with B-ratings, and a number with other ratings. The Department has a good technical and administrative infrastructure, and regularly hosts visitors from abroad.

DEPARTMENTAL STATISTICS 2000

<table>
<thead>
<tr>
<th>PERMANENT AND LONG TERM CONTRACT STAFF</th>
<th>HONORARY STAFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors</td>
<td>Emeritus Professors</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Associate Professors</td>
<td>Emeritus Associate Professor</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Senior Lecturers</td>
<td>Research Associate</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Lecturers</td>
<td>TOTAL</td>
</tr>
<tr>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td>Research Staff</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Technical Support Staff</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Administrative and Clerical Staff</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STUDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-doctoral</td>
</tr>
<tr>
<td>Doctoral</td>
</tr>
<tr>
<td>Master</td>
</tr>
<tr>
<td>Honours</td>
</tr>
<tr>
<td>Undergraduate</td>
</tr>
<tr>
<td>TOTAL</td>
</tr>
</tbody>
</table>
RESEARCH FIELDS

PERMANENT STAFF AND LONG TERM CONTRACT STAFF

Professor Ronald Becker
   differential equations (bifurcations, abstract equations); theory of algorithms (graph partitioning, sorting networks)

Professor Doug Butterworth
   Director, Marine Resource Assessment and Management Group (MARAM); particular focus on South African and Namibian fisheries, Atlantic and southern bluefin tuna, Antarctic whale and krill resources

Professor George Ellis
   Distinguished Professor of Complex Systems; Leader, General Relativity and Cosmology Research Group; cosmology and general relativity theory; science policy; maths and science education; metaphysics of cosmology and its connections to ethics and religion; social indicators

Professor Hans-Peter Künzi
   topology, orders, categories, combinatorics and their applications in analysis and algebra; particular focus being the theory of asymmetric topology

Professor Daya Reddy
   Dean of Science; Co-Director, UCT Centre for Research in Computational and Applied Mechanics (CERECAM); mathematical and computational aspects of continuum mechanics; the finite element method

Professor John Webb
   mathematics education

Associate Professor Igor Barashenkov
   nonlinear dynamics; mathematical physics

Associate Professor Paul Cherenack
   algebraic geometry; differential geometry; algebraic and categorical topology

Associate Professor Christopher Gilmour
   Convenor: Programme in Mathematical and Statistical Sciences; pointfree topology and sigma-frames; categorical topology

Associate Professor Brian Hahn
   Head of Department; scientific computing; Rangeland Modelling Group

Dr Jurie Conradie
   Senior Lecturer; functional analysis; vector lattices; von Neumann algebras; non-commutative function spaces; mathematics education

Dr John Frith
   Senior Lecturer; frame theory; topos theory; categorical topology; mathematical education

Dr Charles Hellaby
   Senior Lecturer; general relativity; cosmology; gravity

Dr Kenneth Hughes
   Senior Lecturer; number theory; algebra; algebraic geometry; topological quantum field theory

Dr Sizwe Mabizela
   Senior Lecturer; approximation theory; functional analysis

Dr Jacek Ronda
   Senior Lecturer; thermodynamics; continuum mechanics; finite elements; metal-forming; welding - metallurgy

Dr Henry Rose
   Senior Lecturer; universal algebra; lattice theory; set theory; model theory

Dr Anneliese Schauerte
   Senior Lecturer; frame and biframe theory; categorical topology; uniform and quasi-uniform structures

Lynn Bowie
   Lecturer; mathematics education; students' conceptual difficulties in calculus

Dr Peter Bruyns
   Lecturer; group theory; permutation groups

Dr Peter Dunsby
   Lecturer; cosmological perturbations; cosmic microwave background anisotropies; gravitational lensing; inflationary cosmology; on-line mathematics education
Vera Frith  
Lecturer (contract), Numeracy Centre; mathematics education; effective use of computers in teaching mathematics; Excel as a teaching and learning tool; foundation courses

Dr Peter Jipsen  
Lecturer; formal aspects of computer science; universal and computational algebra; logic

Dr Henri Laurie  
Lecturer; mathematical ecology; industrial mathematics; mathematics education

Dr Peter Ouwehand  
Lecturer (contract); model theory; lattice theory; universal algebra

Éva Plagányi-Lloyd  
Lecturer; multispecies modelling; S. A. abalone assessment; plankton ecology; pelagic ecosystem modelling

Robert Prince  
Lecturer (contract), Co-ordinator Numeracy Centre; algebraic number theory; commutative algebra; mathematics education

Dr Ingrid Rewitzky  
Lecturer; formal aspects of computer science

Dr Neill Robertson  
Lecturer; functional analysis; locally convex spaces; descriptive set theory; infinite-dimensional holomorphy

Dr Jacob Vermeulen  
Lecturer; category theory and logic; topology; algebraic geometry

Diane Wilcox  
Assistant Lecturer; functional analysis; linear relations and operator theory; mathematics education

Gareth Witten  
Assistant Lecturer (contract); mathematical modelling; applied dynamical systems

RESEARCH STAFF

Helena Geromont  
Senior Research Officer, MARAM; S.A. and Namibian hake, S.A. south coast rock lobster and Atlantic bluefin tuna assessment

Trevor Branch  
Research Officer (contract), MARAM; Antarctic whale assessments

Dr Anabela Brandao  
Research Officer, MARAM; Namibian orange roughy and hake and Southern Ocean toothfish assessment

Dr Susan Holloway  
Research Officer, MARAM; S.A. west coast rock lobster assessment; whale management procedures

Stephen Tladi  
Junior Research Fellow (contract); mathematical and computational aspects of continuum mechanics; the finite element method

DISTINGUISHED VISITOR

Emeritus Professor Bernhard Banaschewski  
McMaster University, Ontario, Canada – pointfree topology; (universal) algebra; categorical topology

HONORARY STAFF

Emeritus Professor Guillaume Brümmer  
categorical topology; category theory; asymmetric topology and uniformity

Emeritus Professor Keith Hardie  
homotopy theory; algebraic topology; digital topology; categorical topology

Emeritus Associate Professor Ronald Cross  
functional analysis; unbounded linear operators; linear relations
Dr David Richardson
Research Associate; Rangeland Modelling Group; modelling grazing animal production systems; relations between complex and simple models

POST-DOCTORAL FELLOWS

Dr Manuel Borges
supersymmetric gravity

Dr Justin Munganga
mathematical and computational aspects of continuum mechanics; the finite element method

Dr Mark Petersen
operator theory: interpolation of non-square rational matrix functions; minimal square spectral factorization

Dr Mark Roberts
general relativity, quantisation of fluids, issues in language and linguistics, and the continuum hypothesis

Dr Valeri Shchesnovich
nonlinear waves and nonlinear evolution equations; soliton theory; perturbation expansion methods; exact solutions and stability

Dr Henk van Elst
physical properties of spatially inhomogeneous cosmological models; structure of the solution space to the Einstein field equations in cosmological settings

Dr Shwetketu Virbhadra
gravitational lensing and cosmic censorship

RESEARCH OUTPUTS

RESEARCH PAPERS AND REFEREED ARTICLES


BOOKS


CHAPTERS IN BOOKS


PUBLISHED CONFERENCE PROCEEDINGS


CONFERENCE ABSTRACTS


Cherenack, P. 2000. Exponential objects for differential and Frölicher spaces. 5th Pan African Congress of Mathematicians, University of the Western Cape.

Conradie, J. 2000. Decomposition of linear functionals on non-commutative function. 5th Pan African Congress of Mathematicians, University of the Western Cape.

Ellis, G.F.R. 2000. Relativity and cosmology at the turn of the millennium: achievements and open issues. 5th Pan African Congress of Mathematicians, University of the Western Cape.

Gilmour, C.R.A. & Matutu, P. 2000. Compactness and the cozero part of a biframe. 5th Pan African Congress of Mathematicians, University of the Western Cape.

Hahn, B.D. 2000. Thoughts on teaching MATLAB as a first programming language. SANUM 2000, 24th Annual Conference held at Department of Applied Mathematics, University of Stellenbosch, Stellenbosch.


Mabizela, S. 2000. Strong uniqueness and continuity of parametric projections. 5th Pan African Congress of Mathematicians, University of the Western Cape.


Rewitzky, I. 2000. A power algebra of games of choice. 5th Pan African Congress of Mathematicians, University of the Western Cape.


Tladi, M.S. 2000. Adiabatic chaos in mesoscale vortices. 5th Pan African Congress of Mathematicians, University of the Western Cape.

Tladi, M.S. 2000. Adiabatic chaos and transport in mesoscale vortices. SANUM 2000, 24th Annual Conference held at Department of Applied Mathematics, University of Stellenbosch, Stellenbosch.


THESES AND DISSERTATIONS PASSED FOR HIGHER DEGREES


UNIVERSITY PUBLICATIONS AND WORKS OF A POPULAR NATURE

Butterworth, D.S. 2000. CITES, IUCN and the precautionary principle, as they relate to classifying marine species as “endangered”. ISANA 22: 3-7.

UNPUBLISHED RESEARCH/TECHNICAL/POLICY DOCUMENTS

Butterworth, D.S. 2000. Aspects for a system for providing the Minister with advice on TAC levels (or similar controls) for SA fisheries. Marine and Coastal Management, South Africa Internal Document: 1-3.

CONSULTANCY AND OTHER ACTIVITIES BASED ON EXPERTISE DEVELOPED IN RESEARCH

The Marine Resources Assessment and Management group (MARAM) carries out consultancy work for a number of agencies. Agencies for which such work was carried out in 2000 were:
2. Gendor Fishing Company, Namibia (acting on behalf of the Namibian deepwater fisheries working group): orange roughy resource.
4. Fisheries Ministry, Japan: southern bluefin tuna, Faroese resource.


In addition to attending meetings associated with the activities above and various related symposia, group members also contributed to meetings of the International Whaling Commission’s (IWC’s) Scientific Committee, and meetings related to the Convention for International Trade in Endangered Species (CITES). The latter improved both the triennial meeting of the parties to CITES and a meeting of Caribbean states in preparation thereof, as well as a meeting of the Food and Agriculture organisation of the United Nations (FAO) and working groups of CITES itself in relation to the reviews of CITES criteria for listing species as endangered.


Johnston, S.J. & Butterworth, D.S. 2000. Results for the current OMP used “as is” and a “re-tuned” OMP, calculated using the new reference case operating model and the new set of assumptions for the future. Marine and Coastal Management, South Africa Document: WG/03/00/WCL14:1–16.


DEPARTMENT OF MICROBIOLOGY

HEAD OF DEPARTMENT - Professor Jennifer A. Thomson

DEPARTMENTAL CONTACT DETAILS
Postal address: Department of Microbiology
University of Cape Town
Private Bag
Rondebosch
7701
South Africa
Telephone: SA (21) 650-3270
Fax: SA (21) 689-7573
Email: secmic@molbiol.uct.ac.za
Web address: http://www.uct.ac.za/depts/microbiology

DEPARTMENTAL PROFILE
Research in microbiology at UCT involves extensive use of the tools of molecular biology. It covers bacteria and viruses important to industry, agriculture, mariculture, medicine, and human health. Areas of interest include metabolic engineering of Clostridium acetobutylicum; degradation of fibre by rumen and ostrich-gut anaerobic bacteria; the development of transgenic, virus-resistant crops; the molecular virology of maize streak virus and the use of it and related viruses for the production of useful foreign proteins in plants; DNA damage in indigenous plants as a result of ozone depletion; algal biotechnology; development of probiotics for maricultured abalone; investigations into the human pathogenic bacteria, Vibrio cholerae and Bacteroides fragilis; the use of bifidobacteria as probiotics; molecular characterization of drought tolerance in the South African resurrection plant Xerophyta viscosa; genetic engineering of crop plants (e.g. maize) for improved tolerance to drought; and novel antibiotics from soil and marine actinomycetes. Members of the Department collaborate with scientists from the Departments of Zoology, Botany, Biochemistry, Medical Microbiology and Pharmacology, the National Botanical Institute, the Peninsula Technikon, the University of Durban-Westville, the University of the Western Cape, as well as internationally with scientists from the United Kingdom, Belgium, the USA, Canada, France, Germany and New Zealand. Although most of the post-graduate students are South African, they also come from Botswana, Zimbabwe, Kenya, Malawi and Mauritius.

DEPARTMENTAL STATISTICS 2000

<table>
<thead>
<tr>
<th>PERMANENT AND LONG-TERM CONTRACT STAFF</th>
<th>STUDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors 1</td>
<td>Post-doctoral 4</td>
</tr>
<tr>
<td>Associate Professors 1</td>
<td>Doctoral 19</td>
</tr>
<tr>
<td>Senior Lecturers 3</td>
<td>Masters 12</td>
</tr>
<tr>
<td>Lecturers 2</td>
<td>Honours 6</td>
</tr>
<tr>
<td>Research Staff 3</td>
<td>Undergraduate 100</td>
</tr>
<tr>
<td>Technical Support Staff 4</td>
<td>TOTAL 141</td>
</tr>
<tr>
<td>Administrative and Clerical Staff 2</td>
<td></td>
</tr>
<tr>
<td>TOTAL 16</td>
<td></td>
</tr>
</tbody>
</table>
RESEARCH FIELDS

PERMANENT STAFF

Professor Jennifer Thomson
Head of Department; biological control of plant diseases; transgenic plants; fibre-degrading bacteria

Associate Professor Edward Rybicki
plant-derived vaccines; geminivirus; potyvirus; maize streak virus; molecular virology; biotechnology; viral molecular systematics

Dr Sharon Reid
Senior Lecturer; Gram-positive and anaerobic bacteria; Corynebacterium; Clostridium; Bifidobacterium; gene regulation of nitrogen- and carbon-substrate utilisation; probiotics; molecular systematics; fibre-degrading bacteria

Dr Vernon Coyne
Senior Lecturer; marine biotechnology; marine microbiology; mariculture; abalone; macroalgae; pathogenesis; Vibrio cholerae; melanin biosynthesis

Dr Val Abratt
Senior Lecturer; Bacteroides fragilis; nitrogen metabolism; virulence; metronidazole; DNA damage and repair; Bifidobacterium; probiotics; science education

Dr Sagadevan Mundree
Lecturer; environmental stress tolerance; regulation of plant gene expression; genetic engineering for drought tolerance; resurrection plant Xerophyta viscosa; Arabidopsis thaliana

Dr Paul Meyers
Lecturer; bacterial metabolism; bacterial taxonomy; actinomycetes; Streptomyces; "bioprospecting"; novel antibacterial agents; polyphosphate; Mycobacterium tuberculosis

CONTRACT RESEARCH STAFF

Dr Inga Becker-Hitzeroth
Post-doctoral fellow; plant-derived vaccines; human papilloma viruses

Dr Ann Jaffray
Post-doctoral fellow; plant-derived vaccines; human immunodeficiency virus

Dr P. Kurian Pius
Post-doctoral fellow; environmental stress tolerance; regulation of plant gene expression; genetic engineering for drought tolerance

Dr Fiona Tanzer
Post-doctoral fellow; plant-derived vaccines; human immunodeficiency virus

RESEARCH OUTPUTS

RESEARCH PAPERS AND REFEREED ARTICLES


CHAPTERS IN BOOKS


CONFERENCE ABSTRACTS


Ten Doeschate, K.I., Macey, B.M. & Coyne, V.E. 2000. Characterisation of the enteric bacteria of the abalone Haliotis midae, and their role in the digestion of ingested seaweed. 4th International Abalone Symposium, Cape Town, South Africa.


**THESES AND DISSERTATIONS PASSED FOR HIGHER DEGREES**


**UNIVERSITY PUBLICATIONS AND WORKS OF A POPULAR NATURE**


**CONSULTANCY AND OTHER ACTIVITIES BASED ON EXPERTISE DEVELOPED IN RESEARCH**

Associate Professor Ed Rybicki is a consultant to the International Service for Acquisition of Agri-Biotech Applications (ISAAA) for maize streak virus research projects, as well as to the Ecoport database of the Food and Agriculture Organisation of the UN for virus information.

Dr Val Abratt has been involved in a collaborative project with PenTech in a biology teacher in-service training program. She has co-authored a school textbook for Francolin Press: "Practical biology: a classroom resource for teachers and learners". Dr Abratt is also involved in practical biology workshops (a series of laboratory workshops, incorporating a novel research-based teaching approach, to provide in-service training for teachers working at previously disadvantaged schools).
DEPARTMENT OF OCEANOGRAPHY
(Including the Research Diving Unit)

HEAD OF DEPARTMENT - Professor Geoff Brundrit

DEPARTMENTAL CONTACT DETAILS
Postal address: Department of Oceanography
University of Cape Town
Private Bag
Rondebosch
7701
South Africa
Telephone: SA (21) 650-3277/8
Fax: SA (21) 650-3979
Email: elley@physci.uct.ac.za
Web address: http://www.sea.uct.ac.za

DEPARTMENTAL PROFILE
The Department of Oceanography is the major focus for research in physical oceanography and ocean climatology in South Africa and elsewhere in Africa. Seven scientists in the Department have been evaluated in the review process of the National Research Foundation, one in the category: “Researchers who, without doubt, are accepted by their peers as being world leaders for the high quality and impact of their recent research outputs”, four in the category: “Researchers who enjoy considerable international recognition as independent researchers for the high quality of their research outputs” and two in the category: “Established researchers who, as individuals or as members of a team, produce research outputs of an international standard which are appreciated by the science, engineering or technology community either internationally or nationally”. Active international associations are maintained by collaborative projects with the Netherlands, France, Germany, USA and the European Union. The Department maintains close contact with marine science activities in the governmental, private and academic sectors in South Africa and into Africa. The UCT Research Diving Unit (RDU) is housed within the Department and is fully equipped with a decompression chamber and compressor. Most scientific diving at UCT is carried out in conjunction with the RDU.

DEPARTMENTAL STATISTICS 2000

| PERMANENT AND LONG TERM CONTRACT STAFF | HONORARY STAFF |
| Professors | 2 | Honorary Professor | 1 |
| Associate Professor | 1 | Honorary Research Associates | 9 |
| Lecturer | 1 | TOTAL | 10 |
| Research Staff | 6 | |
| Technical Support Staff | 2 | |
| Administrative and Clerical Staff | 2 p/t | |
| TOTAL | 14 |

STUDENTS
| Post-doctoral Fellow | 1 |
| Doctoral | 10 |
| Masters | 15 |
| Honours | 3 |
| Undergraduate | 87 |
| TOTAL | 116 |
RESEARCH FIELDS

PERMANENT STAFF

Professor G.B. Brundrit
    Head of Department; operational oceanography
Professor J.R.E. Lutjeharms
    ocean climate
Associate Professor F.A. Shillington
    shelf oceanography
Dr H.N. Waldron
    Lecturer; environmental oceanography
Mr P. Hanekom
    Diving Supervisor; ocean diving

CONTRACT RESEARCH STAFF

Dr I. Ansorge
    Southern Ocean
Dr H. Mulenga
    climate impacts
Dr A. Richardson
    fisheries oceanography
Dr M. Rouault
    ocean atmosphere interaction
Ms I. Stachlewska
    modelling
Ms L.A. Staegemann
    Research Assistant

HONORARY PROFESSOR

Professor L.V. Shannon
    Benguela ecosystem

HONORARY RESEARCH ASSOCIATES

Dr A. Bakun
    fisheries oceanography
Dr P. Cury
    fish-environment interactions
Dr K. Findlay
    whales
Dr P. Freon
    fisheries models
Dr P.A. Hulley
    deep-sea fish distribution
Dr J. Largier-Brown
    coastal studies
Dr C. Mullon
    biological modelling
Dr C. Roy
    shelf circulation modelling
Ms S.J. Weeks
    oceanography from space

DISTINGUISHED VISITORS

Dr Y. You
    Flinders University, Australia - water mass analysis
Dr W. Emery
University of Colorado, United States of America - physical oceanography

Dr G. Reuter
University of Alberta, Canada - cloud modelling

Dr I. Jobard
LMD, Ecole Polytechnique, Palaiseau, France - satellite remote sensing (rainfall, clouds)

N. Fauchereau
CRC, Universite de Bourgogne, Dijon, France - climatology

Dr L. Nykjaer
JRC, Ispra, Italy, EU ENVIFISH project co-ordinator

Professor J. Simpson
University of Bangor, Wales, U.K. - physical oceanography

POST-DOCTORAL FELLOW

Dr J. Schrijvers
coastal studies

RESEARCH OUTPUTS

RESEARCH PAPERS AND REFEREED ARTICLES


THESES AND DISSERTATIONS PASSED FOR HIGHER DEGREES


UNIVERSITY PUBLICATIONS AND PUBLICATIONS OF A POPULAR NATURE


UNPUBLISHED RESEARCH/TECHNICAL/POLICY DOCUMENTS


CONSULTANCY AND OTHER ACTIVITIES BASED ON EXPERTISE DEVELOPED IN RESEARCH

The Centre for Marine Studies - see separate entry.
DEPARTMENT OF PHYSICS

HEAD OF DEPARTMENT – Professor D.G. Aschman

DEPARTMENTAL CONTACT DETAILS

Postal address: Department of Physics
University of Cape Town
Private Bag
Rondebosch
7701

Telephone: SA (21) 650-3326
Fax: SA (21) 650-3342
Email: jennings@physci.uct.ac.za
Web address: http://www.uct.ac.za/depts/physics

DEPARTMENTAL PROFILE

The Department is accommodated in the R.W. James Building, which houses research laboratories equipped for nuclear physics, laser optics (high power Nd:YAG laser), high resolution X-ray diffraction, X-ray stress determination, and positron beam physics. Additional facilities available to the Department are provided by the National Accelerator Centre (200 MeV cyclotron and a 5 MeV Van de Graaff accelerator) used for Rutherford back-scattering and channeling. A microprobe is attached.

Ongoing research activities include:

Nuclear Physics: Charge exchange and transfer reactions, nuclear fission, radiative capture experiments, heavy ion reactions, multigamma decay of fission fragments. Interrogation of hydrogen, carbon, nitrogen and oxygen in bulk samples using neutrons. Strong field QED tests using multi-GeV leptons on oriented crystalline matter (CERN/NA43 experiment). Generation of high energy polarised photons (CERN/NA59 experiment) for spin structure function study. Heavy ion channeling and electron capture for 33 TeV ions in gas targets.


Solid State Physics comprising: Structural and electrical properties of thin films. Near-surface defect profiling in thin film and bulk structures. Positron surface interactions, including positronium formation, surface defects and free positron emission. Computational and experimental studies of light particle dynamics in condensed matter. Stress determination in polycrystalline materials, including non-destructive depth profiling and bulk measurements. High resolution X-ray diffraction in heterogeneous single crystal materials. Modelling of distributions of three dimensional strain states within the framework of continuum field theory.

Chemical Physics: Line shapes of molecular spectra. Coherent anti-Stokes Raman spectroscopy; non-linear optics; image analysis.
Physics Education: Theories of instruction and learning, curriculum design and evaluating teaching methodologies, language issues in the numerate sciences.

DEPARTMENTAL STATISTICS 2000

PERMANENT AND LONG TERM CONTRACT STAFF

<table>
<thead>
<tr>
<th>Role</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors</td>
<td>5</td>
</tr>
<tr>
<td>Associate Professors</td>
<td>5</td>
</tr>
<tr>
<td>Senior Lecturers</td>
<td>4</td>
</tr>
<tr>
<td>Lecturers</td>
<td>2</td>
</tr>
<tr>
<td>Technical Support Staff</td>
<td>5</td>
</tr>
<tr>
<td>Administrative and Secretarial Staff</td>
<td>4</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>

NRF RESEARCH FELLOWS

<table>
<thead>
<tr>
<th>Role</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Fellows</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>3</strong></td>
</tr>
</tbody>
</table>

STUDENTS

<table>
<thead>
<tr>
<th>Degree Level</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctoral</td>
<td>12</td>
</tr>
<tr>
<td>Masters</td>
<td>11</td>
</tr>
<tr>
<td>Honours</td>
<td>6</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>1333</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1362</strong></td>
</tr>
</tbody>
</table>

HONORARY STAFF

<table>
<thead>
<tr>
<th>Role</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emeritus Professor</td>
<td>1</td>
</tr>
<tr>
<td>Honorary Research Associates</td>
<td>5</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>6</strong></td>
</tr>
</tbody>
</table>

RESEARCH FIELDS

PERMANENT STAFF

Professor David G. Aschman  
Head of Department; experimental nuclear physics

Professor Jean W.A. Cleymans  
thoretical physics

Professor Cesáreo A. Dominguez  
thetical particle physics

Professor Sandro M. Perez  
thoretical nuclear physics

Professor Raoul D. Viollier  
thetical particle physics and astrophysics

Associate Professor M. Saalih Allie  
experimental nuclear physics, physics education

Associate Professor David T. Britton  
solid state physics

Associate Professor Craig M. Comrie  
solid state physics

Associate Professor H. Stephen T. Driver  
experimental modern optics

Associate Professor Gerald N.v.dH. Robertson  
experimental modern optics

Dr. Donald Ball  
Senior Lecturer; experimental modern optics

Dr. Andrew Buffler  
Senior Lecturer; experimental nuclear physics; physics education

Dr. Roger W. Fearick  
Senior Lecturer: experimental nuclear physics

Dr. Margit Härting  
Senior Lecturer; solid state physics

Dr. Zeblon Z. Vilakazi  
Lecturer; experimental nuclear/particle physics
RESEARCH ASSOCIATES

Emeritus Professor Frank Brooks
experimental nuclear physics

Dr. Duncan Elliott
theoretical particle physics

Dr. Mirela Fetea
theoretical particle physics

Dr. Georgi Kyrchev
theoretical particle physics and astrophysics

Dr. Robert Lindebaum
theoretical particle physics and astrophysics

Dr. Gary Tupper
theoretical particle physics and astrophysics

RESEARCH FELLOWS

Dr. Remy Bucher
solid state physics

Dr. Angela Hempel
solid state physics

Dr. Maren Hempel
solid state physics

DISTINGUISHED VISITORS

Professor Masud Chaichian
Department of Physics, University of Helsinki, Finland - theoretical particle physics

Dr. Burkhard Kaempfer
Rossendorf Forschungszentrum, Dresden, Germany - theoretical particle physics

Professor Karl Schilcher
Johannes Gutenberg University of Mainz, Germany - theoretical particle physics

Dr. Nick van Eijndhoven
Department of Subatomic Physics, Utrecht University, The Netherlands - theoretical particle physics

RESEARCH OUTPUTS

RESEARCH PAPERS AND REFEREED ARTICLES


PUBLISHED CONFERENCE PROCEEDINGS


CONFERENCE ABSTRACTS


THESES AND DISSERTATIONS PASSED FOR HIGHER DEGREES

DEPARTMENT OF STATISTICAL SCIENCES
( Including the Avian Demography Unit)
(There is also an entry for the Department of Statistical Sciences in the Faculty of Commerce section of the Research Report)

HEAD OF DEPARTMENT - Associate Professor Robin C van den Honert

DEPARTMENTAL CONTACT DETAILS
Postal address: Department of Statistical Sciences
University of Cape Town
Private Bag
Rondebosch
7701
South Africa
Telephone: SA (21) 650-3434
Fax: SA (21) 689-7578
Email: sunshine@maths.uct.ac.za
Web address: http://www.uct.ac.za/depts/stats/

DEPARTMENTAL PROFILE
The statistical sciences are defined to include the traditional concept of statistics (as well as all subdisciplines, such as biostatistics, econometrics, technometrics, etc.) and the newer disciplines such as operations research, management science, decision analysis, and quality management. The Department is located in both the Faculties of Science and Commerce. The statistical sciences are the ultimate service discipline, and the Department believes that the best statistical theory is motivated by data analytic problems in other disciplines. It therefore actively seeks interaction with researchers whose orientation is quantitative.

DEPARTMENTAL STATISTICS 2000

<table>
<thead>
<tr>
<th>PERMANENT AND LONG TERM CONTRACT STAFF</th>
<th>STUDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors</td>
<td>5</td>
</tr>
<tr>
<td>Associate Professors</td>
<td>3</td>
</tr>
<tr>
<td>Senior Lecturers</td>
<td>4</td>
</tr>
<tr>
<td>Lecturers</td>
<td>4</td>
</tr>
<tr>
<td>Assistant Lecturer</td>
<td>1</td>
</tr>
<tr>
<td>Research Officer</td>
<td>1</td>
</tr>
<tr>
<td>Administrative and Clerical Staff</td>
<td>3</td>
</tr>
<tr>
<td>Departmental Assistants</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctoral</td>
<td>10</td>
</tr>
<tr>
<td>Masters</td>
<td>7</td>
</tr>
<tr>
<td>Honours</td>
<td>16</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>3018</td>
</tr>
<tr>
<td>TOTAL</td>
<td>3051</td>
</tr>
</tbody>
</table>

RESEARCH FIELDS

PERMANENT STAFF
Associate Professor R C van den Honert
Head of Department; operations research
Professor Theodor Stewart
decision analysis; bayesian analysis; resource allocation and management
Professor Cas Troskie
  multivariate regression

Professor Les Underhill
  Director, Avian Demography Unit; Director, South African Bird Ringing Unit (SAFRING);
  multivariate analysis; multidimensional scaling and related graphical display methods; ecological
  applications of statistics

Associate Professor Tim Dunne
  generalized linear models; statistical methods in education and psychology

Ms Leanne Scott
  Senior Lecturer; decision analysis

Mrs Francesca Little
  Lecturer; statistical methods in medicine and biology

Mr Karl Stielau
  Senior Lecturer; sampling, ecological statistics and probability models

Dr C Thiart
  Senior Lecturer; geostatistics

Mr Freedom Gumedze
  Lecturer; biostatistics

Ms Monique Hanslo
  Assistant Lecturer; biostatistics

DISTINGUISHED VISITORS

Dr Fabio Losa
  Istituto di Ricerche Economiche – Universita della Svizzera Italiana, Lugano, Switzerland; MCDIA; conflict analysis and resolution

RESEARCH OUTPUTS

(REsearch outputs relevant to the Faculty of Science are listed here; see also Departmental entry in the
Faculty of Commerce section of the Research Report)

RESEARCH PAPERS AND REFEREED ARTICLES

ores as chemical tracers - tin, tungsten and the Neoproterozoic Laurentia-Gondwana connection.

universities and technikons in the Western Cape. South African Journal of Education 20(2):96-
108.

(WCD).


Sole, G., Lambert, M. & Juritz, J. 2000. The role of physiotherapy in sports medicine: perceptions of
orthopaedic surgeons, sports physicians, biokineticists and physiotherapists. South African


PUBLISHED CONFERENCE PROCEEDINGS

Billa, M., Braux, C., Doucouré, C.M., Nicol, N., Thiart, C. & de Wit, M.J. 1999. The Gondwana Metal-
potential GIS. 11th International Conference of the Geological Society of Africa: Earth Resources

Conference, University of Witwatersrand, Johannesburg, 4.


THESES PASSED FOR HIGHER DEGREES


AVIAN DEMOGRAPHY UNIT  
(Including the South African Bird Ringing Unit (SAFRING))

DIRECTOR OF UNIT - Professor Les Underhill

UNIT CONTACT DETAILS
Postal address: Avian Demography Unit  
University of Cape Town  
Private Bag  
Rondebosch  
7701  
South Africa  
Telephone: SA (21) 650-2423  
Fax: SA (21) 650-3434  
Email: adu@maths.uct.ac.za  
Web address: http://www.uct.ac.za/depts/stats/adu

UNIT PROFILE
The mission of the Avian Demography Unit (ADU) is to contribute to the understanding of bird populations, especially bird population dynamics, and thus make a contribution to the conservation of avian biodiversity. The ADU achieves these goals through a variety of projects in which para-ornithologists throughout southern Africa can participate. These projects range from identifying bird species, through undertaking census surveys, to make detailed observations on breeding productivity. The ADU collates the data, and undertakes curation, data analysis, statistical modelling, publication and dissemination of results. The ADU has a strategic partnership with BirdLife South Africa, which in turn is the local partner for BirdLife International, the largest global bird conservation NGO.

UNIT STATISTICS 2000

<table>
<thead>
<tr>
<th>PERMANENT AND LONG TERM CONTRACT STAFF</th>
<th>HONORARY RESEARCH ASSOCIATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors 1</td>
<td>Honorary Research Associates 3</td>
</tr>
<tr>
<td>Research Staff 7</td>
<td></td>
</tr>
<tr>
<td>Technical Support Staff 2</td>
<td></td>
</tr>
<tr>
<td>Administrative and Clerical Staff 5</td>
<td></td>
</tr>
<tr>
<td>TOTAL 15</td>
<td>TOTAL 3</td>
</tr>
</tbody>
</table>

HONORARY RESEARCH ASSOCIATES

<table>
<thead>
<tr>
<th>STUDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctoral 4</td>
</tr>
<tr>
<td>Masters 2</td>
</tr>
<tr>
<td>TOTAL 6</td>
</tr>
</tbody>
</table>

RESEARCH FIELDS

PERMANENT STAFF
Professor Les Underhill  
Director; ecological applications of statistics

CONTRACT RESEARCH STAFF
Marius Burger  
frog atlas project
John Cooper  
seabird ornithology; BirdLife International Seabird Conservation Programme
Doug Harebottle  
monitoring projects
James Harrison
avian inventory and monitoring projects; biodiversity conservation

René Navarro
wader ecology; ecosystem modelling; information systems

Dieter Oschadleus
information systems; weaverbird biology

Donella Young
monitoring projects

HONORARY RESEARCH ASSOCIATES

David Allan
ecology of storks, cranes, bustards and birds of prey

Warwick Tarboton
wetland and grassland ornithology

Tony Tree
wader ecology

DISTINGUISHED VISITORS

Professor Dr Bruno Bruderer
Director and Head of Migration Dept at Swiss Ornithological Institute, Sempach, Switzerland and Zoology Dept, Basel University, Switzerland – ornithology and biogeography; radar studies on bird migration

Wim Van den Bossche
International Coordinator BNVR-RNOB, Belgium – White Stork migration and satellite tracking studies

Michael Kaatz and Rainer Herrman
Vogelwarte Radolfzell, Max Planck Institute, Germany – White Stork migration and satellite tracking studies

Dr Suzie Ellis
Senior Program Officer, Conservation Breeding Specialist Group, IUCN, USA – facilitator for Frog CAMP

Josh Adams, Michelle Hester, Diana Humple and Hannahrose Nevis
Point Reyes Bird Observatory, California, U.S.A. – specialist assistance with banding of oiled African Penguins following the Treasure oil spill in June 2000

Dr Nicholas Davidson
Deputy Secretary General, Ramsar Convention of Wetlands of International Importance, Gland, Switzerland – wetland conservation

Dr Peter Barham
Dept of Physics, University of Bristol, UK – new materials for penguin flipper bands

Dr Nigel Clark
British Trust for Ornithology, UK – contracts developments

Dr Jacque Clark
Manager, Ringing Office, British Trust for Ornithology, UK

RESEARCH OUTPUTS

RESEARCH PAPERS AND REFEREED ARTICLES


BOOK


CHAPTERS IN BOOKS


CONFERENCE ABSTRACTS


UNIVERSITY PUBLICATIONS AND WORKS OF A POPULAR NATURE


UNPUBLISHED RESEARCH/TECHNICAL /POLICY DOCUMENTS


CONSULTANCY AND OTHER ACTIVITIES BASED ON EXPERTISE DEVELOPED IN RESEARCH

Professor Underhill serves as Vice-Chairman of BirdLife South Africa, and on the research, conservation and publications committees of the society. He is a member of the editorial boards of the Journal of Applied Ecology and Waterbirds.

John Cooper is Chair of the Bird Biology Subcommittee of the Scientific Committee on Antarctic Research and Vice-Chair of the World Conservation Union’s Antarctic Advisory Committee. He is Editor of Marine Ornithology and Chair of the African Seabird Group. He is a member of the Individual Mortality from Longline Fishing Working Group of the Commission for the Conservation of Antarctic Marine Living Resources, the Prince Edwards Islands Management Committee, the Gough Island Wildlife Reserve Advisory Committee, the FAO Seabird Technical Working Group, and the International Ornithological Congress’ Standing Committee on Seabird Research. He coordinates BirdLife International’s Seabird Conservation Programme.
The Zoology Department houses the Marine Biology Research Institute (MBRI), the Percy FitzPatrick Institute of African Ornithology (PFI AO), the Freshwater Research Unit (FRU), and groups involved in physiological, biochemical, ecological and ethological research. It has the largest postgraduate school, and is the most productive department in terms of publication output in the University. Scientists in the MBRI work on the ecology and physiology of rocky and sandy shore organisms, on estuarine organisms, fisheries and mariculture issues, marine protected areas, marine parasitology, pollution, invertebrate systematics and the biology of the Benguela upwelling system. The PFI AO is the foremost centre of ornithological research on the African continent and has a strong programme in conservation biology. Research in the FRU centres on the ecology of freshwater ecosystems and particularly the management of river systems. Physiological and biochemical research is carried out on how insects fly, how small peptide hormones produced in nerve cells regulate energy metabolism, growth, development and reproduction in insects and crustaceans, and on the ecophysiology of animal pollinators. Further entomological research centres on plant-insect relationships and the biological control of weeds. A small-mammal research group enjoys international repute for its ethological research on mole-rats and there is a programme on bat biology. Also based in the Department is the CSIRO Biological Control Unit (a branch of the CSIRO Division of Entomology, Australia), as well as two semi-autonomous consulting companies, Southern Waters and Anchor Consultants. These companies undertake contract research in the field of freshwater ecology and coastal marine biology respectively.
RESEARCH FIELDS

PERMANENT STAFF

Professor George Branch
- rocky-shore ecology; fisheries management; fisheries policy; impacts of diamond-mining; coastal ecology

Dr Gary Bronner
- Senior Lecturer; systematics, ecology and conservation biology of small mammals

Associate Professor Anusuya Chinsamy-Turan
- comparative bone and teeth histology of extant and extinct vertebrates; paleobiology

Associate Professor Peter Cook
- Head of Department; abalone culture; aquaculture, mariculture; shellfish farming

Associate Professor Timothy Crowe
- evolution; systematics; gamebird management; sustainable utilization of wildlife

Associate Professor Bryan Davies
- river ecology; water demand management; ecosystem processes; ecological effects of dams and rivers; wetland ecology

Dr Jenny Day
- Senior Lecturer; Assistant Dean of the Faculty; Director of the Freshwater Research Unit; freshwater ecology; ecotoxicology; crustaceans; temporary and saline waters; conservation and management of inland water ecosystems; water chemistry and water quality

Professor Morné du Plessis
- Director of the Percy FitzPatrick Institute; avian evolutionary biology; behavioural ecology; cooperative breeding; life-history strategies; biodiversity and sustainable utilization

Professor John Field
- dynamics of marine ecosystems; benthic ecology; oceans and climate change; marine foodwebs and fisheries

Professor Gerd Gäde
- invertebrates; neuropeptides; intermediary metabolism; flight; phylogeny

Associate Professor Charles Griffiths
- Director of the Marine Biology Research Institute; coastal ecology; coastal zone management; bivalve ecophysiology; amphipod taxonomy; recreational and subsistence fisheries; predator-prey interactions

Associate Professor Philip Hockey
- avian evolutionary biology; shorebirds; migration; community ecology; behaviour

Associate Professor John Hoffman
- integrating biological control into the management of alien invasive weeds in South Africa

Dr David Jacobs
- Lecturer; evolutionary biology; behavioural ecology and sociobiology; bats and mole-rats

Professor Jennifer Jarvis
- small and subterranean mammal ecophysiology and ethology

Jean Jordaan
- Lecturer; Academic Development Programme; science foundation; life sciences; teaching; tutoring; curriculum design; bridging; first year students

Dr Mike Lucas
- Lecturer; biological oceanography; biogeochemical cycling; Benguela upwelling and Southern Ocean ecosystems; JGOFS, GLOBEC & LOICZ climate change programmes of the IGBP

Associate Professor Sue Nicolson
- pollination biology; nectar secretion and composition; ecophysiology of fynbos pollinators; insect Malphighian tubules

Dr Mike Picker
- Senior lecturer; insect ecology; insect biodiversity

Dr Peter Ryan
- Lecturer; avian evolutionary biology; pollution; marine ornithology; behavioural ecology; resource economics

Dr Jane Turpie
- Lecturer; estuarine community ecology; behavioural ecology; resource economics; conservation biology
CONTRACT RESEARCH STAFF

Dr Cate Brown  
water quantity, freshwater ecology

Dr Barry Clark  
management of marine systems; Cape Peninsula National Park

Helen Dallas  
water quality and biomonitoring

Dr Liz Day  
freshwater ecology

Dr Richard Dean  
dryland community ecology

Justine Fowler  
freshwater ecology

Jenny Griffin  
marine biology

Ken Hutchings  
West Coast net fisheries

Dr Jackie King  
water quality; freshwater ecology

Petra Müller  
entomology; biological control of weeds

Dr Andrea Pulfrich  
potential for commercial winkle fisheries

Alan Rees  
biology of deep-water fish

Denise Schael  
fluvial geomorphology and biotopes

Kate Snaddon  
interbasin water transfers

Rebecca Tharme  
water quality, freshwater ecology

Marcus Wishart  
genetic changes associated with inter-basin transfers

HONORARY PROFESSORS

Emeritus Professor Alec Brown  
cecophysiology; sandy shore ecology; marine pollution

Professor Mike Cluver  
palaeontology; museum management

POST-DOCTORAL FELLOWS

Dr Patricia A. Fleming  
small mammal pollination of Protea species

Dr Claudio Velasquez  
coastal ecology; avian population dynamics

Dr Sanghamitra Ray  
functional morphology and bone histology of dicynodonts

RESEARCH OUTPUTS

RESEARCH PAPERS AND REFEREED ARTICLES


BOOKS


CHAPTERS IN BOOKS


PUBLISHED CONFERENCE PROCEEDINGS


CONFERENCE PRESENTATIONS


Botha, J. 2000. Growth patterns deduced from the bone histology of Diademodon and Cynognathus. 60th Annual meeting of the Society of Vertebrate Paleontology, Mexico City, Mexico.


Hazell, R.W.A., Cockcroft, A.C. & Mayfield, S. 2000. Fed up with the cold! Factors influencing growth of juvenile Jasus lalandii. 6th International Conference and Workshop on Lobster Biology and Management, Key West, Florida, USA.
Hoffmann, J.H. 2000. Beneficial ecological impacts of classical biological control: there’s more than meets the eye. Third International Weed Science Congress, Foz do Iguaçu, Brazil.


Marco, H.G. & Gäde, G. 2000. Crustacean neuropeptides: are they unique or are they conserved and reflect peptides from other metazoan groups? The XVIIIth International Congress of Zoology: The new panorama of animal evolution, Athens, Greece.


Mayfield, S., Branch, G.M. & Cockcroft, A.C. 2000. Redundant reserves for rock lobsters. 6th International Conference and Workshop on Lobster Biology and Management, Key West, Florida, USA.


Nicolson, S.W. 2000. Pollination by passerine birds: why are the nectars so dilute? Society for Experimental Biology international meeting, Cambridge, UK.


Ruiz Sebastián, C. 2000. Homing and movement patterns of the limpet Patella argenvillei in a population encroached by the Mediterranean black mussel (Mytilus galloprovincialis) on the West coast of South Africa. Oral presentation at the 5th International Temperate Reef Symposium, Cape Town.


Twatwa, N.M. 2000. Characterising the spawning habitats of sardine and anchovy in the southern Benguela ecosystem Annual CALCOFI conference, Lake Arrowhead, California.


THESES AND DISSERTATIONS PASSED FOR HIGHER DEGREES


UNIVERSITY PUBLICATIONS AND PUBLICATIONS OF A POPULAR NATURE


UNPUBLISHED RESEARCH/TECHNICAL/POLICY DOCUMENTS/REPORTS


CONSULTANCY AND OTHER ACTIVITIES BASED ON EXPERTISE DEVELOPED IN RESEARCH

Professor George Branch serves on the Sea Fisheries Rock Lobster Working Group and the Biodiversity Working Group, and chaired the Committee on Access Rights for Fisheries. He is also a member of Subsistence Fishers task group. He is chair of the NRF evaluation committee for Animal and Veterinary Sciences. He served on the International NRF working group on Marine Reserves.

Professor Alec Brown is a consultant to CSIR on biological effects of fish factory effluents. Professor Bryan Davies is a member of the editorial boards of the following journals: Societas International Vereinigung für theoretische und angewante Limnologie; Aquatic Conservation: Marine and Freshwater Ecosystems; Regulated Rivers: Research and Management. He has made three live television broadcasts and several dozen radio broadcasts both locally and internationally and contributed to New Scientist and other written media articles in relation to the problems of large dams and their management of floods, with particular reference to the Mocambican cyclone of February and March 2000. Recent water restrictions and water-crisis development in Cape Town have also involved a large amount of media coverage. His consultancies include the continuing troubles associated with the management of the Cahora Bassa Dam, inappropriate developments in the Kogelberg Biosphere Reserve, and on Cape Point and in the Hout Bay (Disa) Valley wetlands. He has also acted as specialist consultant to the World Commission on Dams.
Dr Jenny Day is a member of the task team of the Institute for Water Quality Studies (Department of Water Affairs and Forestry), developing methods for estimating the ecological reserve (as defined in the new National Water Bill).

Professor Morné du Plessis is a member of The Auk and Journal of Avian Biology editorial boards. He is a member of the following committees: International Ornithological Committee; Scientific Committee of the Southern Hemisphere Ornithological Congress; Council of BirdLife SA; Advisory Board of the Mammal Research Institute, University of Pretoria; Chairman of the NRF’s Terrestrial Biodiversity and Conservation Thrust Panel; External member of the University of Pretoria's Faculty of Science's Promotions Committee and Appointments Committee; External member of Review Panel of the University of Pretoria's Centre of Wildlife Management and Department of Animal Sciences.

Professor John Field is President, Scientific Committee on Oceanic Research (SCOR, a Committee of ICSU). He is a member of the Fisheries Advisory Committee (to Minister of Environmental Affairs and Fisheries, South Africa) and Chair of the Benguela Ecology Programme and of the SA Global Change Committee (for the IGBP). He is a member of the Scientific Advisory Committee to BENEFIT (Benguela Environment Fisheries Interaction Training) involving South Africa, Namibia and Angola, and a member of the Ocean Observations Panel for Climate (a panel of the Global Ocean Observations Systems and Global Climate Observations System). He also directs a programme on the effects of offshore diamond mining.

Professor Charles Griffiths is leader of the aquatic component of CAPE- "Cape Action Plan for the Environment"- a WWF and World Bank sponsored programme to devise strategies for the conservation of biodiversity in the Cape Floristic Kingdom.

Professor Phil Hockey is on the editorial board of Biological Conservation and is a member of the following committees: BirdLife South Africa Rarities Committee (Chairman), the Madagascar Rare Birds Panel, the Bird Taxon Advisory Group of the Pan-African Association of Zoological and Botanical Gardens. Conservation-management plan for the lower Berg River Consultancy to the RAMSAR Convention, Switzerland. Translocation and reintroduction of the Aldabran Flightless Rail Dryolimnas (cuveiri) aldabranus Consultancy to the Seychelles Island Foundation. Ornithological importance and zoning of the Soetwater coastal strip, Cape Peninsula Consultancy to the South Peninsula Municipality.

Mr Jean Jordaan teaches and tutors, respectively, bridging and first year life science student groups, gathering data which centres on the performance of students in specially designed curricula. The outcomes of revision of these curricula are also under investigation.

Dr Jackie King is the project leader of the R12 million project, leading an international team of 27 specialists, to advise on environmental flows for the Lesotho Highlands Water Project. Completed January 2000, now heading into negotiations between the Lesotho and RSA governments on re-signing of their Treaty on water sales. She is also the specialist advisor in Zimbabwe for a UK Department for International Development (DFID) funded project on environmental flows awarded to Mott MacDonald of UK, beginning December 2000. She taught at a Training Workshop for Undertaking Research to Assess the Socio-economic Benefits off Improved Water Resources Management in the Lower Zambezi Valley as the specialist on environmental flows. The workshop was organised by CalTech (USA) and funded by IUCN (Mozambique, March 2000).

Dr Mike Lucas has been a consultant to the George Deacon Division of the Southampton Oceanography Centre (UK), undertaking collaborative research with Drs R. Pollard and J. Read and Prof P. Holligan. This consultancy work originated from successful research cruises (1995/96) with the Germans and British to the Southern Ocean and South West Indian Ocean respectively. Research at SOC has been extended to work collaboratively with Dr J. Aiken of the Plymouth Marine Laboratory (UK) within the Atlantic Meridional Transect (AMT) programme. He is involved in development of an MoU between the Southampton Oceanography Centre, UK, (SOC) & UCT (CMS) as well as the development of a formal postgraduate (PhD) exchange scheme between the SOC & UCT marine research institutes.

Dr Mike Picker consults widely in respect of environmental impact assessments as a faunal (especially invertebrate) specialist. As an example he was contracted to provide the faunal component for the nomination of the Cape Peninsula as a World Heritage site.

Dr Andrea Pulfrich: Impact of diamond mining on sub-tidal systems.
SOUTHERN WATERS

CONSULTANCIES UNDERTAKEN BY SOUTHERN WATERS DURING 2000 INCLUDE:

Lesotho Project: development of instream flow requirements. Project in collaboration with SMAEC International of Australia, ongoing since 1997 and finalised this year.

Breede river basin study (October 1999 to October 2001): Southern Waters is working in collaboration with a joint-venture between MBB, Ninham Shand and Jakoet and Associates to undertake a determination of the instream flow requirements for the main rivers within the Breede River Basin.

Zeekoevlei and Rondevlei restoration study: Appointed by the South Peninsula Municipality to develop an action plan for the restoration of these two vleis in the Cape Metropolitan Area.

River health programme: Implementation design phase (January 1998 – August 2000). Southern Waters are responsible for the development of a methodology for the derivation of ecological reference conditions for invertebrates in South Africa.

River health programme: Anchoring phase (May 2000 to May 2003): Southern Waters are responsible for developing the Rivers Database which is being used to manage all data collected as part of the programme at a local, regional and national level.

Silvermine catchment management plan: Commissioned by South Peninsula Municipality to compile an Integrated Catchment Management Plan (ICMP) for the Silvermine River.

Assess the potential impacts of the proposed upgrade and extension of the Kraaifontein WWTW on the downstream freshwater ecosystems.

Provision of an overview of the ecological opportunities that exist for the rehabilitation of the Sand River Canal.

Assessment of the potential impacts on freshwater ecosystems of the proposed upgrade of a toll road on the N1 and N2 National Routes in the Western Cape.

Assessment of the current status of aquatic ecosystems within the Salt River Catchment as part of the formulation of the Catchment Management plan for the Salt River.

Zandvlei Environmental Study.

Impact of Vlei Drawdowns on False Bay Water Quality.

Development of an urban river maintenance practitioners manual.

Continued monitoring of the water quality in an artificial lake at the Capricorn Science and Technology Park.

Review of Cyanobacteria in South Africa commissioned by the Water Research Commission.

Assessment of the Tshokwane Wetland in Plettenberg Bay.

Aquatic ecosystem assessment of Little Princessvlei and Princessvlei.

Evaluation of the engineering options for flood alleviation in the Lourens River.


Ecological input and authorship of the commended width of buffer zones for rivers of the Cape Metropolitan Council policy document: “Development Control Guidelines in flood prone areas”.

Contribution to the World Bank Water Resources and Environmental management Series: Guideline 7: Environmental Flow assessments Part II.


Development of DRIFT - a methodology for the assessment of Instream Flows for aquatic ecosystems.

Assessment of the opportunities for wetland creation along the Brookwood Stream.

Development of the design and monitoring protocols for the artificial wetland at Long Beach Mall.

Costing of the pre-development terms of reference for the Berg River.

Development of management options for reed control at Zandvlei.

Input into the design of a wetland along the Moddergat Stream.

Wildervoevleli nutrient and groundwater modelling.

Ecological assessment of the Bellville waste site.

Overall ecological assessment of the Vermont Pan in Hermanus.

Input to the second phase development of flood management controls in the lower Silvermine River.
OFFICE OF THE DEAN
Programme in Science, Mathematics and Technology Education

HEAD:  Professor Michael Kahn

Postal Address:  RW James Building
University of Cape Town
Private Bag
Rondebosch
7701
Telephone:  SA (21) 650-4351
Fax:  SA (21) 650-3250
Email:  anne@physci.uct.ac.za

OFFICE PROFILE

The Programme was formalised in late November 1999 with the approval to offer a new degree, the Bachelor of Science Education, which should enrol its first students in 2001. In addition the Programme teaches the M.Ed. (Science Education) and will convene the Advanced Certificate in Education (Science). The Programme Head is Advisor on Science and Technology to the Minister of Education and advises the national Department of Education on strategy for the improvement of science and mathematics education. The Programme also supports the Faculty of Science through curriculum development in the Life Sciences.

STATISTICS 2000

<table>
<thead>
<tr>
<th>STAFF</th>
<th>STUDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors</td>
<td>M.Ed. 3</td>
</tr>
<tr>
<td>Lecturers</td>
<td></td>
</tr>
<tr>
<td>Administrative staffs</td>
<td>TOTAL 3</td>
</tr>
</tbody>
</table>

RESEARCH FIELDS

Prof. Michael Kahn
- curriculum change; evaluation; education policy; science and technology Policy

Ms. G. Mitchell
- curriculum development in science

RESEARCH OUTPUTS

RESEARCH PAPERS AND REFEREED ARTICLES


REPORTS


CONFERENCE PAPERS

Kahn, M.J. 2000. Education reform with regard to skills development. International Conference on Capacity Building in the Water Sector, Johannesburg (invited address).

POPULAR ARTICLES