

## **Proposal to be a Host Institution for the African Climate Change Fellowship Program**

### **Section 1: Proposing Host Institute**

#### ***Name of Institute***

Discipline of Geography, University of KwaZulu-Natal (Pietermaritzburg Campus; UKZN),  
Private Bag X01, Scottsville, 3209, South Africa

#### ***City and Country of Location***

Pietermaritzburg, Province of KwaZulu-Natal, South Africa

#### ***Type of Institute***

University

#### ***Primary Mission of Institution***

Tertiary education: under- and post-graduate training

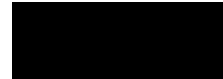
Research

#### ***Secondary Missions of Institution***

Community outreach programs; close relationship and link with City of Pietermaritzburg; joint research activities and involvement with local NGOs; CBOs and government organizations.

#### ***Main thematic area (s) of work***

Extremely diverse due to size (32000 students in total; of which 8000 are on the Pietermaritzburg campus) and number of faculties within the broader University community, particular in our Discipline. Our discipline falls within the School of Environmental Sciences: Geography, Soil Science, Agro-meteorology and the Centre for Environment, Agriculture and Development (CEAD). CEAD has three course work Masters, Research Masters and PhD by Research opportunities; *viz.* Masters in Environment and Development, Masters in Land



Information Systems and Masters in Protected Areas. Many students on these three course work Masters programmes are mid-career professionals thus we cater to a diverse group of students.

To ‘complicate’ the issue, Geography is taught on three campuses; two in Durban and one in Pietermaritzburg – approx 100 km apart! We cover the ‘usual’ array of Geographical subjects and pride ourselves in the transdisciplinary nature of the courses and research interests.

My particular interest is within palynology focusing on the Drakensberg Escarpment and the coastal belt of northern KwaZulu-Natal. This formed the topic of my PhD and a number of my post-grad students have continued the work.

***Working Language of the Institute***

English

**Section 2: Proposal Leader**

***Name***

Trevor Raymond Hill

***Title***

Associate Professor within the Discipline of Geography

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**Section 3: Collaborating Institutes**

Here we have been in discussion with two main partners; viz. Ezemvelo KZN Wildlife and the African Centre for Food Security. KZN Wildlife is a parastatal conservation body that manages the conservation and wilderness areas of the Province of KwaZulu-Natal. For access to these



areas one needs permission from KZN Wildlife. I have been working closely with the organization and have been granted permission for access to a number of palaeo-environmental sites. Furthermore, a number of KZN Wildlife staff either are or have been postgraduate students within the Discipline of Geography or CEAD and thus there is a very close working relationship. At present there is no single individual with whom to cooperate; this will depend on the particular interest and focus of the candidates joining us.

Our second close collaborator is the African Centre for Food Security. This is a research unit housed at the University of KwaZulu-Natal (Pietermaritzburg Campus). The project was initiated in 2001 and coordinates transdisciplinary education and research in food security through the regional linkages in southern and eastern Africa. The Centre currently interacts with 31 UKZN academic staff from 15 disciplines and networks of African and international and regional food security and related specialists. The programme currently has 35 registered postgraduate students. The Centre was selected as the SADC Centre of Excellence (CoE) for Vulnerability Assessment and Analysis in November 2006. The program is managed by Prof Sheryl Hendriks: **Head of School**, School of Agricultural Sciences and Agribusiness and **Director**: African Centre for Food Security, Faculty of Science and Agriculture University of KwaZulu-Natal, PBag X01 Scottsville, 3209

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I think it needs to be emphasized that although I am housed with the Discipline of Geography I do represent the School of Environmental Sciences; as stated above this includes Soil Science, Agrometeorology and CEAD; thus there is a broad collaboration with all of these Disciplines and although the candidates will be housed in Geography they have easy and open access to anybody within the broader School and are seen as members of the School.

#### **Section 4: Fellowship Experiences to be Offered**

We already host a number of visiting Professors and Research Fellows (I recently had a Research Fellow working on a DANIDA funded project with me for the past three years). It depends on the level of entry into the system by the candidate, at PhD and post-PhD level the candidate will become a full member of the Discipline and School, office space is provided, we attempt to



provide a computer but we find, these days, that people bring their own laptops (however if the candidate does not have a laptop a desktop pc can be provided), the person has access to everything we can provide and becomes 'one of us', including having to pay tea club fees! Access to University libraries, data sets etc are provided. We like the students to become as involved as they can within both the Discipline and the School. This includes helping with demonstrating: this is when post-graduates act as teaching assistants to more senior academic staff and are paid an hourly rate to help run tutorial and practical sessions housed with the Discipline to the third year under-graduate students and fourth year (Honours) students. If the students are interested, we would hope they are amenable to this, they would help us with some under-graduate teaching or present some aspects of their research to under-graduate students. We can help with basic training and introduction and this helps both our students in terms of meeting new people and hearing different ideas from our own, but also help the candidates gain new skills; it's a great two way process which we encourage.

In terms of an overall experience within the Discipline, I think we provide a good working environment, quiet campus-style University, which is well resourced in terms of computer and laboratory facilities. Of course this will depend on the particular focus of the individual student as to what laboratory and field-based equipment is required and this needs to be negotiated as we may not house the necessary equipment.

We have a number of non-South African students undertaking postgraduate courses with us and the experience seems to be generally a positive one. As a consequence of our joint DANIDA funded project with University of Copenhagen and an IDRC funded EcoHealth project with Queens University, Canada we have had a number of Masters students undertake their field work from these institutes. We need a point of clarity here and it will be an issue with the program: from which Institute will the final degree be awarded? If the student is based for example at the University of Swaziland, spends time with us, undertakes his or her fields work and is supervised with us, does the program want the PhD to be awarded through UKZN or the University of Swaziland. This does become as issue when for example you have staff from another African University applying to spend time here at University of KwaZulu-Natal. Many programs want the PhD to come from the 'home' University, however this is not always possible (home institute does not offer such a program) or desirable (people wish to broaden their CV and obtain their PhD from a different Institute).



To respond directly to the list of queries outlined in section 4: the candidates will be provided with access to all University facilities, will become members of the Discipline, collaboration with organizations such as KZN Wildlife, local NGOs and local Government organizations will be strongly encouraged. We can help in this regard as we already have a number of very strong links (in particular through a IDRC funded project dealing with EcoHealth). However, I think we also have to be pragmatic and working directly with rural communities is not straightforward. It takes time to set up good relationships and when we already have projects on the go in rural areas it can be difficult to add new people; this also depends on time frames. I think this is a real concern within the South African context: rural communities are suspicious of researchers, there has to be a real need for the research and the community needs to see real returns, often via local based NGOs.

We also have an extensive collection of literature, modern and fossil pollen slides and photographs of pollen for both the Drakensberg and northern KwaZulu-Natal, a well stocked herbarium, large GIS data sets – 1:50 000 topographic sheets, ortho-photography and aerial photographs, and a well resourced GIS laboratory.

## **Section 5: Administration and Cost Issues.**

### ***How many students/researchers?***

Realistically, one post-doctoral researcher and two PhD students would be ideal. Alternatively, and this is something I think the program needs to consider, we could host more Masters level research students. Often there is a gap in African Scholarship at the Masters level: students are unable to get that first step into research and have the opportunity to do their own research, either within a course work Masters with a small component of research, or better still a full research Masters. I appreciate that most funders prefer to fund at the PhD level and that is important in terms of capacity building within the tertiary educational sector but there is a still a big need for Masters level funding. We can accommodate up to four research Masters students.

### ***Dates?***

Our year starts in mid-January and runs through to the end of November, however that is for under-graduate studies. At the post-graduate level we continue all year round with University winter vacation from June–July and summer vacation from December–January. We do not



experience a dramatic “rainy season” so in terms of field work there is no major limitation – other than high altitude work which gets cold between June and August. For us the main issue would be to communicate with potential supervisors and look at optimum timing; we are rarely closed with students always in and out!

***Costing?***

I have spoken to a number of my post-graduate students about costing and they budget on approximately R5 000 per month (ZAR), approx. USD 650. There are residences on campus but very few of my post-graduates recommend that; most start off by staying in a local Youth Hostel and within one month move into a commune-type set up with other students. Students tell me accommodation takes about a month to find but is cheap and ranges from single flats too accommodation with 4–6 others in a house. There are plenty of local shops and large shopping centres. One issue they do raise is that public transport is not the best as there is no regular bus or train service. Therefore all students live within walking distance of the campus – few own cars. Everything is within walking distance as it is very much a campus style University and not city wide. Pietermaritzburg is a city (Provincial Capital) with a population of approx. 800 000, so all necessary services are provided, and the large metropolis of Durban (approx 4 million people) is 90 km away.

***University Costs?***

Other than tea club fees? The University has just announced that there will be no charge for University registration for Masters and PhD students. This is to encourage more post-graduate students to come to our University. There will be nominal cost of photocopying, faxing, telephone calls etc but these are easily covered. These costs can be covered by taking up what we call a ‘graduate assistantship scholarship’ where students become involved in demonstrating within the Discipline. The program does need to consider costs for students to travel to their field sites, laboratory costs, cost of specialized equipment, chemicals etc. I know for my own field of study, palynology, these costs can soon mount up and need to be taken into consideration. We certainly do not want to get rich on the program but on the other hand do not want to disadvantage the student or provide unmet expectations once the student gets here and is unable to undertake a particular avenue of research due to limitations of equipment, cost to field sites etc. This is something that would probably need to be sorted out at the proposal stage through careful budgeting in consultation with potential supervisors.



***Further requirements?***

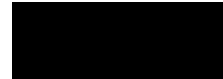
I think the main issue is the one highlighted above: good budgeting and to include research costs. Our discipline, like many worldwide I am sure, do not have very deep pockets and many of our students struggle to find sufficient funds, so we do need to think this through carefully by good communication to prevent unrealistic expectations. We also need to consider what research is realistically possible given time, distance and equipment. For example, radio carbon dating – we have one lab in South Africa which is heavily over-utilised thus we tend to send our samples either to the United States or New Zealand resulting in costs and time delays.

**Section 6: Qualifications of the Host Institute**

***Institutional Capacity***

The University has a proud history and strong learning culture with a focus on Science, Agriculture and the Social Sciences. With the Government shift in funding emphasis the University presently has a strong drive towards improving its research output and all staff are encouraged and supported to produce academic papers and we are aggressively marketing for Masters and PhD students; therefore applicants are entering into a University environment that supports and is looking towards improving research output. The Discipline of Geography occupies an entire floor of the Science block and although we are a small staff complement (6) we teach a wide spectrum of courses all contained within an inter- and trans-disciplinary type approach. We have close links with the city and the students often undertake research projects in conjunction with city environmental companies and local government organizations. We take this civic responsibility a step further and offer short vacation courses (in GIS and Environmental Management) to government agencies, which are well attended.

Many of our students are moving into the field of climate change and two years ago we appointed a full time physical geographer who focuses on climate change; we have recently advertised a similar position on our Durban campus, so although we have a small staff complement we recognize the obvious importance of climate change. We also work closely with other Disciplines, such as Soil Science, Environmental Economics and Hydrology who all have a research interest in climate change. Hydrology have produced a South African atlas mapping, via GIS, the impact of various climate change scenarios on commercial crops.



We do not, as a recognized unit or specialization, have a direct link to policy issues which pertain to climate change. Our staff makes input to environmental policy issues, in particular Environmental Impact Assessments and Reporting and many of our students get their first jobs working for local environmental companies. We have a number of past students in this field and we are often asked for more students, which helps our students gain valuable applied experience. However, through this link and our close network with the City Planners, we are able to provide expert input into City policies. For example, through the EcoHealth project funded by IDRC, we have developed a City wide GIS decision support system and we sit on the City Planning bodies (including Agenda 21, Conservation Trusts and are able to attend City Councilor meetings). I recently had a research student analyze the weather data for the City for the past 30 years looking at the urban heat island effect, at the request of the City. Thus, we do have access to policy level input. Furthermore, on the campus we have the Centre for Government Policy which has a strong focus on policy formulation and implementation. This centre could form a valuable collaborating partner if applicants have an interest in policy. We already have a good working relationship with students taking courses from ourselves and the Centre.

I believe the University environment in Pietermaritzburg to be a sound and productive place, it's certainly much more than just a centre of higher learning and the network, contacts and physical surroundings lend themselves to a conducive working environment.

***Project Experience***

Staff within the Discipline have been involved in a number of Internationally and locally funded projects, which are not all directly related to climate change due to the nature of the discipline. Two that I have been directly involved in include:

***-Natural Resource Management***

DANIDA funded project: **Human Capacity in Natural Resource Management**. This southern African Consortium of Universities for Development and Environment - Sustainable Land Use Project (SACUDE-SLUSE), is a regional initiative that aims to enhance southern African capacity for managing natural resources in a sustainable manner. SACUDE-SLUSE aims to provide a trained human resources base that has the necessary integrated and multi-disciplinary skills. The project has set out to improve the capacity of participating universities to produce high quality post-graduate natural resource management students. This consortium,

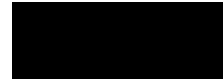


which is regional, includes the University of KwaZulu-Natal (Pietermaritzburg and Westville Campuses), the University of Botswana, and the University of Swaziland.

The key aspects of SACUDE-SLUSE is embedded in exploring the successes, challenges and experiences of utilising interdisciplinary and inter-institutional approaches of building educative and research capacity pertaining to sustainable land use imperatives in rural contexts in southern Africa. It is believed that the issues involving sustainable land can best be understood by the combination of bio-physical, socio-economic, institutional and policy considerations. The collaborative endeavour takes as its point of departure various rural landscapes in southern Africa as they have developed in relation to their natural resource endowments, social and political influences as well as economic imperatives. Furthermore, specific institutional dynamics and capacities are also considered. The project has produced a number of International academic publications as well as a training manual dealing with Natural Resource Management.

***-Environmental Health***

IDRC funded project: **Human ecosystems and human health in South Africa.** This is in partnership with Queens University of Canada and focuses on Ecosystem Health issues within the Pietermaritzburg region. The rationale behind this three year funded project is linked to the unequivocal need to improve the living conditions for millions of urban South Africans, thus the project aims to explore the interface between human health, environment and development policy within the current institutional framework with the objective of articulating methods and strategies for improving urban environmental conditions as a foundation for a healthier and more equitable society. Finding concrete ways to assist local government and urban communities to understand the health challenges they face and to reduce the environmental risks that exist will play an important role in the future development of South Africa's rapidly expanding urban areas. Although this project is sited within the city of Pietermaritzburg as its research site, it is important to emphasize that the methodologies that are developed and tested will be transferable to other, similar, urban situations in South Africa. Given the complexity of the subject matter, this project has a wide range of professionals on its team. Therefore, in addition to the transferable model that forms a major output of this project, the study will help to influence the way in which multidisciplinary research teams from both the 'soft' and the 'hard' sciences can work together with civil society on outcomes based initiatives.



### ***-Palaeoenvironmental Change***

With research students we have recently completed a palynological study along the northern KwaZulu-Natal coastline which documents a continuous ~44000 cal yr pollen record derived from the Mfabeni Peatland on the Maputaland Coastal Plain. A detailed fossil pollen analysis indicates the existence of extensive Podocarpus-abundant coastal forests before ~33000 cal yr BP. The onset of wetter local conditions after this time is inferred from forest retreat and the development of swampy conditions. Conditions during the last glacial maximum (LGM; ~21000 cal yr BP) are inferred to have been colder and drier than the present, as evidenced by forest retreat and replacement of swampy reed/sedge communities by dry grassland. Forest growth and expansion during the Holocene Altithermal (~8000-6000 cal yr BP) indicates warm, relatively moist conditions. Previous records from Maputaland have suggested a northward migration of Podocarpus forest during the late Holocene. However, we interpret a mid-Holocene decline in Podocarpus at Mfabeni as evidence of deforestation. Forest clearance during the mid-Holocene is supported by the appearance of *Morella serrata* suggesting a shift towards more open grassland/savanna, possibly due to burning. These signals of human impact are coupled with an increase in *Acacia*, indicative of the development of secondary forest and hence disturbance.

We presently have an on-going study in a mid-altitudinal wetland within the Drakensberg Mountain range. Radiocarbon dates to 9000 yrs BP have been obtained which is an excellent date for the region, charcoal content of a core has been studied and a detail of the fire regime of the region has been analysed, next step is a detailed pollen investigation of the 3.2 m core.

Both palynological investigations mentioned above have been in collaboration with KZN Wildlife, mentioned as a collaborating institute, above.

### ***Publication Record***

#### ***Key References:***

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### ***Experience Hosting Fellows***

We have hosted Research Fellows (including Dr Catherine Traynor as part of the DANIDA funded project) and Honorary Professors (Prof B Moon, ex-Head of Geography, WITS University, South Africa & Prof T Birch-Thomsen, Geography, University of Copenhagen) in the School within the last five years.



## **Section 7: Qualifications of Collaborating Institutions**

### ***Institutional Capacity***

We obtain strong support from our Faculty in terms of research and the opportunities to collaborate with other Schools, Faculties and in particular other African and International Universities. One limitation is the ability to ‘swap’ credits for courses across Universities – this is something that is receiving attention at present – thus, in theory, students could take courses at University of Swaziland for example and we at UKZN would recognize and accept these courses. A further limitation is the resource allocation – I am sure this is not unique to us in South Africa, but budgets are always being cut and we have to seek funds from outside sources. One innovative approach which has been well received at our University is, due to the government subsidy for gradating post-graduate students and monies received for internationally recognized academic papers, UKZN has ‘returned’ some of that subsidy directly to the researcher / lecturer involved. This money is not paid directly to the person as a salary but rather goes into a University cost code and we can use it to help sponsor new post-graduate students or in our own research endeavors. This is a great help and allows us to attend conferences and attract new students, of course this is only if you produce the students and papers – so it can be a dangerous spiral!

### ***Relationship with Collaborating Institutions***

With KZN Wildlife we have a number of joint research projects and a number of KZN Wildlife staff are furthering their qualifications with various UKZN staff members as supervisors. We also undertake a number of field based courses in conservation areas managed by KZN Wildlife and we liaise closely with them in terms of developing these courses.

As the Centre for Food Security is a research unit based at the University, we have a close working relationship, again there is co-supervision of students between the units and we share many students. As part of our under- and post-graduate programmes students are able to attend courses in food security and community resources.

## **Section 8: Supervisor / Mentor Team**

Again this will depend to some extent on the specific interest of the applicants. However, please find attached my CV as I would be involved with most students working within the broad field of climate change and would be the main contact person. This is not to ‘hog’ the process but I find it easier to have a single point of contact between institutes as a starting point. Others would



include: Prof Rob Fincham (ex Head of CEAD – Food Security), Dr Mark Dent (CEAD – broad systems thinker and specialization in Water Management), Prof Heinze Beckedahl (Geomorphology), Prof S Hendricks (Food Security), Dr Onnie Mutanga (GIS and Remote Sensing specialist); Prof Graeme Jewitt (Hydrologist), and Ms Dayle Trotter (Climatologist).

### **Section 9: Interest in Applicant Review**

I am very happy to do so and I think it is very important that we are part of a participatory process. This is a two-way process, also, as mentioned above, we need to avoid unrealistic expectations and create conflict and to pair a researcher and his/her project with people and an institute that will welcome and be supportive of the researcher and research.

We have two issues here: first the suitability of the candidate and the program is in a better position to judge that, but secondly, how appropriate is the applicant to our institute and it is vital we are part of that process in a proactive and supportive manner.

**TREVOR HILL**  
**Abbreviated CV**

**Position:**

Associated Professor, Discipline of Geography, University of KwaZulu-Natal, South Africa

Deputy Head of School of Environmental Sciences

**Qualifications:**

INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
Rhodes University, Grahamstown	BSc	1986	Geography / Botany
Rhodes University, Grahamstown	BSc Hons	1987	Geography / Botany
Rhodes University, Grahamstown	PhD	1993	Geography / Botany
Rhodes University, Grahamstown	PGDE	2002	Environ. Education

**Employment:**

- Held the position of Junior Lecturer in the Department of Botany, Rhodes University, 1990.
- Teaching assistant and practical course demonstrator in the Department of Geography, Rhodes University 1988 – 92.
- Research Officer in the Institute for Water Research in 1992. Worked on the Buffalo River Project, particularly data analysis and GIS.
- Held position of Lecturer in Department of Geography, Rhodes University and first-year course co-ordinator. Lecture courses included: biogeography, geographic information systems (GIS), ecology and environmental management, statistics and computer literacy.
- Visiting Lecturer, Department of Geography, University of Natal, Pietermaritzburg in 1997. Third-year co-ordinator, taught GIS, Cartography, Ecology, Sustainable Development and Participatory Rural Appraisal. Also involved in the development of GIS courses for secondary schools and Umgeni Water Board.
- External examiner for Department of Geography, University of Pretoria GIS course, Department of Civil Engineering and Surveying, University of Natal GIS course, Technikon SA Plant Studies course, Nelson Mandela Metropolitan University – GIS courses

- External examiner of South African and International MSc and PhD thesis.
- Papers presented at international conferences in Thailand, Denmark, Canada, and South Africa. Including International Geographical Conference and The Role of Higher Education in Sustainable Development.

#### **Latest Publications:**

- Nel, E., Hill, T. & Trotter, D., 2006: The role of Nature Based Tourism in the promotion of locality Based Development in South Africa. *Singapore Journal of Geography*, 27 (2), 163-175.
- Finch, JM., Samways, M.J., Hill, TR., Piper, SE. and Taylor, S., 2006: Bioclim-type modelling for predicting species distribution: Odonata in South Africa. *Biodiversity and Conservation*, 15(13): 4239-4251
- Donaldson-Selby, G., Hill, T.R. & Korrubel, J., 2007: Photorealistic visualisation of urban greening in a low-cost high-density housing settlement, Durban, South Africa. *Urban Forestry and Urban Greening*, 6, 3-14.
- Nel, E.L., Hill, T.R. & Goodenough, C., 2007: Inward Or Outward Focussed Growth: Disjuncture Or Co-Operative Economic Development? A Case Study of Richards Bay. *Urban Forum*, 18 (2), 31-47.
- Hill, T.R., Nel, E.L. & Illgner, P., 2007: Partnership For Success – Community-Based Economic Development: A Case Study Of Ngolowindo Co-Op, Malawi. *Environment and Governance, Part C.*, 25 (4), 573-590.
- Waiklen, J. & Hill, T.R., 2007: The impact of land transformation on breeding blue swallows *Hirundo atrocaerulea* sundevall, in Kwazulu-Natal, South Africa. *Journal of Nature Conservation*, 15, 245-255.
- Hill, T.R.; Traynor, C.H., Birch-Thomsen, T.; de Neergaard, A.; Bob, U.; Manyatsi, A.M., & Sebego, R.J., 2008: Clear the Mind of Pre-conceived Ideas and Get Your Hands Dirty! An Approach to Field-based Courses: The SLUSE-southern Africa Experience. *Journal of Geography in Higher Education. Presently on-line*
- Traynor, C. & Hill, T., 2008: Resource demand estimates for sustainable forest management: Mngazana Mangrove Forest, South Africa. *Bothalia*, 38, 79-86.
- Traynor, C. & Hill, T.R., in press. Mangrove utilisation and implications for Participatory Forest Management, South Africa. *Conservation and Society*

- Hill, T.R., Traynor, C., Birch-Thomsen, T., de Neergaard, A. & Bob, U., in press. Problem-based, interdisciplinary field-based courses: Reflections from southern Africa experiences. *The South African Geographical Journal*.
- Goebel, A., Fincham, R., Lawhon, M., & Hill, T., in press. Providing A Home Is Not Only About Housing! A Transdisciplinary-Approach To Understanding Eco-System Health For Housing Provision, Kwazulu-Natal, South Africa. *EcoHealth*
- Finch, J. & Hill, T., in press: A Late Quaternary pollen sequence from Mfabeni Peatland, South Africa: reconstructing Podocarpus forest history in Maputaland. *Quaternary Review*

*Have a total of 40 Internationally accepted publications, a number of 'more popular' press, including a number of newspaper articles, and 12 book chapters.*

#### **Research Interests:**

- Biogeography and palaeo-climatic change in montane environments
- Development of Geographical Information Systems (GIS) for resource management and education.
- Rural sustainable development using indigenous skills and infrastructure, and local economic development through Participatory Rural Appraisal.
- Small town development and Local economic development impacts

#### **Further Information:**

- Have supervised (to completion) 23 MSc and PhD students
- Awarded University Distinguished Teachers Award 2006
- Have been involved in a number of International Research projects, including being University Project Manager of Study program with SLUSE (Sustainable Land Use and Resource Management), Denmark. Three year funded programme involving three southern African universities entitled: "Human Capacity Building in Natural Resource Management". [www.sacude.unp.ac.za](http://www.sacude.unp.ac.za) and Project member of IDRC (Canada) funded project, three years, entitled: Ecosystem and Human Health. Project linked with Queens University, Canada.