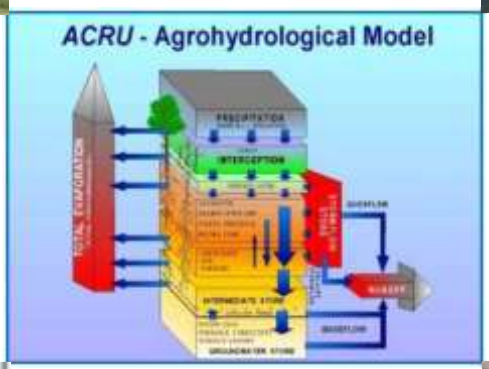
UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

Centre for Water Resources Research

Centre for Water Resources Research

Post-Graduate Research Opportunities:
2018/2019



Developing Future Hydrological Scientists

http://cwrr.ukzn.ac.za/

INSPIRING GREATNESS

About Us

The Centre for Water Resources Research (CWRR) was formed in 2012 out of a cohesive group of academics who have been active in research, teaching and capacity building related to hydrology and water resources research since 1984. The on-going importance and relevance of water resources related research and teaching and the sustained research output of the group provides the basis to formally establish a Centre of Excellence within the University of KwaZulu-Natal. The University of KwaZulu-Natal has a wide range of water related expertise and, in support of its vision to be the Premier University of African Scholarship, is actively involved in water related teaching, research and outreach activities throughout Africa and beyond.

With a focus on water resources related research in sub-Saharan Africa, the CWWR consists of staff, students and associates active in a variety of research projects in the region. Projects are funded by the European Union, DFID, USAID-NSF as well the Water Research Commission, National Research Foundation and various others, both internationally and in South Africa.

Post Grad Research Opportunities

Post graduate programs at the CWRR are offered at Honours, MSc and PhD level. MSc and PhD studies are done by research only.

Post graduate students wishing to pursue studies at the Centre for Water Resources Research need to follow a 2 step application process. Step 1 is an internal process where applicants are screened and linked with potential supervisors (http://cwrr.ukzn.ac.za/postgraduate-opportunities). Once an applicant has been accepted by a supervisor, they will proceed to step 2, which is the formal UKZN application process (http://cwrr.ukzn.ac.za/docs/default-source/studenty-forms/postgrad-application-form.doc?sfvrsn=0).

Minimum requirements for application for MSc (Hydrology):

- Minimum 60% average in 4th year of study, from a recognised university in a relevant discipline
- Minimum 60% for research related components of previous studies

Minimum requirements for application for PhD (Hydrology):

- MSc in relevant subject from a recognised university

NB: Supervisors may prescribe further criteria for admission to study.

Application requirements:

1. Fill in POST GRAD application form (available on website)
2. CV, including at least 2 references including contact details
3. Copy of your latest academic transcript
4. Sample of your scientific writing
5. 1 page research proposal

MSc/PhD/Postdoc Studentships at the University of KwaZulu-Natal
Centre for Water Resources Research

LAND, WATER AND ECOSYSTEM GOODS AND SERVICES

Scholarship description:
Land, soil and water resources and the production of goods and services upon which society depends are intimately linked. In developing countries, society is largely dependent upon the land for its survival, but the production of food and fibre and the land on which this takes place is subject to huge pressure due to a growing demand, both nationally and internationally. Rapid changes in land use and a corresponding degradation of soil and water resources are the result and thus, a decline in the benefits to society.

The overall objective is to develop methods which contribute to the sustainable functioning of river and rivers and to contribute to the development of a framework and strategy to guide investments in rehabilitating and maintaining key catchment areas (i.e. ecological infrastructure) in order to ensure water security (in terms of both water quality and quantity), and to assess the viability (including financial) of the inclusion of the concept of ecological infrastructure in decision-making and policy development nationally.

In pursuing this aim, the following studentships are available:

Quantifying the cost of deteriorating water quality at the Midmar, DV Harris and Durban Heights Water Treatment Works (MSc)
As water quality in the impoundments supplying Umgeni Water's major treatment works deteriorates, it is necessary to quantify the potential increases in the cost of treating this water to a potable standard. This project will suit an MSc student with an interest in economics and will require close collaboration with staff at Umgeni Water.

Linking Critical Source Areas to Ecological Infrastructure (MSc)
Potential source areas of non-point source pollution in the uMngeni have been identified. However, the link between these priority areas and the location and type of Ecological Infrastructure such as wetlands, riparian zones and grasslands in the catchment still needs to better understood. The project will suit an MSc student with an interest in wetlands, soil-water dynamics and water quality.

Modelling the impact of Climate Change on smallholder sugar cane and tea crop yields in the Shire River Basin, Malawi (MSc)
Climate change could have major consequences for members of sugar cane and tea outgrower schemes in Malawi. This project is intended to better understand the likely consequences of changes in key climate metrics on yields from these schemes. The project will suit a student an interest in crop yield modelling and/or climate change impacts on human wellbeing.
Alternative contact: Dr Rebecka Malinga (Malingar@ukzn.ac.za)

A framework for prioritising investment in natural capital/ecological infrastructure at a catchment level (PhD or PostDoc)
This research is intended to guide decisions on where to best invest in ecological infrastructure at a catchment level. It requires an ability to integrate and synthesise information from a variety of different sources and skills in hydrological, economic or systems dynamic modelling are required. It will suite someone with strong analytical skills and an interest in working across disciplines.

These are all full time positions based at the Pietermaritzburg campus of the University of KwaZulu-Natal under the supervision of the Umgeni Water Chair of Water Resources Management.

Eligibility:
The successful candidates should be self-driven, disciplined, be able to work as a member of a team, and be able to set and meet their own deadlines. The candidate(s) are expected to have a BSc (Hons), MSc or PhD degree in hydrology, environmental science, engineering or a related discipline in line with qualification for which they are applying. Experience in hydrological modelling and GIS and/or remote sensing tools will be a strong advantage, but applications from students with a background or interest in resource economics and social science are also welcome. Proficiency in English, both verbal and written, is required.

How to Apply:
Email your CV (with at least three traceable references), academic record and a sample of your writing in the form of a recent project report or publication to Prof Jewitt: jewittg@ukzn.ac.za .

MSc, PhD or Post-Doctoral Opportunities at the University of KwaZulu-Natal
Centre for Water Resources Research

UPDATING AND/OR DEVELOPING NEW TECHNIQUES FOR DESIGN FLOOD ESTIMATION IN SOUTH AFRICA

Scholarship description:
Many of the techniques and approaches currently used in South Africa to estimate design floods which are required for the design of hydraulic structures are based on methods developed in the 1970s and 1980s and which utilised data and computing technology available at the time. With currently available longer periods of records, computing power, GIS and national scale databases, the potential exists for updating the methodologies and/or developing new approaches to design flood estimation which could include the potential impacts of climate change on the estimation of design floods in South Africa. As a consequence, the South African Committee on Large Dams (SANCOLD) and the Water Research Commission (WRC) have initiated a National Flood Studies Programme (NFSP) to modernise methods used for flood estimation in South Africa. Opportunities also exist to (i) assess the impact of declining observation networks and poor data quality on the estimation of design floods, and (ii) develop methods for design flood estimation in data sparse regions, as typically found in many parts of Africa.

Eligibility:
The successful candidate(s) should be focussed, disciplined, able to work as a member of a team, and be able to set and meet deadlines. Candidates are expected to have at least a BSc (Hon) degree in Hydrology or a BSc Eng degree in a related discipline. Experience in design flood estimation and/or hydrological modelling is a prerequisite. Proficiency in English, both verbal and written, is required. For funding, candidates need to be full time students, but part time and self-funded students are welcome to apply.

Scholarship package:
Funding of up to R75 000 for MSc, up to R120 000 for PhD and up to R220 000 for postdoc are potentially available for full time students, dependent on available project funds. These positions are based at the Pietermaritzburg campus of the University of KwaZulu-Natal (www.ukzn.ac.za). Candidates will be expected to cover all living expenses including travel to and from the University out of this stipend. All project running costs will be covered through the project budget. Candidates will be expected to find private accommodation, and make own arrangements for medical insurance and study permits if they are international students.

How to Apply:
Email your CV (with at least three traceable references), academic record and a sample of your writing in the form of a recent project report or publication to Prof Smithers: smithers@ukzn.ac.za.

MSc Studentship at the University of KwaZulu-Natal
Centre for Water Resources Research

WATER USE QUANTIFICATION AND ACCOUNTING

Scholarship description:
With the increasing scarcity of water, reliable information on water availability and use is required for water management. Agriculture is the largest water user worldwide, so it is important that accurate information on agricultural water use and return flows is available for water resource planning and management. Urban water users in a catchment can require a high gross abstraction at a high assurance of supply, but return a portion of the abstracted water, albeit potentially with a lower quality. Water resource accounts aim to show water inflows, outflows, storage and depletion within a catchment. In this project there will be further development of an integrated and consistent methodology for estimating actual water availability and use and summarising this information in the form of water resource accounts. Such an integrated system needs to be able to compute the water balance and estimate water use by different sectors. Potential areas for research by postgraduate students include:

(i) Improving estimates of irrigation water use,
(ii) Improving estimates of urban water use and return flows,
(iii) Improving estimates of water stocks in the form of dam storage, soil moisture and groundwater,
(iv) Investigating the subdivision of catchments into bioresource response regions, and
(v) Investigating linkages between water, land and ecosystem accounts.

Eligibility:
The successful candidate should be driven, disciplined, able to work as a member of a team, and be able to set and meet own deadlines. The candidate is expected to have a BSc (Hons) degree in hydrology or a BSc Eng degree in a related discipline. Experience in hydrological modelling and/or remote sensing is a prerequisite. Proficiency in English, both verbal and written, is required. Candidate needs to be a citizen of an African country, and South African students will be given preference.

Scholarship package:
There is no further dedicated student funding for this project. However, interested candidates may apply for funding through the NRF or the Water Research Commission (WRC). Only full-time studentships based at the Pietermaritzburg campus of the University of KwaZulu-Natal (www.ukzn.ac.za) will be considered. The candidate will be expected to cover all living expenses including travel to and from the University out of this stipend. All project running costs will be covered through the project budget. Candidate will be expected to find private accommodation, and make own arrangements for medical insurance and study permits if they are an international student. This scholarship is subject to availability of funds within the larger WRC project.

How to Apply: Email your CV (with at least three traceable references), academic record and a sample of your writing in the form of a recent project report or publication to Mr Clark: clarkd@ukzn.ac.za.

Two MSc Studentships at the University of KwaZulu-Natal
Centre for Water Resources Research

MODELLING THE IMPACTS OF LAND MANAGEMENT SCENARIOS ON WATER QUANTITY AND QUALITY

Scholarship description:
South Africa has a rapidly changing landscape. To support a growing population and economy, it is necessary for the country to make increasing changes to the land's surface to ensure adequate economic growth and food production. However, with such rapid and widespread changes in land management, vast changes in natural resource and water availability are inevitable. These large scale land management changes include conversion of areas of natural land to industrial or residential areas, conversion of natural land to crop land, biofuel crops and/or forestry, over-exploitation of grasslands for livestock grazing, introduction of alien invasive species due to human movements and economic activities, unsustainable and/or irregular fire regimes which are detrimental to the ecological health of the system (particularly grasslands and savannas), and misuse and degradation of riparian zones and wetlands which are vital ecological infrastructure. Through a five year Water Research Commission funded project the impacts of these land management changes on water quantity and water quality are to be investigated. The water quality aspects of the project are where the candidate would ideally focus.

Eligibility:
The successful candidate should be driven, disciplined, able to work as a member of a team, and be able to set and meet own deadlines. The candidate is expected to have an Honours degree in hydrology, environmental science or a related discipline. Experience with the ACRU agrohydrological model is a prerequisite, GIS experience is preferable. The candidate must be prepared and willing to undertake field work. Proficiency in English, both verbal and written, is required.

Scholarship package:
Funding is available up to R80 000 per year for two years depending on project resources. This is a full-time studentship based at the Pietermaritzburg campus of the University of KwaZulu-Natal (www.ukzn.ac.za). The candidate will be expected to cover all living expenses including travel to and from the University out of this stipend. All project running costs will be covered through the project budget. Candidate will be expected to find private accommodation, and make own arrangements for medical insurance and study permits if they are an international student.

How to Apply:
Email your CV (with at least three traceable references), academic record and a sample of your writing in the form of a recent publication or chapter from honours project to Dr Toucher: warburtonm@ukzn.ac.za.

One MSc and One PhD Studentships at the University of KwaZulu-Natal
Centre for Water Resources Research

EXPAND THE KNOWLEDGE ON EVAPOTRANSPIRATION AND STREAM FLOW REDUCTION OF DIFFERENT CLONES/HYBRIDS TO IMPROVE THE WATER USE ESTIMATION OF SFRA SPECIES (I.E. PINUS, EUCALYPTUS, AND WATTLE SPECIES)

Scholarship description:
Commercial forestry production constitutes a major proportion of the total outputs in South Africa to meet these growing demands. Commercial afforestation is the only land based activity that is currently declared as a Streamflow Reduction Activity (SFRA) in South Africa, which means that a water use licence is required for the planting of commercial trees. There have been many concerns raised around the validity of forestry water use assessments used to determine the SFRA caused by forestry. Therefore more research is required to improve the understanding of the water use of these exotic tree species and to improve estimates of the hydrological impacts of the introduced plantations. This project will use the opportunity presented by the clear felling of the *Acacia mearnsii* in the Two Streams Research catchment and replanting to *Eucalyptus dunnii* to further the understanding of the impacts of commercial forestry on water.

Eligibility:
The successful candidate should be driven, disciplined, able to work as a member of a team, and be able to set and meet own deadlines. For application to undertake an MSc, the candidate is expected to have an Honours degree in hydrology, environmental science or a related discipline. For application to a PhD level scholarship, the candidate is expected to have an MSc degree in Hydrology or related discipline. The candidate must be prepared and willing to undertake field work. A driver's licence is a prerequisite. Proficiency in English, both verbal and written, is required.

Scholarship package:
The funding for an MSc is available up to R80 000 per year for two years depending on project resources (**PLEASE NOTE:** Funding for this project is not confirmed). The funding for the PhD position will be negotiated. This is a full-time studentship based at the Pietermaritzburg campus of the University of KwaZulu-Natal (www.ukzn.ac.za). The candidate will be expected to cover all living expenses including travel to and from the University out of this stipend. All project running costs will be covered through the project budget. Candidate will be expected to find private accommodation, and make own arrangements for medical insurance and study permits if they are an international student.

How to Apply:
Email your CV (with at least three traceable references), academic record and a sample of your writing in the form of a recent publication or chapter from Honours project or MSc dissertation to Dr Toucher: warburtonm@ukzn.ac.za.

MSc Studentship at the University of KwaZulu-Natal
Centre for Water Resources Research

UNDERSTANDING CLIMATE VARIABILITY AND ENVIRONMENTAL CHANGES IN THE CATHEDRAL PEAK RESEARCH CATCHMENTS

Scholarship description:
In a previous WRC (K5/2236) undertaken at Cathedral Peak warming trends in the temperature records were detected as well as decreasing trends in the streamflow records, however no statistically significant changes in precipitation records were observed. This raised questions around the contributions to streamflow from the various flow sources and the role of groundwater. Given the importance of the headwater catchment areas, such as the Cathedral Peak research catchment, to the water resources of KwaZulu-Natal, Gauteng and the surrounding communities it is important to further the understanding of process and contributions to streamflow, and how these may change into the future. A proposal for a three year project has been submitted to the Water Research Commission funded to undertake this improved process understanding.

Eligibility:
The successful candidate should be driven, disciplined, able to work as a member of a team, and be able to set and meet own deadlines. The candidate is expected to have an Honours degree in hydrology, environmental science or a related discipline. The candidate must be prepared and willing to undertake field work. A driver's licence is a prerequisite. Proficiency in English, both verbal and written, is required.

Scholarship package:
Funding is available up to R80 000 per year for two years depending on project resources (**PLEASE NOTE:** Funding for this project is not confirmed). This is a full-time studentship based at the Pietermaritzburg campus of the University of KwaZulu-Natal (www.ukzn.ac.za). The candidate will be expected to cover all living expenses including travel to and from the University out of this stipend. All project running costs will be covered through the project budget. Candidate will be expected to find private accommodation, and make own arrangements for medical insurance and study permits if they are an international student.

How to Apply:
Email your CV (with at least three traceable references), academic record and a sample of your writing in the form of a recent publication or chapter from honours project to Dr Toucher: warburtonm@ukzn.ac.za**.**

MSc at the University of KwaZulu-Natal
Centre for Water Resources Research

UNDERSTANDING HYDROLOGICAL RESPONSES AND SOCIO-ECONOMIC INFLUENCES IN ORDER TO FACILITATE INTEGRATED AND ADAPTIVE WATER RESOURCES MANAGEMENT

Scholarship description:
Impacts of global change are increasingly felt by communities, especially those that are already vulnerable to other issues of change and who lack good governance. This is specifically true in the Sub Saharan context. IWRM and AM have been promoted to ensure the well-being of communities and sectors. However, impact assessments in the hydro-social sphere are rarely to be found. Further, how the different dimensions of change unfold on different scales and shape livelihoods of all types of communities including the influence of the spatial and urban settings they live in, is lacking scientific understanding. Even less research has been done on including lived experience into intervention design and how to mainstream such an approach into decision-making.
A specific focus of this work is currently the uMngeni catchment in close cooperation with many stakeholders and the signatories of the uMngeni Ecological Infrastructure Partnership. Currently linked to funding from a WRC project as well as in cooperation with the Umgeni Water Research Chair on Water Resources Management the following topics for postgraduate studies are available:

- **Understanding hydro-social change in the Duzi-Baynespruit catchment from a systems thinking perspective (MSc)**
- **Understanding hydro-social change in the upper uMngeni catchment from a systems thinking perspective (MSc) [funding pending]**
- **Investigating priorities of water resources management and operations in the uMngeni-Mooi system (MSc)**
- **Insights into the different dimensions of the Sobantu community's water stress in the context of the uMzunduzi municipality and the wider uMngeni catchment (MSc)**
- **Comparing the drought management from 1982/83 and 2015/16 in the uMngeni-Mooi System (MSc)**

Eligibility:
The successful candidate should be driven, disciplined, be capable to work as a member of a team, and be able to set and meet own deadlines. The candidate is expected to have a background in hydrology and/or environmental science. The candidate should possess a valid driver's license. Proficiency in English, both verbal and written, is required.
A specific requirement for this scholarship is an interest in the topic of sustainable development and in working with people from different backgrounds and with different organisations in the catchment.

Additional beneficial skills:

- Zulu as first or second language
- Familiarity with and interested in systems thinking
- Familiarity with working with census and other non-hydrological data

Expected tasks:

- Fieldworkin the uMngeni River catchment (possibly surveys, semi-structured interviews and focus group meeting)
- Contributions to project reports and meetings
- Assistance with the organization of workshops (e.g. workshop invitations, minutes, summary reports)
- Contribution to peer reviewed and popular articles on related topics

Scholarship package:
Funding is available up to R80 000 per year for two years depending on project resources. This is a full-time studentship based at the Pietermaritzburg campus of the University of KwaZulu-Natal (www.ukzn.ac.za). The candidate will be expected to cover all living expenses including travel to and from the University out of this stipend. All project running costs will be covered through the project budget. Candidate will be expected to find private accommodation, and make own arrangements for medical insurance and study permits if they are an international student.

How to Apply:
Email an expression of interest identifying a theme or topic, including your CV (with at least three traceable references), academic record and if applicable a sample of your writing in the form of a recent publication or chapter from an Honours project to Dr Stuart-Hill: stuart-hills@ukzn.ac.za.

MSc studentship at the University of KwaZulu-Natal
Centre for Water Resources Research

UNDERSTANDING HYDROLOGICAL RESPONSES AND SOCIO-ECONOMIC INFLUENCES IN ORDER TO FACILITATE INTEGRATED AND ADAPTIVE WATER RESOURCES MANAGEMENT

Scholarship description:
These scholarships are part of the UMFULA (Uncertainty reduction in Models For Understanding deveLopment Applications) project: Climate change is occurring against a backdrop of economic growth and investment in Central and Southern Africa (CSA); major infrastructural developments with long lifetimes are being planned and implemented. Ensuring they are viable in a changing climate is essential, yet decision-makers in the region have no practical frameworks to assess how climate change may affect critical investment decisions. The UMFULA project will develop and pilot a transferable method to address this challenge. UMFULA comprises a consortium with world-leading expertise in climate science and adaptation research and practice. The objectives are to:

1. Resolve critical knowledge gaps in understanding of CSA's climate, and develop/disseminate improved decision-relevant climate information based on rigorous scientific assessment of climate model performance.
2. Develop an innovative decision framework, to test and compare different approaches to decision-making under uncertainty, and evaluate its performance in real-world decision situations.

The team works in collaboration with stakeholders at different levels in two contrasting Pilot Studies; the Rufiji river basin in Tanzania, and subnational decision-making in selected districts in Malawi. Both Pilots have significant features of economic and social vulnerability to climate. A sequenced research process will be used, co-designed to ensure relevance to societal challenges and share lessons beyond the Pilots.

The three topics available at the moment are:

- **Groundtruthing of civil society's weather observations in the Shire basin, Malawi (MSc)**
- **Structuring water disaster related data for preventive planning and management in the Shire basin, Malawi (MSc)**
- **Exploring change in rainfall of the African southern highlands water tower (MSc)**

Eligibility:
The successful candidate should be driven, disciplined, be capable to work as a member of a team, and be able to set and meet own deadlines. The candidate is expected to have a background in hydrology and/or environmental science. The candidate should possess a valid driver's license. Proficiency in English, both verbal and written, is required. A specific requirement for this scholarship is an interest in the topic of sustainable development. Familiarity with and interested in systems thinking as well as non-hydrological data is of benefit.

Expected tasks:

- Contributions to project reports and meetings
- Working in a research team across continents and thus, regular and good communication skills.
- Contribution to peer reviewed and popular articles on related topics

Scholarship package:
Funding is available up to R80 000 per year for two years depending on project resources. This is a full-time studentship based at the Pietermaritzburg campus of the University of KwaZulu-Natal (www.ukzn.ac.za). The candidate will be expected to cover all living expenses including travel to and from the University out of this stipend. All project running costs will be covered through the project budget. Candidate will be expected to find private accommodation, and make own arrangements for medical insurance and study permits if they are an international student.

How to Apply:
Email an expression of interest identifying a theme or topic, including your CV (with at least three traceable references), academic record and if applicable a sample of your writing in the form of a recent publication or chapter from an Honours project to Dr Stuart-Hill: stuart-hills@ukzn.ac.za.

MSc, PhD or Post-Doctoral Opportunities at the University of KwaZulu-Natal
Centre for Water Resources Research

WATER USE AND YIELD OF STRATEGIC BIOFUEL CROPS

Scholarship description

The research involves the measurement of water use and yield of strategic biofuel crops with particular focus on grain sorghum and soybean. Field work will be conducted at a commercial farm (Baynesfield Estate) environment, as well as at the small-holder farm scale (Swayimane). Research undertaken by the candidate will be used to parameterise both a hydrological model and a crop yield model. Simulated output from the crop model will also need to be validated against observed yield data. There is a wide scope of research required, which allows the candidate to choose a particular topic of interest to focus on. This is a full-time MSc position based at the Pietermaritzburg campus of the University of KwaZulu-Natal.

Eligibility

The successful candidate should be driven, disciplined and be able to work as a member of a research team as well as to set and meet deadlines. The candidate is expected to have an Honours degree (or equivalent 4-year degree) in crop science, agronomy, hydrology, environmental science or a related discipline. Experience in agricultural/hydrological modelling would be advantage. The candidate must be prepared and willing to undertake field work and thus, a driver's licence is a prerequisite. Proficiency in English, both verbal and written, is required. Verbal proficiency in Zulu would also be an advantage. No candidates over the age of 35 will be considered.

Scholarship package

Prospective MSc students are encouraged to apply with competitive funding offered, but dependant on, inter alia, the available budget and other project resources. All project-related expenses, including field monitoring equipment as well as travel to/from the University will be covered by the project. The candidate will be expected to find private accommodation and cover all living expenses including travel to/from the University out of this stipend.

How to Apply

Email your CV (with at least three traceable references), academic record and a sample of your writing in the form of a recent publication or chapter from your Honours project to Mr Kunz: kunzr@ukzn.ac.za.

Application deadline: 15th December 2017	**Start date**: 20th January 2018

Honours, MSc Studentships at the University of KwaZulu-Natal
Centre for Water Resources Research

THE USE OF REMOTE SENSING AND EARTH OBSERVATION FOR ESTIMATING COMPONENTS OF THE WATER CYCLE: RAINFALL, ET AND SOIL MOISTURE

Scholarship description:
Remote Sensing and Earth observation technologies for estimating rainfall, ET and soil moisture are fast becoming an alternate to conventional methods of measurement due to the larger spatial and temporal resolutions. These datasets offer new opportunities for hydrological modelling, flood and drought prediction, water use estimation and decision making for water resources management. However, there is a need for validation of these types of datasets. Opportunities exist for research into the broad areas of satellite based rainfall and new products, ET and energy balance models as well as remotely sensed soil moisture estimates for use in hydrological modelling and water resources management.

Eligibility:
The successful candidate(s) should be focussed, disciplined, able to work as a member of a team, and be able to set and meet deadlines. Proficiency in English, both verbal and written, is required. An MSc candidate is expected to have a BSc (Hons) degree in hydrology/environmental sciences or a BSc Eng degree in a related discipline or the Honours candidate is expected to have a BSc degree in hydrology. For funding, candidates need to be South African citizens eligible to apply for NRF/SANSA or self-funded students are welcome to apply.

How to Apply:
Email your CV (with at least three traceable references), academic record and a sample of your writing in the form of a recent publication or chapter from your Honours project to Mrs K.T. Chetty: chettyk@ukzn.ac.za.

PhD and MSc Opportunities at the University of KwaZulu-Natal
Centre for Water Resources Research

DEVELOPING A GUIDELINE FOR RAINFED PRODUCTION OF UNDERUTILISED INDIGENOUS CROPS AND ESTIMATING GREEN WATER USE OF INDIGENOUS CROPS BASED ON AVAILABLE MODELS WITHIN SELECTED BIO-CLIMATIC REGIONS OF SOUTH AFRICA

Scholarship description

The aim of the research is to develop guidelines for rainfed production of underutilised indigenous crops and estimate water use of indigenous crops based on available models within selected bio-climatic regions of South Africa. these models include AquaCrop, ACRU and APSIM. Research undertaken by the candidate will be used to parameterise/calibrate and test/validate available crop models for selected underutilised crops under rainfed conditions in South Africa. This will also include identifying and mapping bio-climatic regions suitable for the rainfed production of selected underutilised crops, and assessing climate change impacts on yield, water use and water productivity of the selected underutilised crops for rainfed production under South African conditions. There is a wide scope of research required, which allows the candidate to choose a particular topic of interest to focus on. These are full-time PhD and MSc positions based at the Pietermaritzburg campus of the University of KwaZulu-Natal.

Eligibility

The successful candidate should be driven, disciplined and be able to work as a member of a research team as well as to set and meet deadlines. For MSc, the candidate is expected to have an Honours degree (or equivalent 4-year degree) in crop science, agronomy, hydrology, environmental science or a related discipline. For PhD, the candidate is expected to have an MSc degree in crop science, agronomy, hydrology, environmental science or a related discipline. Experience in agricultural/hydrological modelling would be an advantage. The candidate must be prepared and willing to undertake limited field work and thus, a driver's licence is a prerequisite. Proficiency in English, both verbal and written, is required. Verbal proficiency in Zulu would also be an advantage. No candidates over the age of 35 will be considered.

Scholarship package

Prospective PhD and MSc students are encouraged to apply with competitive funding offered, but dependant on, *inter alia*, the available budget and other project resources. All project-related expenses, including field monitoring equipment as well as travel to/from the University will be covered by the project. The candidate will be expected to find private accommodation and cover all living expenses including travel to/from the University out of this stipend.

How to Apply

Email your CV (with at least three traceable references), academic record and a sample of your writing in the form of a recent publication or chapter from your thesis to Dr. T Mabhaudhi: mabhaudhi@ukzn.ac.za .

Application deadline: 31st January 2018	**Start date:** 1st April 2018

MSc Studentship at the University of KwaZulu-Natal
Centre for Water Resources Research

ASSESSING THE HYDROLOGICAL AND SOCIOECONOMIC BENEFITS OF INVESTMENT IN ECOLOGICAL INFRASTRUCTURE IN THE VULINDLELA CATCHMENT

Scholarship description

Numerous climate change studies have indicated that the KwaZulu-Natal Midlands area, within which the uMgungundlovu District Municipality (UMDM) is located, is an area of high climate change risk and is one of three climate change hotspots in South Africa. This is because of the warming already observed and the projected changes in climate and the associated impacts on people, ecosystems and economies.

The uMngeni Resilience project seeks to reduce the vulnerability of rural communities and small scale and emerging farmers in the UMDM in the province of KwaZulu-Natal, South Africa to anthropogenic climate change, focusing on prevention of flooding, management of wildland fire and ensuring water security by combining traditional and scientific knowledge in an integrated approach to adaptation.

The Vulindlela study site is located in the catchment, and is to be cleared of 50Ha of wattle invasion. It is planned to rehabilitate 12km of riparian zone of a tributary of the uMsundusi and 100Ha of degraded grassland in the context of the clearing. There is also a linked rangeland and crop production plan for this area. From an ecological infrastructure (EI) perspective these activities need to be monitored also to assess the hydrological responses to the planned interventions, i.e. rehabilitation of EI. Further, the socio-economic benefits should be investigated. These activities will form part of the project's component 2, i.e. Built and Ecological Infrastructure.

This is a full-time MSc position based at the Pietermaritzburg campus of the University of KwaZulu-Natal.

Eligibility

The successful candidate should be driven, disciplined and be able to work as a member of a research team as well as to set and meet deadlines. The candidate is expected to have an Honours degree (or equivalent 4-year degree) in hydrology, environmental science or a related discipline. Experience in agricultural/hydrological modelling would be an advantage. The candidate must be prepared and willing to undertake field work and thus, a driver's licence is a prerequisite. Proficiency in English, both verbal and written, is required. Verbal proficiency in Zulu would also be an advantage.

Scholarship package

The prospective student is encouraged to apply with competitive funding offered, but dependant on, inter alia, the available budget and other project resources. All project-related expenses, including field monitoring equipment as well as travel to/from the University will be covered by the project. The candidate will be expected to find private accommodation and cover all living expenses including travel to/from the University out of this stipend.

How to Apply

Email your CV (with at least three traceable references), academic record and a sample of your writing in the form of a recent publication or chapter from your thesis to Prof Jewitt: jewittg@ukzn.ac.za or Dr. T Mabhaudhi: mabhaudhi@ukzn.ac.za .