

## **Masters Research Bursaries**

### ***Sustainable Economic Development in Water Constrained Catchments***

Three Masters Research Bursaries have been established at the University of Cape Town, through the African Climate and Development Initiative, with funding from the Water Research Commission. The students will be part of a larger research project that involves close collaboration with GreenCape, a Sector Development Agency established by the Western Cape Provincial Government and The City of Cape Town.

#### **Research Areas**

One bursary will be offered for each of the following research areas:

1. Integrated development planning and governance that recognises the interdependency of economics and water resources
2. Cost benefit analysis of proposed economic developments, water allocations and resource interventions
3. Building a spatial hydro-economic water foot-printing model to aid decision making through the visualisation of quantified “trade-offs” and “knock-ons” in the lower Berg catchment

Further particulars on each research area can be found in Annex A at the end of this advert.

#### **Value and tenure:**

Each Masters bursary is valued at **R100,000 per year**, and is tenable for two years, with continuation in the second year contingent on satisfactory progress (including submission of progress reports to the project steering committee) through the previous year. The Masters research will be supervised by the faculty associated with the African Climate and Development Initiative, and will be registered in the home department of the primary supervisor.

#### **Conditions of award:**

Applicants should satisfy the following criteria:

- (i) At minimum a good (high upper-second) Honours degree in a relevant subject, for the particular project (see attached project descriptions);
- (ii) Acceptance for Masters by research in an appropriate department and faculty (after selection for bursary);
- (iii) Ability to work in a multi-disciplinary team;
- (iv) If not already a registered Masters student, each successful candidate will be required to register at the University of Cape Town as a Masters Student Research Fellow and will be expected to commence the required research at a mutually agreed date that is **no later than 1 July 2015**.

#### **Application Procedure:**

Interested candidates should apply via email to [rabia.karriem@uct.ac.za](mailto:rabia.karriem@uct.ac.za), where the following will need to be provided:

- (i) A letter of application, which includes an indication of the topic the candidate is applying for and a statement of research interests and experience, and how these fit to the relevant research topic;
- (ii) A CV which includes full details of any publications, and a short (max 300 words) summary of the applicant's Honours research project;
- (iii) Copies of academic transcripts and certificates for previous degrees<sup>1</sup>, and
- (iv) The names of two referees, at least one of which is an academic who has supervised a previous research project undertaken by the applicant.

**Closing date for applications is 12:00 SAST, 20 April 2015**

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<sup>1</sup> Note that successful candidates will be required to provide certified copies of certificates and transcripts.

# **Research Bursaries**

## ***Sustainable Economic Development in Water Constrained Catchments***

### ***Further Details***

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#### **Project Background**

Water is increasingly becoming a potential constraint on socio-economic development over much of South Africa. Many river catchments, including the Berg River in the Western Cape Province are already fully exploited, and further socio-economic development will either require accessing non-traditional water sources such as desalination or water re-use, and/or trade-offs between demands on existing sources. However, water resources and economic development plans are generally each treated independently in the planning of the other, often entrenched by the independent planning protocols such as Integrated Development Plans, Water Services Development Plans, and Master Plans. The aim of this project is therefore to develop and test a set of tools and methods that better allow for integration of water planning into development planning, and vice versa. The project will use Saldanha Bay, which draws water from the Berg River, as a case study. Saldanha is a hot-spot for development planning because of its status as an Industrial Development Zone (IDZ), and the potential for increased demand for water as a function of economic development within and around the IDZ.

All students will be part of an integrated research team at UCT and GreenCape, and will be required to attend all project meetings, and to participate in stakeholder workshops and related forums as deemed appropriate.

The broader project focuses around three complimentary work streams, in which a Masters student will undertake research. These will identify and suggest solutions to the governance, planning, economic and resource issues that affect water as a constraint on development:

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#### **Masters Topic 1: Governance and Planning Arrangements for Integrated Economic Planning**

Preliminary research has identified a need for a conceptual framework for development planning that recognizes the interdependency of economic planning and water resources planning. Therefore, the proposed study will develop a holistic understanding of the existing governance system that shapes water resource management and economic development in the Saldanha Bay region so that key actors, their relations, as well as synergies and trade-offs arising from their decision making processes can be identified .

This Masters project will map the alignments (and misalignments) of existing planning processes that govern the Saldanha Bay region. The mapping could take the form of rating the degree to which an integrated systems view of economics and water resources is (or is not) “mainstreamed” into the existing planning processes. The mapping may be based on:

- I. Interviews with those in local, provincial or regional, and national planning departments for water and economic development for Saldanha Bay
- II. Reviews of legislation
- III. Feedback from workshops

Interviews may compare how economic and water resources decisions are made “on the ground”, to the process that is supposed to be followed. The focus will be on stakeholders relevant to the Saldanha Bay planning system, however other relevant stakeholders that are affected or are affecting the Saldanha Bay planning system may also be interviewed to attain a broader picture.

Based on the mapping of alignments and misalignments, a framework for optimizing planning processes will be proposed. The framework will be co-created with interviewed stakeholder and tested at a workshop. The framework will be progressed into a guideline by adding an explanation of the tools available at each stage of development planning. Specifically, this guideline will demonstrate when, where and how tools (such as those developed in the other Masters projects) should be implemented.

We are looking for a student with a strong interest in integrated natural resources management and who has an understanding and/or skills in at least two of the following areas:

- I. Qualitative research methods such as interviews, stakeholder mapping, workshop facilitation
  - II. Multilevel governance and/or integrative and adaptive water management
  - III. South African policy and decision making processes relating to water and economic planning
  - IV. Ability and interest to work in an multi-disciplinary team
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## **Masters Topic 2: Socio-economic cost-benefit analysis of different water allocation options**

Cost-Benefit-Analysis (CBA) provides an analytical method to support water allocation decisions and arrive at an economically “optimal” allocation. Standard applications of CBA have compared the GDP or business benefits arising from particular water allocations and the infrastructure costs of delivering that water. These applications have tended to exclude parameters that are not easily quantified in monetary terms but nonetheless important to economic well-being, such as environmental health and social equity. The inappropriateness of these narrow applications of CBA, and the resultant misallocation of water, has lead some people to explore alternative applications of cost and benefits (see for example Cartwright, et al., 2013). Alternatives seek to include a more diverse and complete set of criteria in what is considered as cost and benefit and inform a more suitable ranking of options.

The Masters project will review the water allocation options in Saldanha and develop locally appropriate set of criteria to be considered under cost and benefit. These criteria will be used to derive a socio-economic ranking of allocation options that is useful to local decision makers.

The suitable applicant should have:

- I. Some economic analysis and modelling training and experience,
  - II. An awareness of the institutional and socio-economic context in water is allocated in South Africa and the development implications of water allocation.
  - III. The ability to engage a wide set of stakeholders from agriculture, industry, business, civil society and government.
  - IV. Ability and interest to work in an multi-disciplinary team
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## **Masters Topic 3: Development of a spatial hydro-economic water foot-printing model**

In addition to understanding the costs and benefits associated with water resource interventions and economic developments in Saldanha Bay local municipality, there is a need to understand how such developments affect water resources and economics across the whole of the Berg River catchment.

This student project will develop a GIS-based spatial model that will calculate the water footprint of different forms land use and economic activity (agriculture, forestry, industry, conservation, urban settlements, etc.) across the Berg River catchment. The model will then be used to estimate current water footprints by land-use and economic activity across the catchment, and the changes in water footprint resulting from new developments and other socio-economic changes (e.g. population growth, urbanisation).

In the larger project, the water foot-printing model will be combined with outputs from the cost-benefit research to enable an assessment of social and economic costs and benefits of different current and future land uses and economic developments. The model will be designed and developed using open source standards and a combination of open source software and commercial software (PostGres GIS; ESRI; Java; ERDAS).

Previous research has established a catchment wide online accessible GIS database of some of the water resources and economics datasets in the Berg (Midgley et al., 2014). The project will build upon this underlying data collection to develop water footprints, with uncertainty estimates, for all current and future socio-economic activities in the catchment.

The suitable applicant should have the following qualifications, skills and interests:

- I. An Honours degree in GIS, Remote Sensing and/or computer science.
  - II. An interest in working on applied natural resource management and economics issues, although no pre-existing training in these areas is required.
  - III. Ability and interest to work in an multi-disciplinary team
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