



## SOUTH AFRICAN SUGARCANE RESEARCH INSTITUTE

# Post-Graduate Student (MSc and PhD) and Post-Doctoral Research Programme



**The Institute**

As primary provider of agro-technical expertise to the South African sugar industry, the South African Sugarcane Research Institute (SASRI) delivers diverse research and development (R&D) outcomes to the industry, including: (a) pertinent and robust agricultural solutions, products and services; (b) novel and improved in-house technologies to enhance the scope and quality of service provision; and (c) innovations to support industry strategic initiatives, particularly those pertaining to sustainability. To support and promote innovation in these key R&D areas, SASRI hosts a dynamic post-graduate student and post-doctoral researcher programme in conjunction with several leading South African universities, including the University of KwaZulu-Natal, University of Pretoria, University of the Free State and Stellenbosch University.

Further information on the South African sugar industry, the South African Sugar Association and the SASRI R&D programme is available at '[www.sasa.org.za](http://www.sasa.org.za)'.

## 2014 Research Opportunities

### Expressions of Interest and Closing Date

Interested prospective MSc and PhD students and PhD graduates are invited to submit expressions of interest and full curriculum vitae for the several research opportunities that will be available from 2014 at the SASRI Mount Edgecombe campus in KwaZulu-Natal. Applications are to be made via our online job portal accessible from our website at [www.sasa.org.za](http://www.sasa.org.za) (navigate to Careers @ SASA - Vacancies). Closing date is 30 August 2013. Please quote the Reference given in the table of opportunities for each study opportunity.

### Additional Important Closing Dates

Potential applicants are also reminded of the following relevant closing dates: (1) NRF Free-Standing and Innovation Masters and Doctoral Scholarships on 30 September 2013; and (2) NRF Free-Standing-Innovation Post-Doctoral Fellowships on 16 September 2013.



South African Sugarcane Research Institute  
is a division of the South African Sugar Association

## Details of Opportunities Available from 2014

Opportunity	Discipline	Reference	Project Title	Brief Description
MSc	Agronomy	14MS01	Identifying genotype by Nitrogen Use Efficiency (NUE) interactions in sugarcane for commercial application.	This project seeks to validate a technology for the assessment of sugarcane genotype NUE that could potentially be more rapid than a conventional field trial approach.
MSc	Agronomy and Breeding	14MS02	Trait modelling to assist breeding for hot and dry climates.	This project seeks to understand the genetics of sugarcane drought and heat tolerance and to demonstrate the value of trait modelling in enhancing sugarcane breeding for dry, hot climates.
MSc	Biotechnology	14MS03	Agronomic evaluation of several imazapyr herbicide tolerant lines and characterisation of the resistance mechanism.	This project seeks to evaluate the yield benefits of imazapyr-resistant sugarcane lines under weed pressure and investigate the nature of the resistance mechanism (e.g. mutated acetolactate gene or herbicide detoxification).
MSc	Biotechnology	14MS04	Sugarcane Nitrogen Use (NUE) efficiency: Glasshouse screening of transgenic lines.	This project seeks to characterise the genotype and phenotype, under glasshouse conditions, of sugarcane that has been genetically modified for enhanced NUE.
MSc	Biotechnology	14MS05	Optimisation of molecular techniques for identifying intergeneric sugarcane hybrids.	This project seeks to adapt and apply technologies for identifying intergeneric hybrids produced during introgression breeding, for example DNA fingerprinting, flow cytometry and <i>in situ</i> genomic hybridisation.
MSc	Botany	14MS06	Optimisation of photoperiod treatments and time of pollination to enhance the production of intergeneric hybrids.	This project seeks to develop technologies that will enhance the synchronicity of flowering to facilitate the production of intergeneric hybrids for introgression breeding.
MSc	Breeding	14MS07	Characterisation and evaluation of South African sugarcane germplasm using phenotypic and molecular approaches.	This project seeks to assess the genetic diversity amongst germplasm used in the breeding of South African sugarcane varieties; information which will be used in the selection of divergent parents to maximise heterosis.
MSc	Breeding	14MS08	Family selection for sugarcane yield across the first stage of selection programmes and determination of potential selection gains.	This project seeks to: (1) determine the magnitude of variability in yield of replicated families planted in the first stages across regional programmes; (2) to determine and evaluate potential selection gains from family selection; and (3) examine the potential of evaluating parents' potential using family evaluation data.

Opportunity	Discipline	Reference	Project Title	Brief Description
MSc	Entomology	14MS09	Rapid means of screening for pest and disease resistance and for novel resistance traits.	This project seeks to: (1) develop new technologies to enable the rapid and early screening of sugarcane genotypes for resistance to stem borer; and (2) investigate the biochemical and physiological basis of resistance.
PhD	Breeding	14PH01	Breeding sugarcane for stalk borer resistance.	This project seeks to: (1) determine the selection gains for borer resistance over time and evaluate their implications of developing borer resistant varieties; (2) evaluate the use of recurrent selection for developing parents for borer resistance breeding; (3) determine and evaluate the contribution of additive and dominance genetic effects in breeding for borer resistance; and (4) evaluate the effect of intensive selection for sugarcane smut disease resistance on achieving genetic gains when selecting for borer resistance.
Post-Doctoral Research	Agronomy and Breeding	14PD01	The Post-Doctoral Researcher will work on two projects:  Genetic trait modelling; and  Modelling climate change impacts.	<p><b>Genetic trait modelling</b></p> <p>This project seeks to: (1) characterise commercial sugarcane varieties in terms of genetic trait parameters that are used in the Canegro model; and (2) use the model with these parameter values to perform a preliminary assessment and ranking of variety suitability for the environments and management practices that make up the SA sugar industry.</p> <p><b>Modelling climate change impacts</b></p> <p>This project seeks to: (1) use the Canegro model to explore probable climate change impacts on sugarcane sucrose content and water use; and (2) use the model to explore ways in which sugarcane production management may be adapted to the projected changed climate.</p>
Post-Doctoral Research	Entomology and Pathology	14PD02	Rapid means of screening for pest and disease resistance and for novel resistance traits.	This project seeks to develop a high throughput phenomics environment, based primarily on Near Infra-Red Spectroscopy, to enable selection for pest and disease resistance based on constitutive and inducible physiological mechanisms.