

University of Pretoria

Institute for Food, Nutrition and Well-being

Report 2013



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

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Contents

The power of people, partners and projects	4		
About the Institute for Food, Nutrition and Well-being	6		
Theme A			
Feeding the world in a resource-constrained environment	11		
Project 1: An investigation of the role of polyunsaturated fatty acids in preventing metabolic and genital diseases in transition cows in South Africa.	15		
Project 2: Determining the water footprint of commercially important irrigated crops in South Africa using in-field measurement, crop modelling and remote sensing	17		
Project 3: Mnisi Community Programme – a platform for collaboration	21		
Theme B			
Ensuring safer food through effective control and regulation	25		
Project 1: An analysis of food safety on fresh produce wholesale markets in South Africa: Towards insights for dual standards development	29		
Project 2: Host-pathogen infection models in plant, animal and human systems.	31		
Project 3: Green Chemistry	35		
Project 4: Laboratories at tertiary institutions: “Improving the quality of results”	37		
Project 5: The evaluation of the risks associated with the use of rainwater, harvested from rooftops for domestic use and homestead food gardens; and groundwater for domestic use and livestock watering.	41		
Theme C			
Promoting health, nutrition and well-being	45		
Project 1: Combating lifestyle diseases associated with over-nutrition through the use of indigenous South African foods	49		
Project 2: Combating malnutrition through meals prepared from bio-fortified indigenous and African grains and leafy vegetables	53		
Project 3: Protein- and starch-based nano- and micro-biomaterials from local African plant sources for improved nutrition, health and well-being	55		
Project 4: Nutritional exposure and environmental sustainability of animal product intake in South Africa and fatty acid profile of South African animal products	59		
Project 5: Effects of food components and bioactives on murine and human bone cells	65		
Project 6: Sorghum production and end-use product development for increased food security	69		
Project 7: Prolamin protein coatings for micronutrients	71		
Project 8: The effect of an enriched maize-based beverage on linear growth, bone length and bone status of Grade 5-7 learners in Bronkhorstspruit area, South Africa	73		
		Theme D	
		Changing consumption behaviour for improved health	77
		Project 1: Schools as sites for social change: facilitating adjusted behaviour in resource-constrained communities by empowering children	81
		Theme E	
		Strategic planning and policy reform to manage food security risks	85
		Project 1: Feed the Future Innovation Lab for Food Security Policy	87
		Project 2: Food insecurity information systems	91
		Project 3: Bureau for Food and Agricultural Policy	93
		Project 4: Current rain-fed and irrigated production of food crops and its potential to meet all year round nutritional requirements of rural poor people in North West, Limpopo, KwaZulu-Natal and Eastern Cape provinces	97
		Project 5: Support to the Department of Agriculture, Forestry and Fisheries on the Comprehensive African Agricultural Development Programme (CAADP)	99
		Project 6: Gauteng Food Security Situational Analysis	103
		Project 7: COPC Living Laboratory	105
		IFNuW’s Advisory Board members	109
		IFNuW’s Inter-Faculty Board of Management	113
		Expert profiles	117
		IFNuW output as at end 2013 (period 2011–2013)	155
		Published articles	155
		Patents	160

The power of people, partners and projects

Tackling the complexities of one of South Africa's most intractable problems – food insecurity entrenched through structural poverty and inequality – while ensuring sustainable national food security, is no small or simple task. Food security is complex. And its causes are multiple and inter-related. However, ending hunger remains an ambitious national and global goal.

The University of Pretoria aims to create knowledge that will make a difference in the world in which we live. For this reason the University identified food insecurity as one of an initial four Institutional Research Themes (IRT). This theme was defined as Food, Nutrition and Well-being (FNUW) and reflects the transdisciplinary focus of the research. It concentrates and consolidates the extensive network of researchers working on food security-related studies across the institution.

The bold initiative – conceptualised by the University's Principal, Prof Cheryl de la Rey – was made possible by a significant investment of R10.5 million over three years by the University. This investment permitted experimentation with innovative research and institutional structures, providing the environment for collaboration and partnerships. The IRT has exceeded expectations. The foundations of the IRT for FNUW's achievements lie in the people, partners and projects that have created a critical mass of expertise focused on solving essential problems in the agriculture and food system in South Africa. The collective pool of expertise represents one of the largest teams of researchers in one institution. Through our people, partners and projects we are, collectively, addressing issues that concern vulnerable communities in South Africa and on the continent. At the mid-term review of the IRT, this report reflects on and presents the people, partners and projects that have made the IRT a success.

The University's institutional culture of "people matter" sets an enabling environment for the transdisciplinary research system the IRT set out to develop. In addition to the provision of resources for the initiative, the University's leadership and management have provided a supportive environment, encouraging and endorsing a transparent and accountable system that strives to increase research efficiency and outputs. Deputy Vice-Chancellor, Prof Stephanie



Burton and the deans of the key associated faculties provide direction, identify opportunities for collaboration, raise funds, coordinate institutional support systems and encourage staff engagement.

Credit for mobilising the IRT must go to the energetic theme leaders who have initiated seven faculty research platforms around strategic issues; creating a contagious excitement for teamwork around highly complex issues. These teams represent staff from seven faculties and 30 Departments focusing their attention on solving problems relevant to the most challenging issues in our country today. They represent some of the country's top-rated researchers in their areas and are creating new knowledge through transdisciplinary enquiry.

Transdisciplinarity moves beyond conventional and accepted ways of thinking established by our disciplinary roots to explore solutions for complex social problems through teamwork and in partnership with society. Therefore, partnerships are essential to our work. Initially we focused on building internal partnerships, bringing together researchers whose work was complementary to establish strong research groups and platforms. These internal partnerships were extended to include

communities, researchers beyond the institution, the public sector, private sector and the international development aid community. These partnerships enrich and strengthen our research, provide opportunities for greater insight into the problems we research and facilitate direct engagement with society at many levels.

Our project model has provided the platform for collaboration. Our transdisciplinary projects are results-driven – designed to solve a specific and relevant problem in a defined time frame and getting the results of this research into print in various media as soon as possible. Seed funding for these projects has created a significant 'pull' factor in facilitating working together.

The enthusiasm of working together has motivated teams to seek external resources to develop long-term and sustainable projects and also attracted significant investment by a range of external partners. The partnerships vary in structure from traditional funding to active partnerships and engagement. These partnerships are profiled in the pages of this report. Through harnessing the power of unconventional partnerships – both internally and externally – we are able to tackle bigger and more complex research problems that are emerging in the world today.

As we move beyond the mid-term review of the IRT's initial funding phase, we will be exploring more opportunities for sustainable long-term research programmes that build on the initial achievements of the IRT and take our people, partners and projects to a higher level in terms of research efficiency and dedicated partnerships. We are establishing a sustainable resource base to support long-term research programmes that will continue to provide solid research solutions to crucial problems, drive innovation in the research system, increase our scientific outputs, provide essential information for decision-making, support the growth of communities and offer exciting opportunities for postgraduate and Postdoctoral projects.

Some of the areas we will be looking to strengthen over the next few years include a stronger focus on agriculture – nutrition linkages, pathways to improved nutrition and more resilient and adaptable agriculture, food and livelihoods systems.

Prof Sheryl Hendriks

Director: Institute for Food, Nutrition and Well-being

Prof Sheryl Hendriks is the founding Director of the Institute for Food Nutrition and Well-

Founding Director: Prof Sheryl Hendriks

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being (IFNuW) at the University of Pretoria. She holds a PhD in Agricultural Economics from the University of Natal and is an Associate Professor in the Department of Agricultural Economics, Rural Development and Agricultural Extension.

Prof Hendriks served as the first female President of the Agricultural Economics Association of South Africa (AEASA) when she was elected to this position during the Association's 50th anniversary conference in 2012.

She is one of only three experts from Africa appointed to the first Committee for World Food Security (CFS) High Level Panel of Experts on Food Security and Nutrition (HLPE). She has recently been re-appointed to a two-year term of office. The CFS is the foremost international and intergovernmental platform dealing with food security and nutrition policy and governance.

She is a global leader in the area of food security and voluntarily led the African Union and NEPAD's Comprehensive African Agricultural Development Programme's (CAADP) Food Security initiatives between 2006 and 2010.

She led the drafting of the CAADP Framework for African Food Security, a continental action plan that is transforming African agriculture and ensuring that investment plans and programmes are effectively addressing hunger and poverty affecting the most vulnerable populations in Africa. The Framework is significantly influenced by Prof Hendriks' research focused on understanding household coping strategies and vulnerability.

Prof Hendriks was appointed to the UP Faculty of Natural and Agricultural Sciences in July 2010 to consolidate food security research at UP and establish a postgraduate programme. The University is already reaping the benefits of her strategic linkages with international and African development and food security experts; development partners; international NGOs; academic institutions and the relationships built with African governments through her engagement in the African Union/NEPAD Programmes.

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About the Institute for Food, Nutrition and Well-being

Food insecurity is one of South Africa's most intractable problems – one of the top priorities of Government in South Africa, the Millennium Development Goals and the focus of many international declarations and discussions.

Seldom before has the world faced such complicated and inter-related problems, made more severe by the inter-connectedness introduced by globalisation. The appropriateness and need for research at the interface of production, food safety, health, nutrition and economics is evident in recent global and African crises that show the limited ability we have to solve complex and often recurring problems in the agriculture and food system.

The 2008 global food and recent financial crisis; high food, fuel and fodder prices;

climate change; the energy challenges and the inability of governments and the world to respond effectively and efficiently to the largest humanitarian crisis in Africa since the Rinderpest-induced famines of the 1800s. The 2011/2012 crisis in the Horn of Africa led to the loss of millions of lives, adding to the toll of deeply entrenched and widespread hunger and malnutrition in Africa.

Tackling these problems requires innovative approaches to research beyond traditional knowledge silos. It demands that we find creative ways of communicating the findings of scientific research to policy-makers and communities where the knowledge can inform decisions and change behaviour. Transdisciplinary enquiry encourages active research through teams of experts from different disciplines working beyond

traditional knowledge boundaries to create new knowledge and solve complex problems, together with communities and stakeholders, to generate new knowledge that goes beyond discipline knowledge.

The University of Pretoria (UP) recognises that traditional academic approaches are inadequate to deal with the complexity of current problems. As part of the UP 2025 Strategy, the University established Institutional Research Themes (IRT) in identified strategic areas that address complex societal issues and are capable of significant growth and improving the University's research output and international positioning.

Following initial approval from UP executive in 2010, an inter-Faculty Task Team was established to develop a business plan for the IRT. This team was led by the deans from the four founding faculties – Education, Health Sciences, Natural and Agricultural Sciences and Veterinary Science. The 17-person team met regularly over 18 months with the support of Prof Luc D'Haese from Ghent University in Belgium. The discussions identified five key research areas as the focus of the IRT, namely:

- Feeding the world in a resource-constrained environment;
- Ensuring safer food through effective control

UP Institutional and Faculty Research Themes

The University of Pretoria recently initiated a process designed to identify the unique research strengths of this institution and to support the development of strong multidisciplinary research groups clustered around the identified strengths.

This process of clustering has two tiers:

- Institutional research themes (IRT), which are major initiatives involving a set of participating faculties
- Faculty research themes (FRTs), which involve participation on a more limited scale by a lesser number of faculties.

Both the IRTs and the FRTs are designed to recognise and foster excellence in research and be led by acknowledged international leaders in their specific disciplines.

It is anticipated that these themes, as they develop, will add to the University's research reputation and, at the same time engender a climate that promotes scholarship among academic staff and postdoctoral fellows, and also produce more doctorates.

The IRT was proposed as a "vehicle" to create a long-term research initiative to bring together postgraduate teaching and research expertise and activities to ultimately become a Centre of Excellence. The institute for Food, Nutrition and Well-being was created to host this initiative.

The **vision** of the Institute is to be a leading international centre of excellence in transdisciplinary research and postgraduate training to address current constraints to attaining the Millennium Development Goals related to food, nutrition and well-being in sub-Saharan Africa in comprehensive and innovative ways by the year 2020.

The **mission** of the Institute is to

- strategically position the UP as an internationally recognised centre of excellence with a critical mass of researchers focusing on trans-disciplinary research and postgraduate training that responds to the needs of stakeholders,
- promote the long-term health and wellness of people,
- support sound policy-making with regard to food, nutrition and well-being and,
- together with strategic national, regional and international partners, significantly scale up capacity in this area through the development of leading professionals and researchers.



Table indicating participation in the IRT

Participants	Number as at end 2013
Number of participating faculties	7
Number of participating departments	35
Number of participating staff	102
Number of participating master's students	38
Number of participating PhD students	20
Number of Postdoctoral Fellows	7

Table indicating output for 2012 and 2013

Indicator	Output
Published ISI rated journal papers	97
Books	2
Chapters in books	11
Workshops/Indabas/Seminars	19
IRT-wide seminars	4
Policy briefs	2
Patents	1

- and regulation;
- Promoting health, nutrition and well-being;
- Changing consumption behaviour for improved health;
- Strategic planning and policy reform to manage food security risks.

These focus areas for research provided the organisation structure for the development of Research Themes. The business plan was submitted on 16 August 2011 and approved by the University Executive in September 2011. An application for the establishment of the virtual Institute for Food, Nutrition and Well-being was submitted and approved in October 2011.

The University's commitment to this initiative is demonstrated by the investment of R10.5 million from UP's strategic reserves, the prioritisation of University bursaries and fellowships to support these institution-wide initiatives and the keen interest and support from University Management in the progress and development of the IRT and Institute. The direct leadership of the Deans from five faculties (now including the Faculty of Law), their active encouragement of staff involvement and their active role in management of the IRT is unique.

Prof Sheryl Hendriks was appointed as the first Director of the Institute in October 2011 and the Research Theme Leaders were appointed in January 2012. Each Research Theme Leader is an internationally recognised researcher and active team leader. During the initial phase of the IRT, the Management Team focused on identifying researchers and projects within the Institution that related to, or could support, the IRT. Initially over 70 staff members were identified as working on over 50 food-security related projects.

The Institute was formally launched in May 2012 by Prof Cheryl de la Rey, the Principal and Vice-Chancellor of the University of Pretoria. Ms Sheila Sisulu, the Deputy Executive Director of the World Food Programme spoke at the event and encouraged the initiative, saying that what the Institute sought to achieve was exactly what the country and Africa needed.

This report provides a broad overview of the activities of the Institute but also sets the scene for its future contribution towards building a safe, healthy and productive society.





Seated left to right: Prof Pete Irons, Prof Koos Coetzer, Dr Langalihle Simela
 Standing left to right: Dr Peter Smith, Prof Ken Pettey, Dr Rebone Moerane, Prof Geoffrey Fosgate, Dr Rhoda Leask, Prof Peter Thompson, Prof Anita Michel, Prof Darryn Knobel, Giulia Esposito, Prof Hettie Schonfeldt and Dr Folorunso Fasina

Feeding the world in a resource-constrained environment

Our research seeks novel ways to maintain and expand sustainable food production in an environment characterised by scarce resources and changing climatic conditions. It takes into account the increasing awareness of the interactions between people, animals and plants in a shared environment as is common in traditional African agricultural systems.



The production of food is the cornerstone of global food security. Increased food production must meet the needs and demands of a rapidly growing population in a world where natural resources are under strain and where the majority of land on a continent is of marginal agricultural value.

In a study released by the United Nations Population Programme in June 2013 it is projected that the current world population of 7.2 billion will increase by almost one billion people in the next 12 years and reach 9.6 billion in 2050.

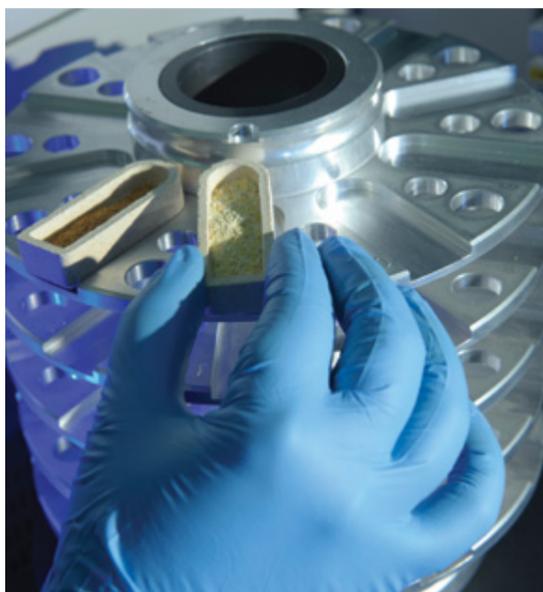
Most of the population growth will happen in developing regions, especially in Africa where projections are that the number of people on the continent may double – from the current 1.1 billion to 2.4 billion by mid-century.

With an estimated 225 million undernourished people in sub-Saharan Africa there is a clear need to increase food production on the continent.

However, the African environment is currently constrained by poor water supplies, marginal agricultural land, a wide range of animal (including zoonotic) and plant diseases, low animal and plant productivity, high post-harvest losses and poorly-developed infrastructure to support agriculture.

Concerns over unstable weather patterns, increased episodes of weather extremities and the potential impact of climate change increase the risks associated with agriculture in Africa.

Food of both animal and plant origins have a role to play in human nutrition. High quality protein from livestock is essential for the promotion of good health but is constrained by limited animal feed resources, water quality, soil and ecological variability, diseases and inadequate management systems.



The research conducted under Theme A seeks novel ways to maintain and expand food production in an environment characterised by scarce resources and changing climatic conditions. It takes into account the increasing awareness of the interactions between people, animals and plants in a shared environment as is common in traditional African agricultural systems.

The research aims to broaden conventional thinking on food production by identifying and developing studies that look at plant and animal products with applications for integrated food, feed, fodder and fuel value chains.

It recognises the reality that large tracts of the continent's land are unsuitable for crop production and large populations of pastoral communities live in the African landscape. Such land can be productively used as natural or improved grazing or for fodder production, thus harnessing its productive potential. The multiple by-products of human food production chains can be used by animals, optimising the nutritional yield of the original crop.

Through improvements in efficiencies the environmental impact of food production is reduced, thereby contributing towards long-term sustainability.

Research done in terms of Theme A contributes to science and knowledge in a number of key areas, most notably:

- Minimising the impact of food production on the environment;
- Optimising food production in adverse environments;
- One Health – a global effort to mobilise integrated responses to diseases such as the recent outbreaks of avian flu, swine flu, foot and mouth disease and the persistent detrimental impacts of parasites on human development in communities where people and animals live in close proximity;
- The socio-economic impact of food production;
- Trade opportunities and barriers – how to move commodities from the producer to the consumer optimally, cost-effectively and in a way which manages risk and enhances value

The objective is to initiate research projects that will lead to novel, multi-disciplinary strategies involving livestock production systems, animal health management programmes and plant production systems that can result in efficient outcomes to benefit both commercial and small-scale farmers.



Theme A Facilitator: Dr Langelihle Simela

Dr Langelihle Simela is an industry leader, academic and researcher in the fields of nutrition, food science and livestock management. She has a PhD in Animal Science and master's in Veterinary Tropical Diseases.

She is part-time facilitator and the Chief Executive Officer of the National Emergent Red Meat Producers' Organisation (NERPO). A notable achievement under her leadership has been the establishment of the African Farmers' Association (AFASA), which represents smallholder farmers of South Africa and is a well-recognised voice in the agricultural sector.

Dr Simela has participated in several local and international consultancies, such as the Ministerial Task Team on Agriculture Marketing,

to review the current structure and functions of government institutions dealing with agricultural marketing; and as a Senior Livestock Sector Development Specialist for a World Bank contract to perform a livestock sector analysis and develop an investment framework in Zimbabwe.

She serves as Director of the International Meat Quality Assurance Services (IMQAS), on the Advisory Board of the UP Faculty of Veterinary Science and as Country Representative of the International Goat Association. Dr Simela has published widely in academic journals and publications and serves on the editorial board of *Small Ruminant Research* (Elsevier) and the *Bulletin for Animal Health and Production in Africa* (BAHPA).





Project 1: An investigation of the role of polyunsaturated fatty acids in preventing metabolic and genital diseases in transition cows in South Africa.

The focus of the first study was on the impact of dietary negative energy balance on various indicators of body energy metabolism, immune and reproductive function as well as genetic markers for the uterine microbiome and immunity in dairy cattle.

The project has been designed to achieve the following objectives:

- To investigate the incidence of metabolic diseases in South African transitional dairy cows during wet and dry seasons and in different farming systems (extensive-pasture based system and intensive – Total Mixed Rations based system);
- To identify molecular and systemic markers of metabolic and genital health in transition dairy cows under induced negative energy balance status;
- To evaluate the effect, if any, of conjugated linoleic acids (CLA) supplementation on metabolism, uterine immune responses and fertility of transition dairy cows.

Practical tool

The project will eventually result in the design of a practical tool for small and emerging farmers to enable them to prevent diseases in their livestock and increase productivity on their farms.

Local research on this scale in the dairy industry is uncommon and this project therefore fills a large gap in the knowledge base and points to important management tools which can be used by dairy farmers to improve their sustainability.

Project leaders: Prof Pete Irons

A graduate of the University of Pretoria, **Prof Pete Irons** has practiced as a veterinarian and worked in academia in both the United States of America and South Africa. He holds a PhD, is a registered specialist and a Diplomate of the American College of Theriogenologists. Prof Irons has a C-rating from the National Research Foundation.

Prof Pete Irons and Dr Giulia Esposito



In addition to teaching and research activities he is also an active clinician and specialist consultant in animal reproduction. As head of the clinical department responsible for the training of veterinarians to serve the agricultural sector he has a passion for food security and the central role that the veterinary profession can play at the interface between animal, human and environmental health.

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Dr Giulia Esposito obtained a veterinary degree (*cum laude*) in 2006, with an experimental thesis: “*Effect of prostaglandin F2α at the time of A.I. in Italian Mediterranean Buffaloes.*”

In the same year she was awarded a Fellowship for Specialization in Animal Nutrition, at the Faculty of Veterinary Medicine, “Federico II” University, in Naples, Italy. In 2007 she was admitted to the PhD programme in production and health of food animal products in the Department of Soil, Plant, Environment and Animal Production Sciences (DISSPAPA) at the same institution.

During her PhD studies she spent 18 months as a visiting student at Cornell University, Ithaca, New York and subsequently joined the university as a graduate assistant researcher.

Before her appointment to the Faculty of Veterinary Sciences of the University of Pretoria Dr Esposito worked as a research officer at the University of Queensland in Australia. Her current research focuses on uterine and metabolic health in farm animals; effect of dietary supplementations on reproduction, metabolism and product quality in farm animals; in vitro maturation and fertilization of oocytes, and embryo culture.

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Team member:

- Prof Edward. Webb – Department of Animal and Wildlife Sciences; (UP Faculty of Natural and Agricultural Sciences);

Project partners:

- BASF South Africa

Project 2: Determining the water footprint of commercially important irrigated crops in South Africa using in-field measurement, crop modelling and remote sensing

In many South African catchments the demand for water currently outstrips supply. Population growth and improved standards of living will exacerbate this constraint even further in the future. In addition, freshwater quality is adversely affected by increasing pollutant loads from the domestic, industrial and agricultural sectors.

[Project K5/2079/4]

Urgent management interventions are required to protect the country’s ground and surface water resources.

Irrigation is estimated to use around 60% of South Africa’s freshwater. However, there is growing pressure to divert some of this water to be used by other sectors such as domestic and industrial users. Farmers are faced with the challenge of producing more food for a growing population using less water.

Data on the week-to-week use of crop and irrigation water use efficiency are also essential in achieving optimal water use and savings at the field and farm scale. The project uses water footprint accounting as a tool to determine both direct and indirect water consumption and pollution of a process or a product.

Accurate information

The envisaged outcome of this project is to acquire accurately determined information on the impact of crop production on water resources and to find ways that this information can be used to improve the management of these resources from the field to catchment scale.

The project will also build capacity in the use of remote sensing to determine crop water use,

and in determining the water footprint of different agri-food products. Water footprint information has the potential to assist commercial companies to identify risks in their supply chain and reduce their water consumption.

Improved understanding of crop water use and the water footprint of agri-food products is essential to produce food in a sustainable way. This information can be used to guide farmers to become more water-efficient at the field scale and empower policy makers and water management authorities to make decisions on freshwater allocation that contribute to higher levels of food security in South Africa. This project has also improved multi-disciplinary collaboration between crop scientists and agricultural economists at UP.

Remote sensing data has been collected for irrigated wheat, maize, lucerne, groundnuts and potatoes grown in the Douglas region. Estimates of crop biomass accumulation and evapotranspiration (ET) determined using satellite imagery are currently being compared to estimates using in-field measurements. The ways in which farmers can use this information operationally, in real-time, are also explored.





Project leader:
Prof John G Annandale

Prof John Annandale is the Acting Head of the Department of Plant Production and Soil Science in the UP Faculty of Natural and Agricultural Sciences. A graduate of the University of Pretoria he obtained a PhD in Soil Physics at Washington State University in 1991.

He is the developer of the user-friendly Soil Water Balance (SWB) model which has been used for practical irrigation scheduling, but also as a tool to develop and guide his research programme in quantitative environmental biophysics. He is currently involved in research on modelling water use of fruit tree crops and pastures, determining nutritional water productivity and contributing towards food security of vulnerable communities, establishing green and blue water footprints of various crops through the use of satellite technology, and fine tuning the recommended municipal sludge guidelines for agriculture.

Professor Annandale has developed and taught courses in Agronomy, Irrigation Management, Agricultural Climatology and Environmental Biophysics. He has supervised or co-supervised over 20 master's and 10 PhD students, and his group has received numerous awards for their papers and presentations at congresses. He is

a Fellow of the South African Society of Crop Production and has published close to 60 peer reviewed papers in scientific journals.

Dr Michael van der Laan is a senior lecturer in the University of Pretoria's Department of Plant Production and Soil Science. He is responsible for lecturing undergraduate courses on sustainable crop production systems and agro-climatology. He is primarily involved in research on crop water use and water footprinting, acid mine drainage, solute leaching, cropping system carbon and nitrogen dynamics, and the use of life cycle assessment to determine the environmental footprint of agriculture. Dr Van der Laan also serves as an Associate Editor for the *South African Journal of Plant and Soil* and is the secretary for the International Commission on Irrigation and Drainage's Working Group for the Environment.



Team members:

- Dr Mark Gush – CSIR;
- Dr Seb Dzikiti – CSIR;
- Mr Gerhard van der Burgh –Bureau for Food and Agricultural Policy;

Students supported by the project:

- Miss Nosey Matlala
- Mr Mpendulo Dlamini
- Mr David Taverna-Turisan

Project partners:

- The South African Water Research Commission
- The Council for Scientific and Industrial Research (CSIR)



Project 3: Mnisi Community Programme – a platform for collaboration

The Mnisi Community Programme is a ground-breaking multi-disciplinary initiative between the University of Pretoria's academic faculties, provincial and local government and the Mnisi traditional authority in Mpumalanga.

The programme, launched in 2008, addresses the complex challenges associated with disease transmission between wildlife, domestic animals and human communities sharing the same environment.

It has grown into a multi-disciplinary research, training and community engagement which is attracting strong local and international interest and participation. More than 60 research projects have been started – including 25 new initiatives during the 2012/13 period.

The close relationship between the Mnisi Traditional Authority and the University of Pretoria ensures that research themes are relevant, the community is informed and involved at all times and important findings are channelled back to the people.

One Health

The University of Pretoria is leading research in South Africa on the global concept of One Health. As the only academic institution in the country that has faculties for medical, veterinary, natural and agricultural sciences it is uniquely placed to contribute to research and understanding of the One Health approach to science.

In a world that is continuously shrinking due to population expansion, new technologies and increased human and animal movement, the boundaries between countries, rural and urban areas are becoming more and more blurred. Today over 60% of recognised human infectious diseases are zoonoses in that they originate from the movement of pathogens mostly from wildlife and livestock to humans.

Rapid outbreaks of infectious diseases such as avian flu, Ebola fever and the West Nile virus have raised public concerns about the impact of such diseases on human health and spurred research on early detection, control and treatment.

The Mnisi community is located in the north-eastern corner of the Bushbuckridge Municipal Area in Mpumalanga, bordering on the Kruger National Park. The study area falls within the savannah ecosystem and forms part of the greater Kruger to Canyon Biosphere, a unique biodiversity hotspot.

The multi-disciplinary nature of the Mnisi Community Programme (MCP) brings together researchers and academics from the University's faculties of Veterinary Science, Natural and Agricultural Sciences and Health Sciences who regularly share their findings. In addition it has attracted research interest from academic institutions in the United States of America, the Netherlands and Belgium.

The MCP addresses the challenges relating to disease transmission between wildlife, domestic animals (both livestock and companion animals), and humans living in the same environment.

Adding to the complexity of the disease ecology, epidemiology and control of such infectious diseases are control policies, integrated land use systems and priorities, environmental limitations as well as socio-economic challenges.

Community sustainability

The MCP responds to aspects beyond disease itself and also focuses on the well-being and sustainability of a particular society. It

demonstrates how a healthier animal population, conservation systems and the ecosystem could contribute to the conservation of biodiversity as well as household and community sustainability and resilience.

The vision of the MCP is to be an international platform in One Health for integrated teaching, learning, research, and community engagement at the livestock/wildlife interface. Its mission is to improve the health and well-being of people, animals (wild and domestic) and the ecosystem through;

- Scientifically informed interventions and services to monitor and promote health and well-being;
- Promotion of resilient and productive ecosystems for sustainable biodiversity conservation, food production and livelihood strategies;
- Training and capacity building through multidisciplinary collaboration and mutually beneficial partnerships.

These objectives are achieved through:

- research in the fields of zoonotic and trans-boundary animal diseases, livestock and wildlife management and production, animal and ecosystem ecology, socio- and agricultural economics, food security, trade and marketing;
- multi-disciplinary collaboration;
- teaching and learning at both post- and undergraduate levels;
- community development through capacity building and the strengthening of long-term sustainable relationships; and
- contributions to conservation initiatives.

Local and international presence

Since its inception in 2008, the MCP has grown into a multidisciplinary research, training, and community engagement platform with a strong local and international presence. It has supported and facilitated over 60 research projects to date of which 40 are still on-going. The main research themes during the initial five years have been disease ecology and emergence (mainly zoonoses) as well as animal health management and control.

Other project themes covered by research include policy, trade, and market access, economics of societies, health and production, natural resource management and utilisation, as well as livestock production, animal (wildlife and

livestock) ecology and food security.

The significant growth in the research activities is evident in the approximately 25 new projects listed during 2012/2013. In total eight PhD projects, 35 master's, and five honours projects have been part of the MCP. An estimated 30 publications have emerged from postgraduate and collaborative research projects.

A primary highlight of the MCP has been its success in the establishment of networks and relationships, capacity building and the growth of longitudinal research platforms.

Three such platforms have been established in recent years, namely the continuous monitoring of rangeland change, a health and demographic surveillance system among all cattle as well as a health and demographic surveillance system of owned-dogs in villages.

Contribute to improved health

Existing and new projects within the MCP will significantly contribute to our insight into the role food and nutrition play in the well-being of communities in resource-constrained environments.

It will lead to a greater understanding of the complex relationships between food production, food security and well-being at household and community level. It will also contribute to improved health and productivity of livestock, strengthened disease control measures and address the impact of climate change on impoverished and resource-constrained communities.

The MCP holds great potential to test and implement interventions to improve food, nutrition and well-being in a programme while their impact and success can be monitored and scientifically proven.

Existing research projects will continue in partnership with the Mnisi community and the national and provincial governments. At least two multi-disciplinary initiatives are being planned, including the expansion of the UP Department of Family Medicine's very successful Community-Oriented Primary Care model.

A pilot research project in partnership with the National Institute for Communicable Diseases is being conducted in the MCP in which the role of zoonotic pathogens in patients presenting with febrile syndromes at community health clinics is being investigated. This is expected to result in the establishment of a long-term health surveillance site in the community in partnership with the MCP.

Project leaders:

The main project leaders within the MCP have been:

- Prof Darryn Knobel - Associate Professor: Department of Veterinary Tropical Diseases, (UP Faculty of Veterinary Sciences);
- Prof Anita Michel - Associate Professor: Department of Veterinary Tropical Diseases, (UP Faculty of Veterinary Sciences);
- Prof Maxime Madder - Head: Veterinary Entomology Unit, Department of Biomedical Sciences, Institute for Tropical Medicine, Antwerp, Belgium;
- Prof Vic van Rutten - Division of Immunology, Dept of Infectious Diseases and Immunology; Faculty of Veterinary Medicine, Utrecht University, The Netherlands;
- Prof Eddie Webb - Head of Department: Department of Animal and Wildlife Science, (UP Faculty of Natural and Agricultural Sciences);
- Prof Geoffrey Fosgate - Professor: Department of Production Animal Studies, (UP Faculty of Veterinary Sciences).

The main institutional partners are:

University of Pretoria:

- Faculty of Veterinary Science:
- Faculty of Natural and Agricultural Sciences:

- Faculty of Health Sciences
- Department of Family Medicine

External partners:

- Institute for Tropical Medicine, Belgium
- Faculty of Veterinary Medicine, Utrecht University
- School of Veterinary Medicine, University of California – Davis
- Oregon State University
- AHEAD – Greater Limpopo Transfrontier Conservation Area (GLTFCA)
- Kruger to Canyons Biosphere Reserve
- South African National Parks
- Buffelshoek Trust
- Mnisi Traditional Authority
- Mpumalanga Department of Agriculture, Rural Development and Land Administration (DARDLA) – Thulamahashe, Bushbuckridge
- Mpumalanga Veterinary Services, Orpen and Thulamahashe Offices
- Department of Agriculture, Forestry and Fisheries – Skukuza offices
- Department of Environmental Affairs – Expanded Public Works Programme

From left to right: Prof Nick Kriek (Veterinary Pathology), Ms Marie Watson (Centre for Veterinary Wildlife Studies), Prof Darrell Abernethy (HoD: Dept. Veterinary Tropical Diseases), Dr Mohamed Sirdar (PhD student), Prof Peter Thompson (Dept. Production Animal Studies), Dr Laura Salisbury (MSc student), Prof Pete Irons (HoD: Dept. Production Animal Studies), Prof Gerry Swan (Dean), Prof Darryn Knobel (Dept. Veterinary Tropical Diseases), Mr Jacques van Rooyen (MCP coordinator), Dr Nicola Collins (Dept. Veterinary Tropical Diseases), Dr Anne Conan (Postdoc Fellow), Mr Choopa Chimwele (MSc student)





Front: Dr Lyndy McGaw, Mr Lizeyben Chidamba, Mrs Annancietar Gomba, Zandile Mahlangu, Magalane Makgolane, Prof Lise Korsen, Millicent Motileng
Middle: Prof Kristen Kruger, Tshiwela Nembudane, Mari Roleen la Grange
Back: Mr Mbulaheni Thomas Mutengwe, Dr Francien Botha, Mr Pieter Louw and Prof Nico Labuschagne

Ensuring safer food through effective control and regulation

The research efforts of the Institute for Food Nutrition and Well-being are intended to strengthen the “farm to fork” supply chain. It will achieve this through supporting the growth of a strong regulatory framework and building capacity in critical areas of food safety, biosecurity and public health.



Food safety is an increasingly important public health concern and governments across the world are stepping up efforts to improve the safety of the world's food supplies. A growing and dynamic food industry is adopting a range of voluntary food safety standards to ensure food safety compliance within the supply chain. Global trade in agriculture products ensures a wide variety of food for the ever-increasing world population. In most developing countries trade in agriculture and food present ideal opportunities to earn much-needed foreign exchange and provide local growers with greater market access for their products.

The export of agriculture products contribute to the economic growth of local economies, create employment and, ultimately, support food security. In many African countries agriculture is a primary economic sector that contributes to the general health and well-being of society.

The supply and availability of safe and nutritious food are, therefore, essential for prosperity, economic development and stability. However,

the very nature of food trade contributes to the increased health risks associated with the food industry leading to concerns about the potential outbreak of foodborne diseases. The presence of chemical contaminants such as mycotoxins, heavy metals and excessive residues from pesticides in the food chain products have further been identified as additional potential risks for consumers across the world.

'Farm to Fork'

Government and food regulatory authorities are faced with the challenge to define and draw up clear sets of guidelines, rules and regulations and to ensure adherence throughout the supply chain. The World Health Organisation recognises food safety as an essential public health function and Section 27 of South Africa's Constitution states that every citizen has the right to access sufficient safe food and water.

South Africa has, through the years, developed a well-established food industry, supported by a strong regulatory framework, expertise and technical competence in the field of disease detection and diagnostics. However there are concerns that this strong foundation is being eroded by lack of capacity, loss of technical expertise and insufficient funding.

The research efforts of the Institute for Food Nutrition and Well-being through the theme on food safety, biosecurity, public health and regulatory control – are intended to strengthen this capacity and provide insights on the most recent research, technology and infrastructure.

The objectives of the programme are, to:

- ensure comprehensive monitoring and evaluation of risks within the field of sanitary and phytosanitary (SPS) requirements;
- develop a diagnostic framework and infrastructure for the rapid detection of food-borne pathogens;
- build competence and capacity to manage risks;
- provide training, mentoring and research in food safety, food law, accreditation and certification;
- strengthen post-harvest technology capacity to address the country's food security needs;
- promote food sovereignty and ensure the participation of food producers and agrarian communities into the global food system.

The research conducted by the IFNuW is intended to strengthen the entire "farm to fork" supply chain, contributing to a strong regulatory framework and, ultimately, ensuring healthier and safer communities.



Theme B Leader: Prof Lise Korsten

Prof Lise Korsten is a professor in the Department of Microbiology and Plant Pathology in the Faculty of Natural and Agricultural Sciences at the University of Pretoria. She serves on the boards of the National Laboratory Association and the Post-harvest Innovation programme of the Department of Science and Technology and the Fresh Produce Exporters Forum. She is also a member of the Specialist Technical Committee of the South African National Accreditation System (SANAS).

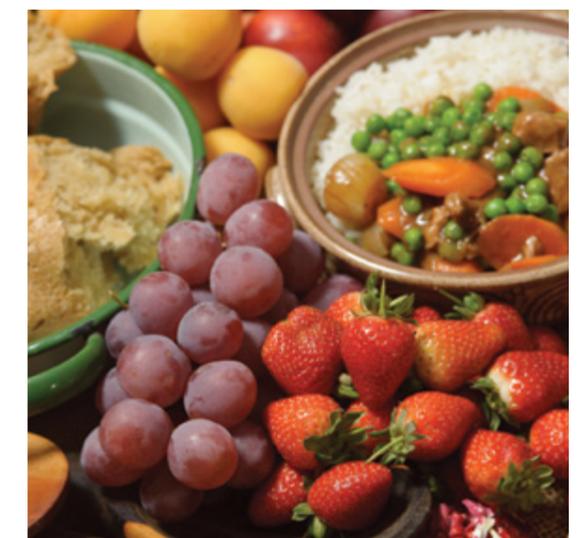
Prof Korsten developed South Africa's first biological control agent for fruit and has established a research group in sanitary and phytosanitary issues of importance in international trade. She has expanded her research portfolio to include aspects related to post-harvest pathology and food safety in the fresh produce supply chain.

Her research work has contributed to the development of a more effective food management system to reduce waste and ensure product safety. Through her leadership of the team she intends to bring together existing expertise in plant-, animal- and human health under a uniting focus on One Health. This will provide a unique opportunity for researchers from different fields of study to

integrate complementary research activities and strategically position UP as a leading institution in Africa in the fields of food safety, biosecurity, public health and regulatory control.

She is a three-time recipient of the University of Pretoria's Exceptional Achievers Award and twice received special recognition from SANAS for her significant contribution to improving and promoting SANAS accreditation. Prof Korsten holds a B-rating from the NRF.

Email: lise.korsten@up.ac.za



Project 1: An analysis of food safety on fresh produce wholesale markets in South Africa: Towards insights for dual standards development

The project assessed food safety concerns and regulatory control mechanisms on wholesale markets in South Africa and addresses the question whether dual standards can be developed which will ensure both adequate food safety and better market access for small scale farmers.

The research seeks to address a number of key questions:

- What are the particular food safety concerns on fresh produce wholesale markets?
- Are there particular challenges related to the enforcement of food safety at wholesale level?
- Does the ownership structure of wholesale markets affect the development, implementation and enforcement of food safety standards?
- How do food safety requirements impact on the organisation and governance of the supply chain?
- Are there already different risk management systems being applied at the different wholesale markets and inside them depending on the customers?
- How does consumer perception of food safety differ in retail versus wholesale markets and is there a link to actual purchasing behaviour?

To date, the research indicates that while the South African regulatory framework for food safety is sufficient, the main concern is with the enforcement of these regulations. Lack of inspections and fragmented mandates lead to significant food safety gaps on fresh produce

wholesale markets. The study also indicates how concerns about liability and competitive forces between markets are driving food safety initiatives.

The project will contribute to a deeper understanding of the South African food control system, an area which has received little attention from academic researchers to date.

Project leaders:



Prof Johann Kirsten is Professor and head of the Department of Agricultural Economics, Extension and Rural Development at the University of Pretoria. He completed his MSc Agric (cum laude) at UP and then spent two

years in London as South Africa's agricultural attaché.

He returned to South Africa in 1992 when he joined the University as lecturer, completed his

PhD and was appointed to his current position as Head of the Department in 1996.

Prof Kirsten served as a council member of the National Agricultural Marketing Council in South Africa and as the Vice-President of the International Association of Agricultural Economists.

He has published 112 articles in peer reviewed journals as author and co-author and also co-edited four books. A total of 51 master's students and 20 PhD students completed their studies under his supervision.

His main research interests relate to the commercialization of farming in poor communities, land reform, and agricultural policy. In recent years his focus areas also include aspects related to price transmission and the role of market power in supply chains and the economics of origin based foods.

Email: johan.kirsten@up.ac.za



Ms Cerkia Bramley is a qualified attorney and agricultural economist. She is an agricultural and food law specialist with a particular interest in the role of law in food system governance. Ms Bramley is currently a researcher at

the Institute for Food, Nutrition and Wellbeing (IFNUW) at the University of Pretoria.

She completed a master's degree in Agricultural Economics at the University of Pretoria. Her thesis explored the relevance of geographical indications in the South African Agricultural sector.

She has participated in various projects related to the economics and legal dimensions of food quality. Her research interests include intellectual property rights and food law, with particular emphasis on the role of the State in supporting participation in the global food system through appropriate regulatory frameworks.

Email: cerkia.bramley@up.ac.za

Team members:

- Dr Gerrie du Rand – Department of Consumer Science (UP Faculty of Natural and Agricultural Sciences);
- Prof Lise Korsten – Department of Microbiology and Plant Pathology (UP Faculty of Natural and Agricultural Sciences)
- Dr Estelle Bienabe (CIRAD, Agricultural Research for Development, France)

Students

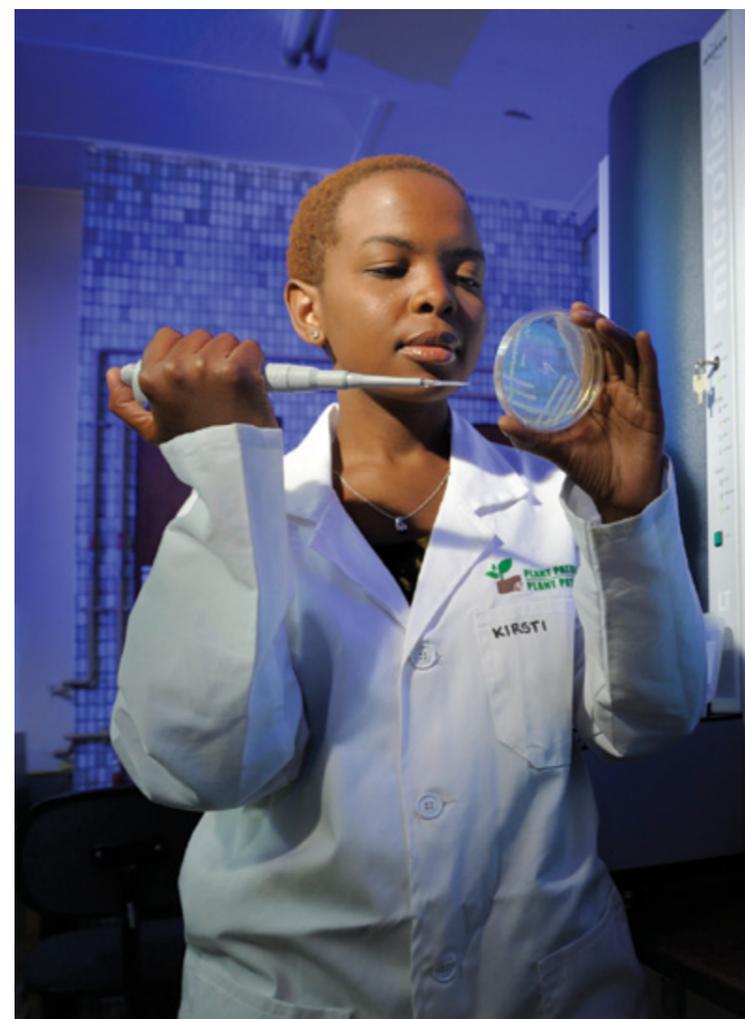
- Mr Thomas Mutengwa
- Ms Brigitte van Dyk
- Ms D Ferreira

Mr Mbulaheni Thomas Matengwe, Mrs Annancietar Gomba, Ms Brigitte van Dyk, Prof Lise Korsten, Dr. Johan Kirsten and Ms Cerkia Bramley



Project 2: Host-pathogen infection models in plant, animal and human systems.

The increase in foodborne disease outbreaks over the past 20 years has resulted in a compromised public health system and placed more pressure on the food supply system requiring compliance with good agricultural and food safety systems. This has resulted in new studies to determine why foodborne pathogens which ultimately affect human health and well-being are increasingly using plants as vehicles.



Water sources contaminated with enteric human pathogens have been identified as the primary cause of contamination in food production systems. This leads to increased risks in the 'water-plant' to 'food-human' continuum, and highlights critical questions that require interdisciplinary research teams to resolve.

Food safety compliance in the "farm to the fork" supply chain is the main focus of the research programme together with the development of a strong national food safety research and diagnostic framework. It addresses various facets of food safety including microbiological and agricultural chemical aspects in the supply chain.

Through this project, which brings together researchers from a number of complementary fields, the Institute will contribute to more effective food control measures.

Interactive research

The primary aim of the project is to establish an interactive research and disease diagnostic platform within the Institute for Food Nutrition and Well-being. This will ensure that scientists from various disciplines can integrate research activities within a common theme of water, plant, food, animal and human health, addressing food safety and biosecurity challenges in South Africa.



The research question is to determine the potential of *Escherichia coli* to internalise plants and pose a food safety risk for the consumer. An interactive research platform is being established to share knowledge, techniques and equipment of importance in food safety research. This will be supported by a data bank of facilities, equipment, test methods and culture collections.

By centralising bacterial cultures and sharing isolates the various research groups will be strengthened and it will allow for a greater integration of research activities.

Contribute to food safety

The outcomes of the research will contribute to food safety and the rights of communities to have access to safe, nutritious and adequate food supplies.

The duration of this project is three years, with an initial period devoted to literature review and the development of test methods, collection of isolates and the establishment of a central databank of expertise, methods used and a cultural collection of critical isolates.

Project leader:

- Prof Lise Korsten (see profile on page 35)

Team members:

- Prof Elna Buys – Department of Food Science (UP Faculty of Natural and Agricultural Sciences)
- Dr Juan Vorster – Department of Plant Production and Soil Science (UP Faculty of Natural and Agricultural Sciences)
- Prof Riana Bornman – Department of Public Health (UP Faculty of Health Sciences)
- Mr Alan Hall, Central Microscopy Unit (UP Faculty of Natural and Agricultural Sciences).

Student supported by the project:

- Ms Willeke de Bruin (PhD Plant Pathology)

From left to right: Ms Willeke de Bruin, Prof Elna Buys and Prof Lise Korsten





‘Green chemistry’ is the study and research of chemical processes and methods that limit the use of hazardous substances emitted into the environment. The objective is to design molecules, materials and chemical processes that are sustainable and safer for human health and the environment.

The University of Pretoria has established a relationship with the Department of Agriculture, Forestry and Fisheries (DAFF) and a contractual agreement with BASF (previously Becker Underwood) for scholarships and supportive research programmes.

This initiative will train and develop emerging scientists in the field of eco- and mammalian toxicology with a special emphasis on risk assessments. It also focuses on pesticide regulatory science in fields of plant pathology, entomology, weed science, agronomy and soil science.

The DAFF will fund eight master’s bursaries which will include internship and special skills development programmes, while BASF, will fund the supportive research programmes in biological and chemical technologies, agricultural product research and development.

The future growth of ‘Green Chemistry’ is central to the national innovation and skills development and this project will contribute to efforts to promote sustainable scientific practices in South Africa.

Talented young people

The aim of the partnership is to develop talented young people who will have a positive impact on the country and continent and to build awareness and expertise in the utilisation of sustainable biological technologies in agriculture.

Through a strategic alliance with industry partner, BASF, the IFNuW will develop capacity and train students in agricultural green chemistry science and technology for crop protection and animal health.

In support of this project the DAFF recently established a capacity-building programme within the regulatory science field. This will contribute to the development of scientists in the field of eco- and mammalian toxicology with special emphasis on risk assessments.

BASF provided funding for the promotion of agricultural studies at the University of Pretoria. Financial support will be provided to eight Master of Science students linked to research programmes funded by the company BASF. A Green Chemistry workshop was hosted by the UP in September 2013 with funding from the Department of Science and Technology and the Fresh Fruit Exporters Forum: Post-harvest Innovation Fund.

Sustainable platform

Through this project a sustainable green chemistry platform has been created at the University of Pretoria bringing together the multi-disciplinary skills and knowledge of researchers from animal sciences, veterinary sciences, plant pathology, weed science and entomology.

Access to this large pool of scientists will contribute to the training and development of young professionals in the fields of agricultural chemical product research, development, registration and regulation.

The research conducted will provide valuable inputs into the broader concept of pesticide regulatory control. Participants in the project will contribute to technical input into issues relating to governance, regulatory control and the development of green technologies.

The ‘green chemistry’ platform represents an open-ended source of technical experts that

can advise regulators on issues pertaining to the Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act no. 36 of 1947) and provide linkages and mentorship programmes for post-graduate students working in the field of regulatory science and agriculture.

Project leader:

- Prof Lise Korsten (see profile on page 35)

Team members:

- Prof Francien Botha – Department of Paraclinical Sciences (UP Faculty of Veterinary Science);
- Prof Kobus Eloff – Department of Paraclinical Sciences (UP Faculty of Veterinary Science);
- Prof Nico Labuschagne - Department of Microbiology and Plant Pathology (UP Faculty of Natural and Agricultural Sciences);
- Prof Zeno Apostolides – Department of Biochemistry (UP Faculty of Natural and Agricultural Sciences);
- Prof Kerstin Kruger – Department of Zoology and Entomology (UP Faculty of Agricultural and Natural Sciences);
- Dr Lyndy McGaw – Department of Animal Health (UP Faculty of Veterinary Science);

- Prof Tiaan de Jager – Department of Public Health (UP Faculty of Health Sciences);
- Prof Egmont Rohwer – Department of Chemistry (UP Faculty of Natural and Agricultural Sciences);
- Dr Natalie Aneck-Hahn – Department of Urology (UP Faculty of Health Sciences);
- Prof Anita Michel – Department of Animal Health (UP Faculty of Veterinary Science).

Students supported by the project:

- Ms Pheladi Makgolane (MSc Plant Pathology);
- Ms Stella Nembudane (MSc Agronomy);
- Ms Andille Mahlangu (MSc Veterinary Sciences);
- Ms Millicent Motileng (MSc Entomology);
- Ms Roleen La Grange (MSc Entomology);
- Mr Thomas Mutengwa (PhD Plant Pathology).

Project partners:

- The Department of Agriculture, Forestry and Fisheries;
- BASF

Front left to right: Ms Mari-Roleen la Grange, Ms Magalane Makgolane, Ms Zandile Mahlangu, Dr Lyndy McGaw and Ms Millicent Motileng

Back left to right: Prof Nico Labuschagne, Ms Tshiwela Nembudane, Prof Kerstin Kruger, Mr Pieter Louw, Prof Francien Botha, Prof Lise Korsten and Mr Thomas Mutengwe



Project 4: Laboratories at tertiary institutions: “Improving the quality of results”

To ensure greater global participation and more effective trade flows South Africa needs technical infrastructure and a knowledge chain to support the national Standards, Quality, Accreditation and Metrology (SQAM) framework.

Once this technical framework has been established it requires equivalence in measurement systems and in standards to support industrialisation and export trade, provide proof of compliance with technical regulations, product specifications and standards.

There is, thus, a strong need for a national accreditation body, a standardisation body, a metrology system and a technical regulatory framework. For each of these critical domains certain internationally accepted practices are required to ensure mutual recognition and universal acceptance.

South Africa has a national accreditation body, the South African National Accreditation System (SANAS), mandated to accredit conformity assessment bodies namely certification bodies, testing laboratories and inspection services in terms of the Accreditation for Conformity, Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act 19 of 2006). Although the SA accreditation system is well-developed and internationally recognised, it is still necessary to raise awareness about accreditation and the role of SANAS. Furthermore it is important to expand the human capacity and expertise required in accreditation as the needs are continuously growing. A specific need exists to establish an awareness programme within academic institutions to foster their knowledge and skills in the technical infrastructure for the country.

In addition, inadequate human capacity and expertise in accreditation hamper future

growth in trade. There is a need to establish an awareness programme within academic institutions to foster knowledge, build human capacity and skills in the technical infrastructure of the country’s accreditation system.

Knowledge platform

The “Laboratories at Tertiary Institutions: Improving the quality of results” programme was therefore established to create a knowledge platform and partnership with academic institutions such as Pretoria University to build their capacity and understanding of laboratory accreditation to contribute to improve research results as well as laboratory results of their commercial laboratories.

The purpose of this agreement is to engage academia to train junior lecturers and students in laboratory accreditation, create accreditation awareness in research and train technical assessors for the country.

A Memorandum of Understanding was established between SANAS and UP and four bursaries were awarded to undergraduate students:

- Ms F. Abdool-Khader
- Ms Carien Du Toit
- Ms Khrystyne Hill
- Mr Olivam Monakali

An important impact of the project will be to strengthen the technical competence and human competence in the diagnostic laboratory capacity within the agriculture and food environment.

SANAS-funded project



The partnership with SANAS will support the objectives of excellence in research within the IRT.

This project will stimulate awareness within academic institutions to foster knowledge, build human capacity and skills in the technical infrastructure of the country. A revitalised national accreditation system will provide a crucial framework for the growth of a knowledge-based economy in South Africa.

Project leader

Prof Lise Korsten (see profile on page 35)



Front left to right: Ms Carien du Toit (SANAS bursary holder), Dr Lyndy McGaw, Ms Khrystyne Hill (SANAS bursary holder), Prof Lise Korsten and Prof Zeno Apostolides

Back left to right: Dr Francien Botha, Mr Olwam Monakali (SANAS bursary holder) and Ms Anette Durand

Team members:

- Ms Anette Durand - Quality Assurance Officer Paraclinical Science (UP Faculty of Veterinary Science)
- Dr Mapitsi Thantsha – Department of Microbiology and Plant Pathology (UP Faculty of Natural and Agricultural Sciences)
- Dr Francien Botha – Department of Animal and Wildlife Sciences (UP Faculty of Veterinary Science)
- Dr Akinbowale Jenkins – Department of Veterinary Tropical Diseases (UP Faculty of Veterinary Science)
- Prof Elna Buys – Department of Food Science; (UP Faculty of Natural and Agricultural Sciences);
- Prof Egmont Rohwer - Department of Chemistry (UP Faculty of Natural and Agricultural Sciences);
- Dr Yvette Naudé - Department of Chemistry (UP Faculty of Natural and Agricultural Sciences);
- Prof Zeno Apostolides – Department of Biochemistry (UP Faculty of Natural and Agricultural Sciences).





Project 5: The evaluation of the risks associated with the use of rainwater, harvested from rooftops for domestic use and homestead food gardens; and groundwater for domestic use and livestock watering.

(Water Research Commission: Project 2012 KSA 4)

The harvesting of rainwater from rooftops for domestic consumption is widely regarded as an ecologically friendly approach to address the country's critical water shortages.

Water collected in this manner can be used for domestic purposes, human consumption and to irrigate food gardens. Food gardens are increasingly being promoted as sustainable projects to promote food security among urban and rural communities, create jobs and provide access for emerging producers into the broader market supply chain.

However, there are certain important safety concerns that must be investigated and addressed before the use of such water is promoted.

It is essential to determine the potential level of microbiological risks associated with water collection systems. Harvested rainwater is commonly stored in large plastic containers. The ability of micro-organisms to proliferate in such water storage containers is well documented but the quality of such harvested and stored water is not well known.

Quite often dust, bird droppings, chemical leachates from the roof material, adhesives, and coatings and other contaminated material are washed down from the roofs after heavy rain storms. This water that is collected in containers poses a potential serious risk for consumers. The water quality is, thus compromised by the method used for collection.

Water quality

In addition, biofilms may develop in the storage unit and further deteriorate the water quality. This is of particular importance since it is known that waterborne pathogens may survive, proliferate and shed into the waterways thereby contributing to the contamination risk.

The risks posed by inorganic water quality constituents (WQC) to livestock have been studied in various scenarios in South Africa since 1990 with the focus on groundwater. The results showed that there is the potential for high risks to livestock and rural communities.

However, the risks attributed to naturally occurring WQC in groundwater are not generic,



but are associated with the type of livestock, the livestock production system (LPS), the geographic location, the physiological condition of the livestock and the inorganic constituent being ingested.

An assessment of the risks led to the publication of Guidelines for LPS as an easy, handy reference document. Further research went into the development of a software system as a useful tool to assess risk by coupling the biological attributes of livestock, the physical attributes of the environment and the ingestion rate of the WQC. This resulted in the development of a constituent ingestion rate risk assessment (CIRRA).

The recent research has progressed to the point where the Guidelines need to be updated and republished. This project should eventually also lead to a revision of the CIRRA software programme.

The project is being approached in a multi-disciplinary context with the main focus on the microbiology of rain harvested from roof tops commonly used in food gardens. The project will also focus on the quality of surface water mixed with rain harvested water and used in livestock production for small scale farmers and human user groups.

The project has two components:

- Microbiological water quality of rain-harvested water used in food gardens led by Prof Lise Korsten.
- Water quality constituents (WQC) regarding livestock production systems (LPS) and human user-groups led by Prof Norman Casey.

Project leaders

- Prof Lise Korsten (see profile on page 35)

Prof Norman H Casey attained the BSc (Agric) and MSc (Agric) degrees at the University of Natal and the DSc (Agric) at the University of Pretoria. In 1979, he accepted an academic appointment at the University of Pretoria in animal production physiology.

As professor, he was the Head of the Department of Animal and Wildlife Sciences, from 1992 to 2005. He is chairperson of the Ethics Committee of the Faculty of Natural and Agricultural Sciences and sits on the Senate Committee on Research Ethics and Integrity. He is Honorary President and a former President of the South African Society of Animal Science and is a Ministerial appointee on the Council for Natural Scientific Professions.

Prof Casey is a former President of the



Congress of the World Association of Animal Production, was Vice-president of the International Goat Association and chaired the 8th International Conference on Goats and 9th International Symposium on Ruminant Physiology.

He has received awards for research and academic excellence and for services to the Animal Science profession. He serves on the editorial boards of *Livestock Science*, *Small Ruminant Research* and the *SA Journal of Animal Science*. He has 69 scientific peer reviewed publications, 80 conference proceedings and presentations, 22 books and reference manuals, 38 contracted scientific reports and has supervised 62 MSc and PhD candidates.

Prof Casey has more than 20 years of experience in livestock science and water quality. He has done extensive research on water quality and its effect on animal health and has written guidelines and easy to use hand reference documents.

Team members:

- Dr Jan Myburgh – Department of Paraclinical Sciences (UP Faculty of Veterinary Science);
- Prof Elna Buys – Department of Food Science (UP Faculty of Natural and Agricultural Sciences);
- Prof Ronel Ferreira – Department of Education Psychology and Human Nutrition (UP Faculty of Education).

Partner:

- South African Water Research Commission



Dr Naushad Emmambux, Prof Marlena Kruger, Dr Anabella Gaspar, Prof André Oelofse, Prof Gyebi Duodu, Dr Magdalena Coetzee and Dr Janet Taylor



Promoting health, nutrition and well-being

Indigenous food crops and domestic animals have the potential to meet the nutritional needs and ensure the good health of African communities. Through this research the Institute for Food, Nutrition and Well-being establishes itself as the world centre for research into the value of these products and development of innovative food products.



The African continent is blessed with a wide range of indigenous food crops and domestic animals which have the potential to provide excellent nutrition to communities resulting in long-term good health.

However, malnutrition remains an issue of serious concern among decision-makers and healthcare professionals and the burden of chronic diseases is still enormous. The challenge for the Institute for Food, Nutrition and Well-being is to address the issue of malnutrition through research into, and the promotion of indigenous African plant and animal products that may improve the health status of the population.

Africa is faced with two chronic nutrition and health-related challenges:

- *Malnutrition* which causes high levels of child mortality and morbidity. Much of this relates to protein-energy malnutrition and micro-nutrient deficiency diseases which are exacerbated by conditions such as malaria and HIV.
- *Overnutrition* which is associated with so-called Western lifestyle diseases, particularly obesity, Type-2 diabetes, cardiovascular diseases and certain cancers. These are collectively known as the Metabolic Syndrome.

Health statistics released by various national and international research bodies paint an alarming picture of the health status of the African population and the burden of disease prevalent on the continent.

- figures published by Statistics SA in 2005 show that 20% of deaths in the age group 35-64 can be attributed to chronic diseases related to lifestyle;
- despite major advances in HIV-AIDS treatment and counselling it is still estimated that 17.8 % of South African adults have HIV-AIDS and that 310 000 people died from AIDS in 2009;
- research into malnutrition among children aged between one and nine years by the National Food Consumption Survey show that 10% were underweight and one in five were stunted;
- premature deaths due to cardiovascular diseases are expected to increase by 41% between 2000 and 2030;
- the African region has the highest incidence of TB and South Africa's death rate from diabetes – of 50 per 100 000 of the population – is the 25th highest in the world.

For developing countries, especially in Africa, the costs of tertiary hospital healthcare and associated drug treatments are unaffordable by most individuals and ruinous to fragile national economies. The primary emphasis should, thus, be on prevention and alleviation as the most viable strategies to combat the scourge of malnutrition.

Unique materials

Indigenous food crops and domestic animals have traditionally provided excellent nutrition and still have the potential to ensure good health and the well-being of African communities. The fauna and flora of southern Africa are biodiverse due to the region's wide range of climatic conditions and topography.

Novel and unique animal and plant materials are found in the arid areas of southern Africa. These include goat's milk, cereal and grain legumes (e.g. sorghum, millets, cowpeas, marama beans) and indigenous leafy vegetables. Many of these foodstuffs are underutilised and contain valuable functional biomolecules and can be utilised as functional staple foods or novel dishes.

Research shows that such indigenous food products are nutrient-rich and outstanding sources of functional biomolecules, also known as phytonutrients or phytochemicals. These phytonutrients have multiple important health-promoting properties such as the prevention and reduction of oxidative stress, anti-cancer, anti-diabetic, anti-inflammatory, anti-hypertensive and cardiovascular disease prevention.

Transdisciplinary approach

The Institute for Food, Nutrition and Well-being intends to become the world centre for scientific research into the nutritional and health-promoting functionality of indigenous African plant and animal foodstuffs and African food products. A priority is to expand the depth of its scientific expertise at the critical interface between nutrition, physiology, cellular biochemistry and the food sciences. This is achieved by trans-disciplinary research groups and through attracting top post-doctoral research fellows from across the world.

The current initiative has, for the first time, brought together experts from four UP faculties – Natural and Agricultural Sciences, Health Sciences, Veterinary Sciences and Engineering – to work in trans-disciplinary research groups. This novel, trans-disciplinary approach has the potential to mobilise UP's wide scope of expertise to find viable science-based solutions for the scourge of malnutrition in Africa.

The research findings will result in practical



Theme C Leader: Prof John Taylor

outcomes, leading to decisions and actions taken by relevant governments and decision-makers. Visionary future science leaders will emerge from the research projects to influence policy and practices and contribute to the health status and well-being of African communities.

Prof John Taylor is the theme leader for the Institute's theme on Functional Biomolecules and Health-promoting Foods. A full professor of Food Science at the University of Pretoria, he is globally recognised for his research into the science and technology of African cereal grains, especially sorghum and millets.

He is a B-rated researcher with the NRF. He is an author and co-author of some 140 papers in peer-reviewed scientific journals, 20 book chapters, many technical reports to industry, and has co-edited a monograph on Pseudocereals and Less Common Cereals. He is an Editor of the *Journal of Cereal Science* (Elsevier) and

a member of the Editorial Boards of two other journals.

During 2009 and 2010 he served as President of the International Association for Cereal Science and Technology (ICC). Prof Taylor has been supervisor and co-supervisor of some 80 MSc and PhD graduates and postdocs from across sub-Saharan Africa, many of whom now hold senior positions in academia, industry and government in Africa and across the world.

Prof Taylor is a recipient of several awards, including: Member of the Academy of Science of South Africa, AACC International's Excellence in Teaching Award, Fellow of AACC International, Fellow of the International Academy of Food Science and Technology, Fellow of the ICC Academy and recipient of the University of Pretoria's Chancellor's Award for Research.

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Project 1: Combating lifestyle diseases associated with over-nutrition through the use of indigenous South African foods

The burden of chronic diseases in southern Africa is enormous. Rapid urbanisation coupled with rising incomes has led to a growing urban adult population in the region.

The inevitable results of this have been poor dietary choices and low levels of physical activity leading to the increasing prevalence of overweight and obesity. These have become the drivers for increased occurrences of chronic diseases of lifestyle such as cardiovascular disease, Type-2 diabetes, certain cancers and collectively, the Metabolic Syndrome.

Indigenous plant materials are currently utilised by the food industry in the manufacturing of various food products. Importantly, what needs to be known is whether the potential functional biomolecules – such as phenolic compounds and bioactive peptides – present in the raw material are physiologically available after processing and the ultimate digestion of the food products.

Many health claims about the alleged benefits of food products are made without the necessary scientific evidence. South Africa's new labelling regulations require claims to be supported by solid research and evidence. The IFNuW research will develop a scientific approach and a set of methodologies to help evaluate the potential health claims of such Functional Foods.

Provide scientific evidence

In the long term innovation and development strategies will be implemented to assist local and international food companies to develop healthy indigenous foods with proven beneficial effects.

The main aim is to provide scientific evidence for the potential health-promoting properties of indigenous commercially produced South African foods. Among the objectives are:

- To identify and characterise useful biomolecules/bioactive compounds from indigenous South African food products;
- To determine the potential health benefits of these bioactive compounds in-vitro and in-vivo (animal studies) to show proof of concept and thus potential efficacy in humans;
- To determine the efficacy of these functional biomolecules in humans through an intervention study.

Wide-ranging outcomes

The outcomes and outputs envisaged for the project are wide-ranging. The primary outcome is a clear demonstration of proof of concept and provision of scientific evidence for health-promoting properties of bioactive compounds in indigenous South African foods.

In addition to publications in international peer-reviewed journals, other expected outcomes will include generation of data and information on the following:

- Secondary metabolite profile of foods (e.g. sorghum-cowpea composite porridges, South African honeys) before and after in vitro enzymatic digestion
- Effect of extracts from foods on the proliferation of cancer cells in vitro and induction of phase II detoxification enzymes
- Identification and characterisation of ACE-inhibitory peptides in foods as an index of potential anti-hypertensive properties

At the early stage of the research it has already determined that honey from the Fynbos region of the Western Cape has similar antioxidant activity similar or even greater than that of well-known, health-promoting manuka honey from New Zealand. Bioactive peptides with ACE-inhibitory activity are found in mageu, a non-alcoholic fermented maize-based beverage. ACE-inhibitors are the active component in many pharmaceuticals used in the treatment of hypertension and congestive heart failure.

A highlight has been the identification of tannin-like compounds in these foods, specifically procyanidin B in cowpea varieties with high phenolic content. This has important implications for their antioxidant activity and potential health benefits.

Consolidating research

The research contributes to achieving the vision of the IFNuW to be a leading international centre of excellence in trans-disciplinary research and post-graduate training.

The team brings together researchers from three faculties namely, Natural and Agricultural Sciences, Health Sciences and Veterinary Sciences. It has been able to extend and consolidate the research and collaboration between the Departments of Anatomy, Biochemistry and Food Science. A next step will be to take advantage of a Memorandum of Understanding between the UP and the Massey University in New Zealand to further extend research collaboration across disciplines and institutions.

The scientific depth of the project will be expanded through utilising diverse cell tissue culture models and animal models for in vivo studies. Additionally, as phytochemical components of foods are not restricted to

phenolics and bioactive peptides there are opportunities to study other targeted bioactive compounds.

It is envisaged that the project will also be expanded to study other plant-based foods of importance in Africa such as the pseudocereals and indigenous green leafy vegetables.

An essential component will be working closely with rural communities, bringing in the expertise of social scientists and economics researchers. This will strengthen the trans-disciplinary effectiveness of the project.

Project leader

Prof Kwaku Gyebi Duodu holds a PhD in Food Science and is Associate Professor of Food Chemistry and Food Engineering in UP's Food Science Department. His research focus area is "*Health-promoting African foods and beverages*"



in which several interrelated topics are being researched, including:

- Combating conditions and diseases associated with overnutrition such as metabolic syndrome, certain cancers, Type-2 diabetes and cardiovascular diseases with African foods;
- The effect of novel food processing technologies on health-promoting properties of legume-based foods.

Since 2003, Prof Duodu has acted as supervisor or co-supervisor of 16 master's and doctoral students who have completed their degrees. He has been the main author or co-author of 30 articles in international peer-reviewed journals and five book chapters. Prof Duodu is a member of the editorial board of the *Journal of Food Composition and Analysis* and holds a C3 rating from the National Research Foundation.

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Team members:

- Prof John Taylor - Department of Food Science (UP Faculty of Natural and Agricultural Sciences);

- Prof Amanda Minnaar - Department of Food Science (UP Faculty of Natural and Agricultural Sciences);
- Prof Elna Buys - Department of Food Science (UP Faculty of Natural and Agricultural Sciences);
- Prof Megan Bester – Department of Anatomy (UP Faculty of Health Sciences);
- Dr Anabella Gaspar – Department of Biochemistry (UP Faculty of Natural and Agricultural Sciences);
- Prof Zeno Apostolides – Department of Biochemistry (UP Faculty of Natural and Agricultural Sciences);
- Prof Vinny Naidoo – Director of the UP Biomedical Research Unit.

Students supported by the project:

- Mr Franklin Apea Bah – PhD student (funded by IRT)
- Ms Ilrienne du Plessis – MSc student (Funded by IRT)
- Ms Alice Nderitu – PhD student (Supported by USAID Dry Grains and Pulses CRSP

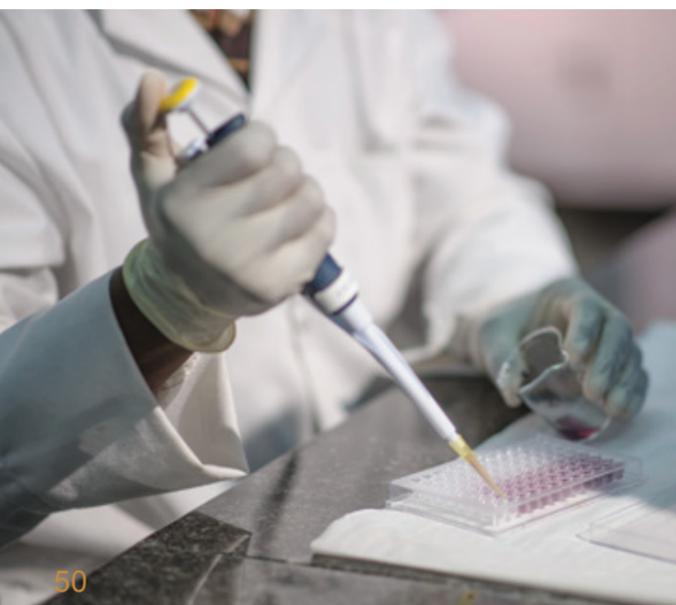
Project)

- Ms Twambo Hachibamba – PhD student (Supported by USAID Dry Grains and Pulses CRSP Project)
- Ms Eugenie Kayitesi – PhD (Part supported by USAID Dry Grains and Pulses CRSP Project)
- Ms June Serem – PhD student (Supported by Dept Anatomy as a member of staff)
- Dr Oluyemisi Adelakun – Post-doc Fellow (Funded by Vice-Chancellor's Post-Doctoral Fellowship Award)

Project partners:

- National Research Foundation (NRF) Incentive Funding for Rated Researchers
- USAID Dry Grains and Pulses CRSP Project

Postgraduate students of the Department of Food Science and Department of Human Nutrition who are working on IFNuW projects and Prof Duodu. Standing from left: Marina Bester, Franklin Apea Bah (PhD), Ilrienne du Plessis (MSc) and Wura Falade (PhD). Seated: Carmen Van Niekerk and Prof Gyebi Duodu



Project 2: Combating malnutrition through meals prepared from bio-fortified indigenous and African grains and leafy vegetables

Indigenous South African foods – most notably grains and leafy vegetables – offer opportunities to diversify farming activities ensure food security and alleviate poverty. It can provide income to emerging farmers and improve the health of consumers.

Such crops are adapted to local conditions and tolerant to harsh environmental conditions. Many rural South Africans consume these products and they form part of the country and the region's rich traditional heritage.

African leafy vegetables form part of the daily staple diet of many communities and are rich in nutrients, such as iron and vitamin A. Currently most of the crops are wild harvested and few are cultivated.

Positive impact on nutrition

The cross-cutting research project initiated by the IFNuW will determine whether the consumption of indigenous African plant foods, prepared in the form of meals, impact positively on the nutritional status of children under five years of age.

The intended outcome of the research is to develop a composite flour of sorghum and soy, which will be easily made or acquired, and used as the porridge base for an infant complementary food.

The flour composite of sorghum and cowpea has been successfully made. The research team is now preparing the laboratory to do the nutrient availability from the composite as well as from the cooked cowpea leaf and finally, the production of the whole meal.

A scientific paper was published in a peer-reviewed publication, *Food Chem* 2012; 131 (1): Kruger J., Taylor JRN., Oelofse A. *Effects of reducing phytate content in sorghum through*

genetic modification and fermentation on in-vitro iron availability in whole grain porridges.

The project has been expanded to include analyses in collaboration with Prof M Smuts from North West University (NWU) and a student from NWU will visit UP for training in technique.

Project leader:



Prof Andre Oelofse is an Associate Professor in the Department of Human Nutrition in the Faculty of Health Sciences at the University of Pretoria.

His primary research interest lies with infant

and young child nutrition and health. He has conducted and published on numerous studies assessing the nutritional and health status of vulnerable infants in different communities in both South Africa and other developing countries. He has also been working on the potential contribution of indigenous foods to the nutrient and health status of young children. This work has culminated in a comprehensive report on the nutritional value of indigenous green leafy vegetables to alleviate malnutrition. Nutrients of particular interest to his work are Vitamin A, iron and zinc.

Prof Oelofse has initiated work on assessing the bioavailability of key nutrients (Vitamin A, iron and zinc) through human cell line models in collaboration with international partners. He holds an MSc from Stellenbosch University and a PhD from Wageningen University in the Netherlands. Prior to joining the UP he was employed by the Nutrition Intervention Research Unit of the Medical Research Council.

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Team members:

- Prof John Taylor – Department of Food Science (UP Faculty of Natural and Agricultural Sciences);
- Prof Megan Bester - Department of Biochemistry (UP Faculty of Health Sciences);
- Dr Zelda White - Department of Human Nutrition (UP Faculty of Health Sciences);
- Prof Paul Rheeder – School of Public Health (UP Faculty of Health Sciences);
- Prof Sheryl Hendriks – Director of the Institute of Food, Nutrition and Well-being (University of Pretoria);
- Prof Amanda Minnaar – Department of Food Science (UP Faculty of Natural and Agricultural Sciences);
- Prof Gyebi Duodu – Department of Food Science (UP Faculty of Natural and Agricultural Sciences);
- Prof Mario Ferruzzi – Department of Nutrition Science (Purdue University, USA)

Students supported by the project:

- Ms N Vilakati (PhD)
- Mr A Adetunji (PhD)
- Dr J Kruger (Postdoctoral fellow)

Project partners:

- South African Sorghum Forum (stakeholders and research funding forum)
- SA Agricultural Research Council: Grain Crops Institute (Dr Nemera Shargie); Vegetable and ornamental plant institute VOPI (Dr Yacob Beletse and Mr Willem Janse van Rensburg)
- Medical Research Council MRC: Prof Mieke Faber
- Pannar Seeds South Africa (Mr Dries Booyens)
- Africa Biofortified Sorghum Project (Africa Harvest Biotechnology Foundation International, Dr Florence Wambugu, Pioneer Hi-Bred International Dr Marc Albertsen)
- HarvestPlus Foundation (Dr Fabiana de Moura) and UC Davis (Prof Bo Lonnerdal), and Purdue University (Prof Bruce Hamaker and Prof Mario Ferruzzi)
- ICRISAT (International Crops Research Institute for the Semi-Arid Tropics) Nutriplus Programme (Dr Kiran Sharma)
- INTSORMIL (International Sorghum, Millet and Other Grains Collaborative Research Program and Texas A&M University, USA (Profs Gary Peterson and Dirk Hays)
- Dry Bean and Pulse Collaborative Research Support Program and Prof Maurice Bennink, Michigan State University, USA



Project 3: Protein- and starch-based nano- and micro-biomaterials from local African plant sources for improved nutrition, health and well-being

Indigenous South African foods – most notably grains and leafy vegetables – offer opportunities to diversify farming activities ensure food security and alleviate poverty. It can provide income to emerging farmers and improve the health of consumers.

African grains such as sorghum and teff contain biopolymers with unique properties, which can be utilised to produce biomaterials to combat obesity and can alleviate lifestyle diseases such as Type-2 diabetes and cardiovascular conditions.

There is a growing demand for biopolymers made from natural materials in the nutrition, healthcare, medical and cosmeucetical fields. Biopolymers are polymers – or large molecule structures – produced by living organisms. A problem, however, is that current bioplastic materials made from such biopolymers are inferior in functional properties compared to synthetic plastics.

Natural biopolymers have exciting potential as a “green technology” in South Africa with a wide range of potential applications in food production, nutrition, controlled drug release, re-vegetation and soil restoration following mining activities.

The research has already led to the development of a novel process to make plant-protein-based microparticles, called KEMS. The process for making the KEMS has been patented in South Africa, Europe, the United States of America and China.

Improve the properties

The project sets out to understand at the molecular level how cereal prolamin protein polypeptides self-assemble into various structures, including: microspheres, nanoparticles, fibrils, bioplastic films, membranes

and doughs, and how to manipulate the process of self-assembly to improve the functional properties of these structures.

Among its other objectives are:

- Developing protein-based biomaterials for encapsulation of nutrients and nutraceuticals;
- Understanding the functionality of amylose-lipid nanomaterials as a fat mimetic or “replacer” in food products such as mayonnaise, margarine and cheese analogues;
- Developing bi-component protein-starch biomaterials with excellent functional properties by combining prolamin microspheres with amylose-lipid complexes.

New processes

The research has resulted in a new, patented, process to make plant protein-based microparticles (microspheres), also known as KEMS. The KEMS have a novel structure, including an extremely large surface area and useful functional properties, such as water-insolubility, hydrophobicity, non-allergenicity and slow degradation by mammalian proteolytic enzymes.

The KEMS can be made into high quality bioplastic films and membranes. These properties enable the KEMS to be used for encapsulation to allow delayed or controlled release of the core material, which may be bio-active molecules, drugs, nutraceuticals or food ingredients.



The research has shown that when starch is wet-heat processed for a prolonged period in the presence of endogenous or added lipid it exhibits uniquely high viscosity paste properties. Using X-Ray Diffraction and Differential Scanning Calorimetry the team recently demonstrated that these unique viscosity characteristics are related to the formation of crystalline amylose-lipid complexes, also known as V-amylose.

In addition, the research team has developed a novel process for isolating these starch-lipid complexes, with only food grade chemicals used, and the time taken for isolation is less than six hours. The viscosity characteristics and low calorific value of the starch-lipid complexes indicate that they have great potential as fat replacers in foods.

Some of the research findings have already been published in peer-reviewed scientific journals and applications for patents have been granted, or are pending, in a number of international jurisdictions.

Green technology

The project is unique in its trans-disciplinary nature, bringing together experts across four university faculties to jointly create a platform for the “green technology” of biopolymers.

The focus is both novel and highly relevant, utilising the unique properties of the biopolymers of African grains such as sorghum and teff to improve the health and well-being of South Africans. It has significant potential to address the problem of obesity in society which can alleviate lifestyle diseases such as Type-2 diabetes and cardiovascular conditions.

Because of the non-allergenic nature of the biomaterials, they have potential as “natural scaffolds” for the repair and regeneration of soft and hard tissue, for the treatment of burns and possibly to combat degenerative diseases such as osteoporosis.

Project leaders

- Prof John Taylor (see profile on page 53)

Dr Mohammad Naushad Emmambux is a senior lecturer in UP’s Food Science department. He teaches food chemistry, cereal science and food rheology. His research deals with the science and technology of carbohydrate-based food biopolymers, with a focus on food nanotechnology. He has specific expertise in the isolation, characterisation, modification and application of indigenous African grain starches in food and non-food systems. A highlight is that Dr Emmambux and his research team have successfully isolated starch nanomaterials from indigenous African cereal grains. They have



Dr Janet Taylor holds a PhD in Food Science from the University of Pretoria and is a Research Officer in the Department of Food Science. In addition to research, her responsibilities include the co-supervision of postgraduate students both at a master’s and PhD level. Her main research interests

are in the functional properties of plant protein based bioplastics and biomaterials, with specific interest in the prolamin proteins of sorghum and maize. She has authored and co-authored a number of papers in international peer reviewed journals on various aspects of sorghum prolamin protein digestibility and as biomaterials and this work has been presented at numerous international and national conferences. She is also the co-author (with Prof John Taylor) of a series of International Association for Cereal Science and Technology Sorghum Grain Quality Standards. These standards are widely used in the sorghum industry.

Team members:

- Dr Johan Labuschagne – UP Department of Chemical Engineering
- Prof Vinny Naidoo – UP Biomedical Research Centre
- Prof Michael Pepper – UP Institute for Cellular and Molecular Medicine
- Prof Suprakas Ray - Centre for Nano-structured Materials, CSIR
- Prof Marlena Kruger - Institute of Food, Nutrition and Human Health, Massey University, New Zealand and Extraordinary

Professor, UP Department of Human Nutrition

- Dr Stuart Johnson - School of Public Health, Curtin University, Australia

Students supported by the project:

- Ms Alex Sly (MSc student) – Industry funded
- Ms Malory Links (MSc student) – National Research Foundation (NRF) and industry funded
- Ms Thabeleng Maphalla (MSc student) – NRF funded
- Ms Juliet Muronzwa (MSc student) – INTSORMIL funded
- Mr Preen Moodley (MSc student) – Winter Cereals Trust funded
- Ms Adeliwura Falade (PhD student) – UP Institutional Research Theme (IRT) funded
- Mr Welay Teklehaimonot (PhD student) – IRT funded
- Mr Mohammed Mustafa (PhD student) – UP funded
- Dr Joseph Anyango (Postdoctoral fellow) – UP funded
- Dr Obiro Wokadala (Postdoctoral fellow) – UP funded



Project partners:

- AFGRI Animal Feeds
- Blue Sky Venture Partners

From left to right: Ms Malory Links, Ms Wuru Falade, Mr Joseph Anyango, Ms Thabelang Maphalla, Ms Memory Chawafambira, Mr Fidelis Ocloo, Ms Alex Sly, Mr Welay Tekiehaimanot and Ms Charity Magwenzi

Front Row: Prof John Taylor and Dr Janet Taylor



Project 4: Nutritional exposure and environmental sustainability of animal product intake in South Africa and fatty acid profile of South African animal products

The most recent data from the South African National Health and Nutrition Examination Survey (SANHANES-1) indicates that many South African children under 14 years of age are stunted with increasing rates of overweight and obesity observed.

These continue to co-exist with persistent vitamin A and iron deficiencies in children. The majority of South African adults, and especially women, are overweight or obese, while many women also suffer from the consequences of micronutrient deficiencies, i.e. anaemia and vitamin A deficiency. South Africa is experiencing the Nutrition Transition – the paradox of persistent under-nutrition and increasing incidence of overnutrition – together with high reported values of household food insecurity. Addressing this huge nutrition challenge requires a new paradigm.

The typical diets of South African families are heavily dependent on maize meal and brown bread as staple foods. These diets are often nutritionally first limiting in lysine, iron and vitamin B12. However, even a small amount of animal products could significantly complement the nutritional value of meals comprising these staple foods.

On the other side of the malnutrition scale, the overconsumption of food, and specifically animal products that are high in saturated fatty acids and cholesterol have been linked to overweight, obesity and subsequent diseases of lifestyle. Although the production of livestock has increased in developing communities, under-nutrition, including insufficient consumption of protein and other nutrients, remains a persistent problem. Nutrient composition, bioavailability

and digestibility within the food matrix need to be interpreted. Additionally, correct and accurate intake data are required to determine human dietary exposure. To meet this need, we are developing appropriate tools to gather the relevant information.

Comprehensive database:

This will result in a comprehensive database on the nutrient composition of animal food products, to formulate evidence-based guidelines and policies for consumption by South Africans.

The broad aim of the project is to determine the nutrition-sensitivity and sustainability of livestock production and consumption in South Africa. The data gathered will contribute to evidence-based alignment of relevant health, agricultural, food system and educational policies, programmes and frameworks.

The project focuses on two specific issues:

- Nutritional exposure and environmental sustainability of animal product intake in South Africa:
 - Determining the contribution of animal products to the exposure of nutrients and anti-nutrients of South Africans;
 - Determining how the nutrient contribution of red meat relates to the impact of the production of red meat on the environment.



- The fatty acid profile of South African animal products as a source of natural bio-active components
 - Developing a national database on the total fat and fatty acid profile of South African animal products;
 - Research and capture of available fatty acid data generated in prior research on South African animal products at the University of Pretoria.
 - Analysis of the fatty acid profile of selected South African animal products, including lamb, mutton, beef, goat, veal, dairy products and poultry.

Important insights:

During the initial project stages the research team produced a visual book of meat portions and three questionnaires designed to target three different income groups participating in the survey. The project was then rolled-out among low-income communities in five districts in rural Limpopo and in Gauteng among middle-income groups.

The first results already provide important insights into consumer behaviour and preferences. Middle-income consumers preferred to consume animal products on a daily basis. A relatively high consumption of take-away food was observed. Participants in the survey indicated that they receive the bulk of their information about red meat from TV, family and friends, with the most trusted information sources being family, doctors, dieticians and friends.

Among low-income communities no correlation was found between livestock ownership and households' average monthly expenditure on animal protein foods. This suggests that households would rather purchase animal protein foods from retail channels, despite limited budgets, than consuming their own reared livestock.

Valuable lessons were learnt from the survey and will be applied to improve further actions within the larger consumer research project.

A database master sheet was developed in collaboration with the South African Medical Research Council to determine the fatty acid composition of South African animal products and an analysis of data is currently underway.

Well-balanced diet

Good nutrition consisting of an adequate and well-balanced diet, combined with regular physical activity is considered a cornerstone of good health. Agricultural production provides the

food – and nutrients – to the food supply chain and, increasingly, the nutrition-sensitivity and sustainability of agricultural and food systems are being investigated globally.

The project will provide researchers and decision-makers with current evidence-based insights on the consumption patterns of animal products by low, middle and high income communities as well as a database of the fatty acid composition of South African animal products.

Red meat plays a critical role in the diet of most South Africans and it is often regarded as a central food in dietary patterns. The impact of red meat consumption on the nutrition and health status of the national population needs to be determined including its contribution to the daily requirements of specific nutrients.

The project should be expanded by:

- Increasing the representation of consumers from all three income groups;
- Expanding the database to include other nutrients and anti-nutrients;
- Identifying gaps in knowledge which need to be further investigated resulting in an evidence-based alignment of the red meat industry.

Project leaders:



Professor Hettie Schönfeldt is a NRF C-rated researcher and a registered Natural Scientist (nutritionist and food scientist) and mentor in the fields of human nutrition and food composition. She is a Professor Extraordinaire in the Faculty of Natural and

Agricultural Sciences, Department of Animal and Wildlife Sciences and an Associate of the Institute of Food, Nutrition and Well-being.

Under her guidance 25 post graduate students have received their degrees and has published more than 60 contributions in numerous international journals and books, 117 technical reports for industry and more than 130 contributions to conferences.

She has been part of the Faculty of International Training Courses being held worldwide, including participation on the Advisory Board for the

Production and Use of Food Composition Data in Nutrition Courses. She was chief rapporteur for the Food and Agriculture Organization (FAO) of the United Nations Expert Consultation on Protein Requirements for Human Health, as well as being part of the evaluation team of the FAO's work in Nutrition. Prof Schönfeldt was recently invited by the United Nations Systems Standing Committee on Nutrition (UNSCN) to perform a descriptive review of food and agricultural policies in South Africa to encourage discussion on nutrition-sensitive agriculture.

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Prof Eddie Webb is Head of the Department of Animal and Wildlife Sciences at the University of Pretoria. A graduate of the University he completed his postdoctoral studies at the University of Ghent in Belgium and Nutreco in The Netherlands

on aspects of fatty acid synthesis in ruminants and growth modelling.

He has been President of the South African Society of Animal Science since 2008 and deputy-editor of the *SA Journal of Animal Science*. He also serves on the editorial board of *Small Ruminant Research*.

Prof Webb served on the organising committee and as special editor of the International Conference for Meat Science and Technology held in Cape Town in 2008. He is a member of the advisory committee on meat science research for the Agricultural Research Commission and was the chairperson of the scientific committee of the 8th International Congress on Goats.

During his career Prof Webb has published 72 papers in peer-reviewed scientific journals, delivered 85 papers at international conferences and participated as guest lecturer at international symposia and universities.

He holds a C-rating from the NRF and has mentored eight PhD and 33 master's students. Prof Webb is registered, professionally, with the SA Council for Natural and Scientific Professions, the SA Association for Professional Animal Scientists and the SA Society for Animal Science.



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Team members:

- Prof Gerry E Swan – Dean Faculty of Veterinary Sciences;
- Prof Johann Kirsten – Department of Agricultural Economics, Rural Development and Agricultural Extension (UP Faculty of Natural and Agricultural Sciences);
- Dr Beulah Pretorius – Department of Animal and Wildlife Science (UP Faculty of Veterinary Sciences);
- Mrs Nicolette Hall – Department of Animal and Wildlife Science (UP Faculty of Veterinary Sciences);
- Mrs Hester Vermeulen – Department of Agricultural Economics, Rural Development and Agricultural Extension (UP Faculty of Natural and Agricultural Sciences);
- Prof Una MacIntyre – Department of Human Nutrition (UP Faculty of Health Sciences);
- Dr Gerrie du Rand – Department of Consumer Science (UP Faculty of Natural and Agricultural Sciences);
- Dr Annemarie Viljoen – Department of Consumer Science (UP Faculty of Natural and Agricultural Sciences);



Students supported by the project:

- Mr Oliver Mwale (PhD student) – supported by IRT
- Ms Nicolette Hall (PhD student) – supported by Red Meat Research and Development (RMRD SA)
- Ms Innike Rajput (PhD student)

- Ms Marina Bester (MSc student)
- Ms Leandi Bain (M student)
- Ms Alizia Alison (M student)

Project partners:

- Red Meat Research and Development (RMRD SA)

Front from left to right: Dr Annemarie Viljoen, Mr Oliver Mwale, Prof Edward Webb and Prof Hettie Schönfeldt

Back from left to right: Dr Beulah Pretorius, Ms Carmen van Niekerk, Ms Nicolette Hall and Ms Marina Bester



Project 5: Effects of food components and bioactives on murine and human bone cells

Osteoporosis, the most commonly occurring bone disease, is the leading cause of serious morbidity and functional loss in the elderly. This disease is considered a major public health problem in the Western world with an increasing prevalence in the developing world.

The World Health Organisation (WHO) lists osteoporosis as one of the major diseases that needs to be reduced as the loss of quality of life is considerable and often results in complete dependency on healthcare systems and care takers. There are concerns that despite the existence of management guidelines for osteoporosis only a few patients currently receive preventative drugs. It is of the utmost importance that drug-based prevention and treatment must be preceded by changes in lifestyle and nutrition.

Nutrients with the proven potential to support bone health and reduce bone loss include long chain polyunsaturated fatty acids, phytoestrogens and polyphenols. This project investigates whether selected long chain polyunsaturated fatty acids derived from plant and animal sources and bioactives, including phytoestrogens and polyphenols found in soy beans and local teas such as rooibos and honeybush affect the biological activity of bone cells in vitro.

Support public health

The acquired knowledge can be applied to in vivo bone research and may support public health initiatives towards the prevention and treatment of bone diseases such as osteoporosis.

The primary objectives are:

- To investigate the effects of food components and bioactives on cell proliferation in murine osteoblast (MC3T3-E1) and monocyte (RAW 264.7) cell lines;

- To investigate the effects of the various food components and bioactives on:
 - osteoclast formation in RAW 264.7 murine monocytes and CD14+ human monocytes;
 - TNF-alpha secretion in differentiating osteoclasts;
 - bone resorption by visualisation of pit formation on synthetic bone-analogue plates and bone slices;
 - the levels of osteoclast markers such as cathepsin K, MMP-9 and TRAP in cell lysates by Western blotting;

Secondary objectives are:

- To determine if the antioxidant and anti-inflammatory activities of black, rooibos and honeybush teas have a beneficial effect on murine and human osteoblasts and osteoclasts function;
- To identify the bioactive components contributing to these antioxidant and anti-inflammatory effects specifically related to murine and human osteoblast and osteoclast functioning;

Beneficial effects

The research is investigating the possible beneficial effects of rooibos tea compounds on bone cell functioning in vitro. We are also establishing the antioxidant content of the tea. Rooibos tea extracts, prepared from both fermented and unfermented leaves, were applied to RAW 264.7 murine macrophages.



Results showed no significant effect of the teas on cell proliferation. Both types of rooibos tea showed high antioxidant content which may in part explain the protective effects of the teas on bone in vitro.

We are establishing the optimal experimental conditions to determine whether selected polyunsaturated fatty acids in combination with the phytoestrogens genistein and daidzein synergistically inhibit osteoclast formation and bone resorption. The effects of arachidonic acid and docosahexaenoic acid on osteoclast formation and bone resorption in the CD14+ human monocyte cell line are being determined.

This project contributes to knowledge on how deficiencies in nutrition, particularly fatty acid deficiency, may affect human health. The information can be used to help design and create new functional foods that will deliver high value nutrition and support skeletal health.

The participation of international researchers with strong backgrounds in nutrition and health supports international visibility and is helping to build the UP as a centre of human health research.

Studies will focus on the effects of polyunsaturated fatty acids in combination with the phytoestrogens on osteoclastogenesis. The project will also be expanded to include research into the effects of the bioactives in human CD14+ osteoclast precursors. In contrast to work using murine precursor cells as model, CD14+ precursor cells purified from human peripheral blood mononuclear cells has direct relevance to human health. Long-term objectives include investigation into the cellular pathways that the compounds may act upon when modulating osteoclast formation and activity.

Project leaders



Dr Magdalena Coetzee is a senior lecturer in UP's Physiology Department. She completed a BSc Hons at the Potchefstroom University of Higher Education in 1978 and started her career as a Physical Science school teacher while

continuing with post-graduate studies. In 1981 she joined the Catholic University of Leuven, Belgium to do preliminary research for her MSc degree.

She was appointed as lecturer in the Department of Physiology in 1996 and completed a PhD '*Differential effects of arachidonic acid and docosahexaenoic acid on cell biology and osteoprotegerin synthesis in osteoblast-like cells*' in 2005. In this study, osteoblast-like cell models were used to investigate mechanisms of action of polyunsaturated fatty acids on bone cell functioning.

Dr Coetzee is co-author of a number of research publications and acts as supervisor for post-graduate students. She made research visits to various international facilities including the Department of Medical Sciences, Uppsala University Hospital, Sweden; Nordic Bioscience, Herlev, Denmark; and the Institute of Food, Nutrition and Human Health, Massey University, New Zealand.

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Prof Marlena Kruger is Professor of Nutritional Physiology, Deputy Head of the Institute of Food, Nutrition and Human Health (IFNHH) and Director of Research for the College of Health at Massey

University, New Zealand.

She obtained a PhD in 1986. After completing a six month's science exchange through the German Academic Exchange Service (DAAD) she progressed to a three year postdoctorate in Biochemistry at the University of Texas, Austin, USA. She joined UP's Physiology Department in 1991, and subsequently set up a bone research laboratory with the focus on fatty acids and bone health.

She joined Massey University in 2000, as Senior Scientist at the IFNHH, where her role was to help establish bone research at the university. She was appointed Associate Professor in 2002, Director of the Division of Human Nutrition and Member of the Executive of IFNHH in 2005, and was also promoted to her current position as Chair of Nutritional Physiology in 2005. She took on the role of Director of Research for the College of Health in 2013. Prof Kruger was

appointed as extraordinary professor in Human Nutrition at the University of Pretoria in 2012.

Professor Kruger has over 95 publications in international peer reviewed journals. Her current research focus is nutrition and bone health with an emphasis on dairy foods, polyphenols and lipids.

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Team members:

- Prof Megan Bester (Department of Anatomy, UP);
- Prof Annie Joubert (Department of Physiology, UP);
- Prof Kwaku Gyebi Duodu (Department of Food Science, UP);
- Ms Gerda Gericke (Department of Human Nutrition, UP);

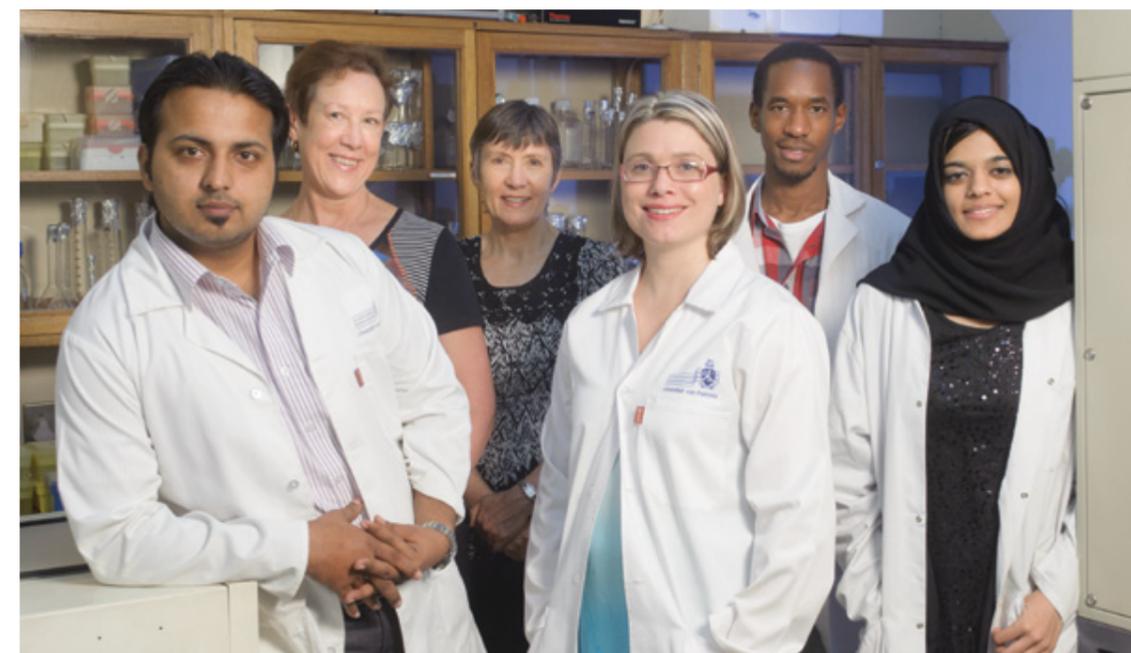
Students supported the project:

- Mr Abe Kasonga (MSc student, UP staff),
- Ms Sumari Marais (MSc student, UP staff)
- Ms Shaakirah Moosa (BSc Honours student, NRF supported)

Project partners:

- South African Medical Research Council;
- National Research Foundation.

From left to right: Dr Vishwa Deepak, Prof Marlena Kruger, Dr Magdalena Coetzee, Mrs Sumari Marais, Mr Abe Kasonga and Miss Shaakirah Moosa





Funded by the Howard W. Buffett Foundation through the Norman Borlaug Institute for International Agricultural Research of Texas A&M University

Project 6: Sorghum production and end-use product development for increased food security

Indigenous African cereal grains should be significant contributors to food and nutrition security in sub-Saharan Africa. Sorghum, an important traditional cereal grain grown primarily by small-holder farmers, provides a reliable food security crop.

This can be attributed to its adaptation to harsh environments, capability of producing harvestable grain in multiple cropping systems and grain that can be processed into nutritious food products.

Value-added products could provide sustainable cash income to small-holder farmers. Potential market opportunities exist provided there is a consistent supply of quality grain and products with sorghum or composite flour products have a reliable market niche.

This project is supported by The Howard W. Buffett Foundation through the Norman Borlaug Institute for International Agricultural Research of Texas A&M University.

Small scale entrepreneurs

The project will evaluate and develop improved sorghum genotypes and production technology using the Ukulima Research Farm in Limpopo as the base environment. The objective is to develop food science and technology suitable for small scale entrepreneurs and evaluate sorghums for potential benefits as health foods.

Sorghum plots will include trials for adaptation, resistance to disease, insects and drought and grain quality. Food science research will include sorghum, and sorghum-cowpea or sorghum-peanut composites.

The technology developed will be evaluated for applicability to real world situations. Post-

graduate student research and training in food science and plant pathology will be major components of the project.

Project leader:

- Prof John Taylor – see profile on page 53

UP team members:

- Prof Kwaku G Duodu – see profile on page 56
- Dr Janet Taylor – see profile on page 63

Project partners:

- Texas Agrilife Research
- Texas A&M University
- University of the Free State
- Zambia Agricultural Research Institute
- University of Limpopo (associate partner)
- South African Agricultural Research Council (associate partner)

Students:

- Mr Adeoluwa Adetunji (PhD student, project funded)
- Mr Mohammed Mustafi (PhD student, UP supported)
- Ms Pamela Dovi (MSc student, project funded)

Funded by AFGRI Operations and the Technology and Human Resources Programme – THRIP

Project 7: Prolamin protein coatings for micronutrients

The project is developing technology for the encapsulation of essential micronutrients, to improve their nutritional availability. The micronutrients are encapsulated in a cereal prolamin protein-based coating. This type of protein is both hydrophobic and only slowly digestible and therefore a good barrier. A successful proof of concept has been developed. The project involves developing prototype particles encapsulating micronutrients and evaluating them in vitro and in vivo into cattle.

The project is developing technology for the encapsulation of essential micronutrients, to improve their nutritional availability. The micronutrients are encapsulated in a cereal prolamin protein-based coating. This type of protein is both hydrophobic and only slowly digestible and therefore a good barrier. A successful proof of concept has been developed. The project involves developing prototype particles encapsulating micronutrients and evaluating them in vitro and in vivo into cattle.

The project is supported by AFGRI Operations and the Technology and Human Resources Programme – THRIP – research initiative of the Department of Trade and Industry and the NRF. The THRIP-supported component is enabling fundamental scientific research and development undertaken by post-graduate students to improve the effectiveness of the barrier properties of the protein coating and reduce the cost of the coating materials. This will be done through the usage of by-products and waste products of the South African cereals, beverage and bioethanol industries.

Project leader:

- Prof John Taylor – see profile on page 53

UP team member

- Dr Janet Taylor – see profile on page 63

Students

- Dr Joseph Anyango (Postdoctoral fellow, UP funded)
- Ms Alexandra Sly (MSc student, project funded)
- Ms Malory Links (MSc student, NRF and project funded)

Project partners:

- AFGRI Operations





Project 8: The effect of an enriched maize-based beverage on linear growth, bone length and bone status of Grade 5-7 learners in Bronkhorstspuit area, South Africa

Despite significant research on micronutrient supplementation there is still a paucity of data on the impact of such products on growth in African children aged between nine and 12 years. There are also few studies done on bone growth and mineralisation in this age group.

Other research indicates that black children may suffer compromised growth, possibly due to lack of various nutrients. This project will evaluate an affordable multi-nutrient drink made from maize products, which could improve growth and nutritional status in growing children, especially at the age before the adolescent growth spurt.

The study, initiated in September 2013 will be the first to investigate the effectiveness of an enriched maize-based meal supplement on linear growth, bone length and bone status. The outcomes will provide important information about the effect of these specific nutrients on bone accretion and improvement in nutritional status.

The study assesses nutritional status, vitamin D sufficiency and body composition in a group of primary school children in the Bronkhorstspuit area of Gauteng Province, South Africa. This will be followed by a nutritional intervention over a period six months.

- Part A (Baseline assessment): The determination of the nutritional status, dietary intake and anthropometry of Grade 5-7 learners from two primary schools in a rural community; their vitamin D status and

body composition in a randomly selected sub-group.

- Part B (Intervention): Nutritional intervention for six months among a group of Grade 5-7 learners to assess the effect of a protein/ micronutrient supplement on linear growth, bone length, bone status and vitamin D status.

This project presents an opportunity to build capacity and expertise in the area of bone health and vitamin D status. A novel procedure to assess vitamin D in blood will be standardised and validated and the methodology to assess bone health and body composition in children will be established.

Address malnutrition

The outcome and findings of the study will contribute to national efforts to address malnutrition in communities with limited access to resources.

The research findings will provide valuable information to assist decision-makers to make informed choices about the importance and potential impact of multiple micronutrient interventions in primary school children.



The study will make a valuable contribution to South Africa's Integrated Nutrition Programme, specifically the Primary School Nutrition Programme (PSNP) on the use of maize-based meal supplements in school feeding to reach the most vulnerable groups of children.

Project leader

- Prof Marlena Kruger – see profile on page 73

Team members:

- Ms Gerda Gericke - Department of Human Nutrition (UP Faculty of Health Sciences);

- Dr Zelda White - Department of Human Nutrition (UP Faculty of Health Sciences);
- Dr Jane Muchiri - Department of Human Nutrition (UP Faculty of Health Sciences);

Student

- Ms Michelle Fourie (Postdoctoral fellow)

From left to right seated: Dr Zelda White and Prof Marlena Kruger
 Standing: Prof Gerda Gericke, Dr Jane Muchiri and Dr Rendani Lladzani





Front: Dr Peet du Toit, Ms Karien Botha, Prof Ronel Ferreira and Ms Gerda Gericke Middel (standing): Dr Salome Human-Vogel, Mr Michael Kleynhans, Ms Debbie Kupolati and Ms Vangi Nortje
 Back: Prof Marlena Kruger, Prof William Fraser, Dr Una MacIntyre, Ms Elzaan Smuts and Dr Zelda White

Changing consumption behaviour for improved health

This research focuses on how the health and well-being of communities can be improved through greater awareness of good nutrition and behaviour change.





Urbanisation in South Africa is occurring at a rapid rate and informal settlements are growing on the outskirts of cities and towns. Recent figures released by the World Bank show that the proportion of people living in urban areas has increased from 52% in 1990 to 62% in 2011.

Despite rapid advances in the provision of health care since democratisation in 1994 there remain concerns about the health status of communities in urban areas combined with high levels of poverty.

Both under-nutrition and diseases of lifestyle need to be addressed in developing countries such as South Africa. Urbanisation is often accompanied by a transition from a traditional high fibre, low fat diet to a typically “Western diet” associated with a number of chronic diseases such as obesity, cardiovascular conditions, hypertension and type-2 diabetes mellitus.

“Hidden hunger” has become a phenomenon of global concern. This refers to the lack of micro-nutrients – vitamins and minerals – in foods commonly consumed by resource constrained communities. A lack of variety and diversity in the diets of communities often have an impact on growth and cognitive development of children, the health of individuals, interpersonal relations and the ability to survive.

It is important to limit the burden of diseases of lifestyle in this sector of the population and to

address the problem of under-nutrition, including hidden hunger. Diseases of lifestyle must primarily be addressed through prevention and health promotion rather than the management of conditions after they have occurred.

Eradication of hunger

This requires the development of culturally appropriate interventions which could encourage sustainable livelihoods and play a role in the eradication of poverty – and hunger – in South Africa and beyond.

The challenge is to facilitate behaviour change. Research in this area can provide insight in how well individuals function in their daily lives and how they perceive their own physical, mental and social well-being. It will also reveal which factors interfere with their intentions to experience a positive well-being.

“Well-being” refers to positive psychological functioning in terms of self-acceptance, positive relations with others, purpose in life, personal growth and positive self-images. Consumer well-being can be defined as the satisfaction with experiences during the consumption of goods and services – from acquisition through possession and preparation to the eventual disposal of the product.

Through greater insight into perceptions, attitudes, values and nutrition behaviours, hidden hunger can be addressed and nutrition, food security, health and environmental sustainability strengthened. This can be achieved through:

- Raising awareness and educating people on health promoting messages through appropriate programmes, including social marketing;
- Facilitating behaviour change through the communication of nutrition and health-related messages. This will lead to increased knowledge, changing attitudes and ultimately change behaviour;
- Enhancing social responsible food consumption and social change, including the reduction of the carbon footprint of food;
- Assessing the impact of health promotion programmes over time.

Research conducted and actions taken through these programmes link up well with the other themes initiated by the IFNuW, thus also strengthening the visibility of the IFNuW and positioning it as a global leader in this field of research.



Theme Leader:

Prof Ronél Ferreira is Head of the Department of Educational Psychology at the University of Pretoria. Her primary research focus areas are psychosocial support within the context of vulnerability, the psychological well-being of children and communities; HIV&AIDS, asset-based psychosocial coping, and the use of action research in combination with intervention-based studies that could facilitate community development and well-being.

With a PhD in Education Psychology from the UP, Prof Ferreira is involved in various research projects, some of which involve international affiliations. She is a rated researcher at the South African National Research Foundation (NRF) and the recipient of the Samuel Henry Prince Dissertation Award of the International Sociological Association (2009). In the same year she received the Young Researcher Award

Theme D Leader: Prof Ronél Ferreira

from the University of Pretoria and was also honoured with the Young Researcher Award from the Education Association of South Africa (EASA) in 2007.

Prof Ferreira incorporates academic service-learning and community engagement through her research, teaching and learning activities. She actively involves postgraduate students in broad research projects and joint publications.

She has successfully supervised and co-supervised 27 master’s students and six PhD students to completion of their studies. She is the author of 22 published articles in peer reviewed journals, 13 chapters in academic books, one scholarly book and contributed to presentations at 43 national and international conferences.

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Project 1: Schools as sites for social change: facilitating adjusted behaviour in resource-constrained communities by empowering children

Major changes in consumption behaviour can be achieved through the empowerment of children with correct information and by providing them with adequate skills, lifestyle choices and access to nutritional products.

The project focuses strongly on schools as “sites for social change” and on the training of teachers to impart health-related messages. In the long term, the aim is to encourage social responsible food production, food consumption and social change in resource-constrained communities by using children’s voices.

A parallel leg of the research recognises the fact that modern lifestyles are often characterised by sedentary behaviour and lack of exercise resulting in a global increase in chronic diseases. This is also evident in the recent explosion in the market of wellness centres, emphasising the need to explore the physiological components of overall wellness.

The project will also devise scores to serve as indicators of overall wellness. This will provide individuals with an understandable assessment of the current state of well-being. Over time, the impact of the health promoting interventions will be monitored and evaluated against this wellness index. This data will be modified for future research projects in other schools.

The research findings will contribute to the growing body of knowledge about nutrition and its impact on health in resource-constrained communities. This can assist decision-makers to adjust their strategies to meet the

broad objectives contained in the Millennium Development Goals, most notably:

- Goal 1 – Eradicating extreme poverty and hunger;
- Goal 4 – Reducing child mortality rates;
- Goal 5 – Improving maternal health; and
- Goal 7 – Ensuring environmental sustainability.

The project includes primary research and knowledge creation, combining the outputs of a team of researchers in collaboration with post-graduate students. This will result in capacity building and the transfer of experience to young researchers.

It focuses strongly on social responsibility that could translate into better well-being in a sustainable environment. The research is conducted at the psychosocial and cognitive interface between food, nutrition and well-being that relates to food and nutrition behaviours of communities and individuals.

It addresses sustainable natural resource management and vulnerability to risk by facilitating behaviour change that reduces the food carbon footprint and enhances environmental sustainability and healthy diets.

Project leaders

- Prof Ronel Ferreira – see profile on page 89



Ms Gerda Gericke is Head of the Department of Human Nutrition at the University of Pretoria. With an MDiet from the UP her primary fields of research interest relevant to this study are eating behaviour; nutrition education to promote good health and nutrition behaviour change.

She has supervised several theses for the MDietetics degree on food intake and eating behaviour which contributed to her experience in the development of appropriate methodology and data collection techniques.

She was actively involved in the National Food Consumption Survey – Food Fortification

Study in 2005. Ms Gericke was responsible for developing and verifying the Knowledge, Attitude and Behaviour Questionnaire used for data collection and quality control and for interpreting and reporting the findings. In 1999 she was involved in a similar national study (National Food Consumption Survey-Food Fortification Baseline Study I) on the food consumption of children aged one to nine years. She served on an advisory committee for the SA National Health and Nutrition Survey (2012/13) and is the co-author of World Health Organisation publication on food security.

Email: gerda.gericke@up.ac.za



Prof Peet du Toit is senior lecturer in the Department of Physiology at the UP. As part of

his drive to improve education methods, he has developed a number of multimedia packages, including: Sports Vision, Health Genius, Body Genius Performance Kit, Profile Genius and the Eye-drills online performance evaluation package. The Health Genius package, the Body Genius Performance Kit and the TEARS principle system were awarded Telematic Education Innovation Awards at the University of Pretoria. He is one of two nominees selected to represent UP at the National Heltasa Teaching Awards.

Prof Du Toit's lectures are evidence-based and therefore his research contributes significantly to the industry. He is currently supervising seven honours, 14 MSc and two PhD students. He has published 47 articles and presented at 73 conferences, workshops and short courses

He is a reviewer for SA Journal for *Research in Sport; Physical Education and Recreation; Stress; Journal of Anthropology; South African Journal of Education* and the *Journal of Sports Science and Medicine*. Prof Du Toit is a member of the Physiological Society of Southern Africa (PSSA), a member of the ACBSP-Accreditation Council For Business Schools & Programs, USA and a member of the ECBE-European Council For Business Education, Switzerland. He is also a founding member and chair of the Neuroscience research group at the University of Pretoria, Institute for Cellular and Molecular Medicine and an associate of the Institute for Food, Nutrition and Well-being.

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Team members:

- Prof Peet du Toit – UP Department of Neuroscience and Physiology;
- Ms Karien Botha – UP Department of Educational Psychology;
- Dr Nicoleen Coetzee – Department of Psychology;
- Prof Elmarie de Klerk – Department of Consumer Science;
- Ms Nicki de Villiers – UP High Performance Centre;
- Prof Liesel Ebersöhn – Department of Educational Psychology;
- Prof Ronel Ferreira – Department of Educational Psychology;
- Prof William Fraser – Department of Curriculum Studies;
- Dr Rina Grant – Head of Research – Section Sports Medicine;

- Dr Craig Grobbelaar – Department of Physiology;
- Dr Christa Janse van Rensburg – Head: Section Sports Medicine;
- Prof Lise Korsten – Department of Microbiology and Plant Pathology;
- Prof Ernst Kruger – Department of Biokinetics, Sports and Leisure Sciences;
- Dr Rendani Ladzani – Department of Human Nutrition;
- Dr Carien Lubbe- de Beer – Department of Educational Psychology;
- Dr Kim Nolte – Department of Biokinetics, Sport and Leisure Sciences;
- Dr Annemarie Viljoen – Department of Consumer Science;
- Dr Zelda White – Department of Human Nutrition;
- Dr Paola Wood – Department of Biokinetics, Sport and Leisure Sciences;

Students:

- E Smuts (Cook)
- E Henning
- H Terblanche
- M King
- D Khumalo
- M Kleynhans
- F Mohamed-Ali
- L Naicker
- J Lawson
- J Fourie
- P Janse van Vuuren
- S Le Roux
- J Clarke
- G Kalmeier
- M Payne
- B Smit
- R Treurnich
- K Rhodes
- R Ebersohn
- D Ngwenya
- M Jooste
- S Mostert
- D Kupolati





Front left to right: Mr Mmatlou Kalaba, Prof Tessa Marcus, Prof Sheryl Hendriks, Dr Friede Wenhold, Prof Liesel Ebersohn and Dr Michael van der Laan
 Back: Prof John Annandale, Mr Jacques van Rooyen, Dr Annemarie Viljoen and Prof Johann Kirsten



Strategic planning and policy reform to manage food security risks

Decision-makers across Africa require strategic, evidence-based information on food security and nutrition. This will enable them to take vital decision which will have an impact on the lives of communities and contribute to the global efforts to combat hunger and poverty. The research conducted by the IFNuW contributes to evidence and knowledge.

Achieving food security in Africa requires a delicate balance of policies, strategies and programmes based on empirical evidence and best practice. Quite often, governments and multinational development agencies have to weigh up the competing interests of producers, consumers and vulnerable communities to develop an appropriate and sustainable framework.

The ultimate objective is to achieve food security – a situation defined by the World Food Summit in which “*all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life.*”

This is a complex development issue – touching not only on the health of communities but also on sustainable economic development, the environment and trade.

On the continent of Africa, the Comprehensive Africa Agriculture Development Programme (CAADP) provides a framework to achieve these goals but considerable policy support is needed in-country and across the Regional Economic Commissions.

However, empirically-based evidence to influence policy reform is lacking and monitoring and evaluation systems are still based on agronomic and food balance systems. These ignore the need to understand the impact of policies and programmes on intended beneficiaries and the requirements for comprehensive monitoring and evaluation of the multiple facets of food security.

In line with emerging international interest on food security policy, the aim of research conducted through Theme E is to provide strategic evidence-based guidance on food security and the nutrition impact of national and regional policies. This will enable decision-makers to reflect, disseminate and learn from best practice and influence policy reform and strategic planning in Africa.

Affecting the lives of millions

Understanding who and where the hungry and food insecure are and identifying appropriate policy instruments to manage and promote household food security and sustainable livelihoods will have a powerful impact on the African transformation agenda and affect the lives of millions of households who face food insecurity risks.

International research focuses increasingly on the issues of price volatility and the transmission of price hikes to consumers. Very little is understood regarding the drivers of volatility and the impact on rural households and

smallholders. While higher prices are good news for farmers, reduced purchasing power has an impact on consumption behaviour among consumers and ultimately affects health and well-being.

There is a great deal of international attention on the development of agricultural value chains, but not enough thought has been put into how such development can contribute to much needed broad-based development, bring the most poor into the growth agenda and address crucial nutrition problems.

Simple adjustments of the product mix – the identification of non-farm opportunities; the protection and preservation of nutrients through processing; exploring alternative market channels and collective marketing opportunities – can provide gender-sensitive, pro-poor growth opportunities to the most vulnerable and marginalised members of society.

Meeting the needs of the poor

The promotion of nutrition-sensitive value chain development can bring significant health benefits to children and other vulnerable groups – pregnant mothers, the elderly and the ill – with special nutritional requirements.

Social protection is a crucial tool to meet the needs of the most poor and vulnerable. Carefully designed programmes can provide the essentials for survival to communities at risk and, thus, reduce the burden on the state for emergency and crisis responses and help to mitigate hunger and poverty. Social protection programmes that provide transfers – food, cash or assets such as livestock – provide for those in need, protect vulnerable households and promote sustainable livelihoods.

However, very little is known regarding the most appropriate options and models for efficient investment in social protection programmes which can also contribute to social stability and reduce the reliance on international aid.

The research conducted by the IFNuW will provide decision-makers with the necessary information and evidence to enable them to make informed choices and advance the cause of food security in Africa.

Theme Leader:

Prof Sheryl Hendriks – see profile on page 12

Project 1: Feed the Future Innovation Lab for Food Security Policy

Stimulating growth in agriculture has proven to be an effective way to reduce poverty and increase food security in Sub-Saharan Africa and Asia. However, this sector was neglected in many government and donor investment portfolios over a 25-year period.

To address and correct this neglect, heads of state in Africa formed the Comprehensive African Agriculture Development Programme (CAADP) as a shared framework to achieve sustained public expenditure in support of agricultural growth and poverty reduction. Governments in Asia have adopted similar approaches at country level, with coordination on food security and agricultural trade through the Association of Southeast Asian Nations (ASEAN).

Increased investment in agriculture alone will not be sufficient to address existing development challenges. Governments that champion CAADP programs, as well as development partners such as USAID, recognise that increased public investment must be accompanied by better policies and a more conducive policy environment.

In the absence of effective policies, the private sector, from smallholder farmers to multi-national agribusiness firms, will not have adequate incentives to make their own investments, undermining the impact and rationale for public investments in agriculture. Indeed, ineffective policies can sometimes discourage private investment and have the opposite effect to that intended by policymakers.

Using science and technology

The lack of engagement with private sector and other non-government stakeholders in policy debates and policy formation is increasingly recognised to be a key constraint on the impact of public investment programmes.

Shortly after the conclusion of US President, Barack Obama's June 2013 visit to three African countries – including South Africa – the US Agency for International Development (USAID) announced the launch of two new “Feed the Future Innovation Labs”. USAID administrator, Rajiv Shah, said this initiative reflected Pres Obama's strong focus on using science and technology to help smallholders meet the challenge of increasing cereal production – even as climate change alters environmental conditions and reduces agricultural productivity.

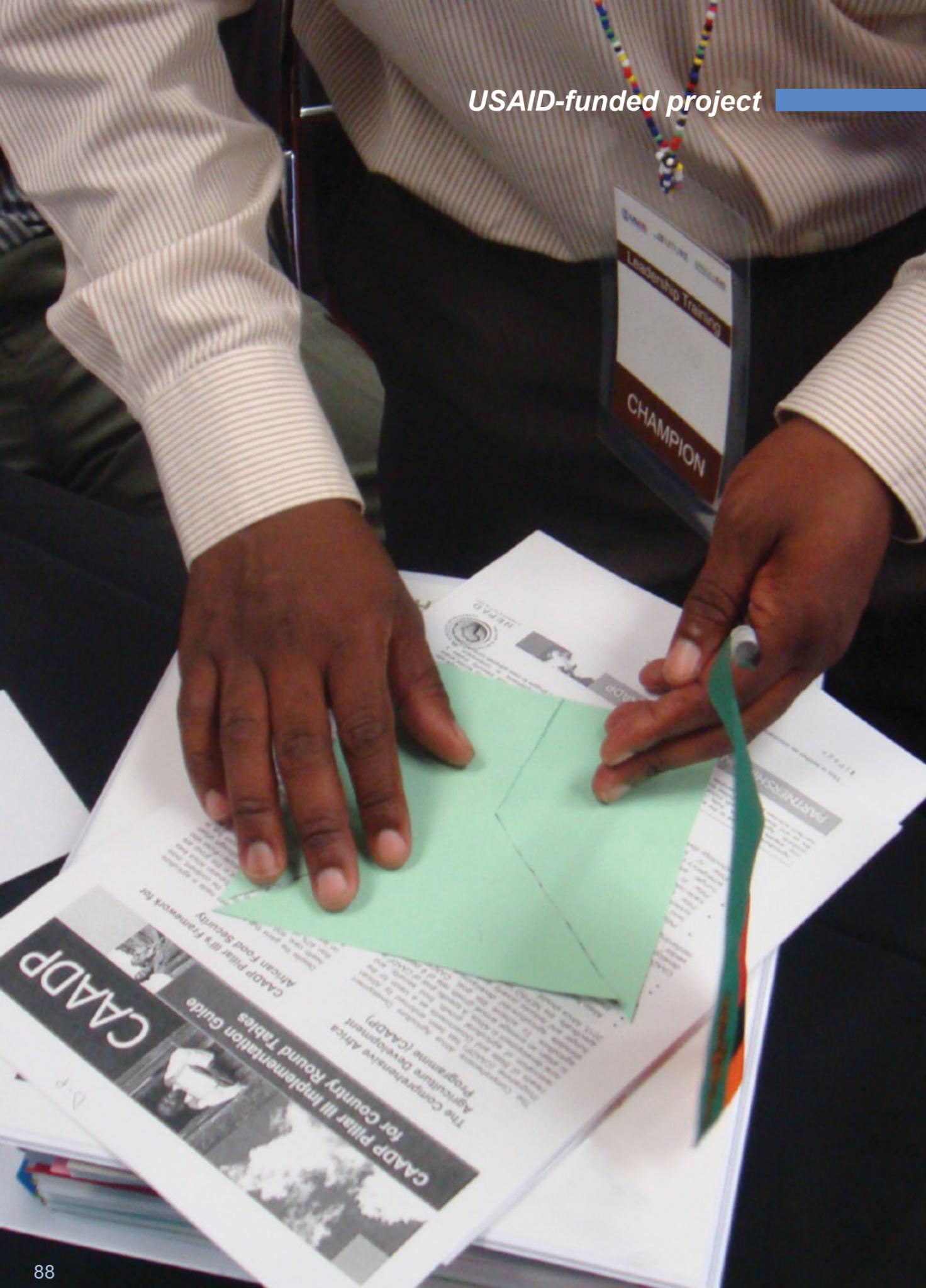
The Feed the Future Innovation Lab for Food Security Policy is led by a consortium including Michigan State University, the International Food Policy Research Institute and the University of Pretoria. This initiative will help increase partner countries' capacity to identify and implement improved food security policies that can help facilitate greater food security and nutrition.

This Innovation Lab will work with and support a wide range of governments, local think tanks, university researchers, private sector associations and civil society groups in building capacity and providing critical information to inform better food, agriculture and nutrition policies.

Improve policy implementation

The overall goals of the FSP program are to promote inclusive agricultural productivity growth, improved nutritional outcomes, and enhanced livelihood resilience through improved policy environments. This will be

USAID-funded project



achieved through increased in-country capacity to generate policy-relevant evidence and analysis used by stakeholders to improve policy formulation and implementation.

The FSP focus will be on two integrated objectives:

- Address critical evidence gaps for informed policy debate and formulation at country, regional and global levels;
- Foster credible, inclusive, transparent and sustainable policy processes at country level.

The project provides an exciting opportunity to mobilise institutional research experience through a global partnership. This is a major opportunity for the Institute of Food, Nutrition and Well-being to participate in a global research programme with well-established partners offering a wealth of knowledge and experience. It will provide valuable opportunities for postgraduate students and significantly raise the profile of both the IFNuW and the University of Pretoria.

Participating institutions, partners and team members:

The USAID Feed the Future Innovation Lab for Food Security Policy was awarded to a consortium comprised of Michigan State University (MSU), the International Food Policy Research Institute (IFPRI) and the University of Pretoria. The overall Project leader is Prof Duncan Boughton from Michigan State University's Food Security Group.

The UP team is led by Prof Sheryl Hendriks and consists of:

- Prof Ferdi Meyer – Department of Agricultural Economics, Extension and Rural Development (UP Faculty of Natural and Agricultural Sciences);
- Prof Lorenzo Floramonti – Department of Political Science (UP Faculty of Humanities);
- Prof Coleen Vogel – Department of Geography, (UP Faculty of Natural and Agricultural Sciences);
- Dr Marnus Gouse – Department of Agricultural Economics, Extension and Rural Development (UP Faculty of Natural and Agricultural Sciences);
- Ms Angela McIntyre – Research Assistant, IFNuW

Project 2: Food insecurity information systems

In health you cannot treat what you cannot diagnose. This is as true for disease as it is for hunger and food insecurity. Without accurate and robust measures that identify hunger and food insecurity, there is no hope of addressing the misery they cause. Nor is it possible to know if the actions taken to address them have their intended impacts.

The 2015 Millennium Development Goals (MDG1) requires the reduction by half of the 1996 levels of both poverty and hunger. Current estimates show that only 12 of 53 African countries are likely to achieve the MDG1 poverty targets by 2015 and 13 are likely to achieve the hunger target. Ghana, which achieved both by 2011, is likely to remain the only country on the continent to reach this.

Internationally, the universal measurement of poverty is per capita, per day income in purchase parity terms. To date, an equivalent consensus measure for food insecurity has not been developed despite two decades of research. The absence of an agreed scientific approach to measure the complicated and complex state of food insecurity and deprivation is a major constraint on efforts to combat hunger.

In South Africa, our understanding of food insecurity and poverty is compromised by out-dated data. The 2010 South African MDG Report is based on 2006 poverty and 2005 nutrition-related data. These statistics are too far removed from current realities.

Moreover, they do not reflect the cyclical nature of hunger and deprivation that constrains human and economic development and traps at least a quarter of South African children in under-development and poverty. Public resources cannot be optimally directed because the depth, breadth and severity of food insecurity are poorly understood.

Monitoring the impact

This research project seeks to address this problem by creating nationally representative, time-series data against which it will be possible to monitor and evaluate the impact of food security and hunger alleviation programmes and policies at the district, provincial, national, regional and international levels.

The purpose of this study is to develop a set of empirical measures for food insecurity, determine cut-off values for differentiating between classes of severity of food insecurity and develop a pilot score card to measure and monitor food insecurity. The specific aims are:

- Identify concise measures for food insecurity that can be monitored continuously and, through periodic national surveys, provide up-to-date and accurate information on the state of food insecurity in South Africa;
- Develop a food security score card for monitoring food insecurity over time;
- Determine cut-off values for differentiating between classes of severity of food insecurity;
- Test the accuracy of the score card and its component measures against existing databases for accuracy;
- Establish a panel database in at least one community to evaluate the score card and develop a 'dashboard' that demonstrates the trends among the score card indicators over time.

The project will create a real-time food security information system that monitors changes in levels of food security and enables timeous, actionable reporting.

International significance

A highlight of work to date is the development of a real time digital survey tool using indicators identified through the project. The tool has been operationalised in Jozini, in KwaZulu-Natal where it is linked to the survey for the Water Research Commission project profiled on page 99. It is being tested in the Department of Family Health's Community- Oriented Primary Health Care Programme (profiled on page 109).

Project researchers have also engaged with StatsSA to participate in the review of the General Household Survey and the development of a Continuous Population Survey. Initial research results were presented at the 5th Joint Ministers Meeting on Agriculture Environment and Natural Resources organised by the Common Market for Eastern and Southern Africa (Comesa) in Addis Ababa in September 2013. An invited paper based on the initial assessment of continental food security assessment has been published in the *European Journal of Development Research*.

The project contributes to the Institutional Research Themes in two important ways. One is through the development of indicators to measure food security. The other is to find a way of measuring the real time impact of programmes and policies that address food

insecurity. Both contributions are of national, regional, and international significance and will inform post-MDG discussions and African development.

Project leader

- Prof Sheryl Hendriks – see profile on page 12

Team members:

- Prof Jannie Hugo – Department of Family Medicine (UP Faculty of Health Sciences);
- Prof Tessa Marcus – Department of Family Medicine (UP Faculty of Health Sciences);
- Dr Friede Wenhold – Department of Human Nutrition (UP Faculty of Health Sciences).

Students funded by and working on the project:

- Mr Christopher Manyamba;
- Ms Maria Molokomme;
- Mr Corné van der Merwe.

Project partners:

- The National Research Foundation's competitive programme for rated researchers.

From left to right: Dr Mjabuliseni Ngidi, Mr Mmatlou Kalaba, Ms Maria Molokomme, Prof Sheryl Hendriks and Mr Chris Manyamba



Project 3: Bureau for Food and Agricultural Policy

The Bureau for Food and Agricultural Policy (BFAP) has become a valuable resource to the agro-industrial sector by providing analyses of future policy and market scenarios and measuring their impact on farm and firm profitability.

Founded in 2004, the BFAP has offices at the University of Pretoria, the University of Stellenbosch, and the Western Cape Department of Agriculture. It is made up of 37 public- and private sector researchers, analysts and experts who pool their knowledge and research to inform policy and decision-making within South Africa's food system.

The BFAP is a multidisciplinary and inter-institutional platform collaborating with the Food and Agricultural Policy Research Institute (FAPRI) and the University of Missouri, the Food and Agricultural Organisation (FAO), the Thünen Institute in Braunschweig, Germany, and is part of the newly established Regional Network of Agricultural Policy Research Institutes (ReNAPRI).

Over the past ten years the BFAP has developed a number of tools and systems to analyse agricultural commodity markets, looking at the sustainability of farming systems, unpacking food value chains and understanding consumer behaviour. Addressing the impact on consumption is an often neglected element of food price analysis.

Future scenarios

The Bureau has been tracking South African commodity prices. The framework is based on the global data feeding into the South African situation – looking at supply and demand balances and farm sustainability. The typical analyses look at price trends, shocks and future outlooks. The Bureau generates future scenarios of the production and consumption of food under various macro and policy assumptions and projects commodity and food price inflation, taking price transmission and market integration into consideration.

For the past ten years the BFAP has published the South African Agricultural Baseline where a 10-year outlook is provided for 44 agricultural commodities and the consequent impact of the outlook on farm profitability and household food affordability is indicated.

Apart from the Baseline, the BFAP has a further range of standardised products that are published on a regular basis, for example the contributions to the quarterly Food Price Monitor published by the National Agricultural Marketing Council (NAMC). BFAP researchers keep track of the impact of food price inflation on household food expenditure patterns and provide a quarterly outlook of food price inflation.

The BFAP also undertakes independent research projects. Over the past ten years, more than thirty research reports have been compiled and published. The most recent reports were conducted for the National Planning Commission and focused on employment in agriculture and a sectoral analysis of minimum wages. The BFAP developed an employment matrix for the agricultural industry that was included in the National Development Plan 2030. Other recent research was conducted on the impact of the proposed National Water Resource Strategy on job creation and household food security in a pilot irrigation region in Mpumalanga.

Since its inception, 14 master's and five PhD degrees have been completed under BFAP, which has led to the publication of a range of articles in journals and other literature. BFAP researchers have delivered 92 presentations at a range of national and international conferences and workshops, either by means of an invitation or through a peer reviewed process.



Strong partnerships

The Bureau consults to both private sector local and international companies as well as the national government. Long-standing partnerships have been formed with institutions such as the National Agricultural Marketing Council (NAMC), ABSA and SAB Miller. It is the BFAP's vision to expand the analysis into African countries through the newly established Regional Network of Agricultural Policy Research Institutes (ReNAPRI).

Through a partnership with the Bureau, the Institutional Research Theme that focuses on food security and nutritional impacts of policies and programmes has access to a comprehensive system of models and economic intelligence that is unique in the South African context and has a 10-year track record. It is the only system that has the ability to undertake simultaneous quantitative impact analysis of external shocks on farm, sector and consumer levels and also has the ability to generate a set of plausible future scenarios of the South African food system taking risk and uncertainty into consideration.

Project leader

Prof Ferdinand Meyer holds the position as director of the Bureau for Food and Agricultural Policy (BFAP) and associate professor in the Department of Agricultural Economics, Extension and Rural Development at the University of Pretoria. He has served on the National Crop Estimates Committee and is a Board Member of the Protein Research Foundation (PRF) and the Regional network of Agricultural Policy Research Institutes (ReNAPRI). He holds a rating as



young researcher from the National Research Foundation (NRF); 14 masters' and 4 doctoral students have graduated under his supervision, and under BFAP he has led 35 research reports and delivered 74 national and international presentations at conferences as invited speaker.

His field of interest relevant to the IRT includes developing future scenarios for agricultural markets and food systems through econometric modelling and scenario thinking techniques. Future scenarios highlight future supply, demand, trade and price patterns under a range of assumptions. The co-integration of various key drivers in the value supply chains is analysed and the impact on price risk and volatility measured.

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Project 4: Current rain-fed and irrigated production of food crops and its potential to meet all year round nutritional requirements of rural poor people in North West, Limpopo, KwaZulu-Natal and Eastern Cape provinces

An earlier study by the Water Research Commission (WRC) revealed numerous knowledge gaps with regard to smallholder production and food security in South Africa. It highlighted the fact that there is limited current and generalisable food and nutrition research conducted in the country. (WRC Project K5/1954/4 and published WRC report number TT 537/12)

Very few studies have investigated the sources of food of the rural poor across seasons. Of particular concern is the absence of particular, nutrition-sensitive agricultural interventions – in which water forms the link between the agricultural practices and nutrition. This has an impact on eventual outcomes of health, education and economics.

The two primary knowledge gaps that were identified and which are relevant to this study are:

- What is the contribution of home / smallholder grown foods to total dietary intake and nutritional requirements?
- What is the effect of seasonality on home / smallholder production and resultant food intake?

Efficient use of water

The study addresses a significant and longstanding gap in knowledge on this topic with the intention to propose a set of options which

can strengthen rain-fed and irrigated production in rural areas. The more efficient use of water can overcome dietary inadequacies and lead to better nutrition of rural household members.

It will determine what agricultural production is possible under rain-fed and irrigated conditions that will contribute to household food security in rural areas of South Africa. The team takes into account household consumption needs, production and the area required to produce sufficient crops in the specific location to meet the year-round consumption requirements of rural households.

A desk study was conducted to carefully select the most food insecure areas in the identified provinces. The first survey was done in the community of Jozini in KwaZulu-Natal. The initial findings show that rural diets in Jozini are mostly traditional but very few wild foods are consumed. Hunger is not widely experienced by the majority of households except during certain months of the year that coincide with periods of very low agricultural activity.

The results raise concerns over the quality of diets consumed by the households in terms of variety and nutritional quality.

Solving real issues

The study contributes directly to the IRT goals and purpose, providing opportunities for student bursaries, research training and an opportunity to bring experts from Nutrition, Plant Production and Agricultural Economics together to solve a real issue identified by the WRC.

The study has the potential to produce a report which details the type of crops and production systems that should be further researched for its potential to provide adequate diets for the rural poor in terms of their water use, yield and good management practices.

Project leader

- Prof Sheryl Hendriks – see profile on page 12

Team members:

- Dr Friede Wenhold, Department of Human Nutrition (UP Faculty of Health Science);
- Dr Annemarie Viljoen, Department of Consumer Science (UP Faculty of Natural and Agricultural Sciences);
- Mr Mmatlou Kalaba, Department of Agricultural Economics, Rural Development

and Agricultural Extension (UP Faculty of Natural and Agricultural Sciences);

- Prof John Annandale, Department of Plant Production and Soil Science; (UP Faculty of Natural and Agricultural and Sciences);
- Mr Duncan Stewart, LIMA Rural Development Foundation;
- Ms Makhosazana Dlamini, LIMA Rural Development Foundation.

Students funded by and working on the project:

- Dr Mjabuliseni Ngidi (Postdoctoral fellow),
- Mr Christopher Manyamba (PhD candidate),
- Ms Angela McIntyre (PhD candidate),
- Ms Maria Molokomme (master's candidate),
- Ms Grace Timanyechi Munthali (master's candidate)
- Mr Corné van der Merwe (honours candidate)

Project partners:

- Water Research Commission of South Africa;
- Department of Water Affairs, Forestry and Fisheries.

From left to right: Dr Mjabuliseni Ngidi, Prof John Annadale, Dr Annemarie Viljoen, Mr Corné van der Merwe, Ms Maria Molokomme, Ms Angela McIntyre, Dr Friede Wenhold, Prof Sheryl Hendriks, Ms Grace Tima Munthali and Mr Mmatlou Kalaba



Project 5: Support to the Department of Agriculture, Forestry and Fisheries on the Comprehensive African Agricultural Development Programme (CAADP)

In 2003, African Heads of State and Government signed the Maputo Declaration, committing the continent to accelerate agricultural growth and poverty reduction to ensure food security in Africa. The framework for this growth is the Comprehensive African Agricultural Development Programme (CAADP).

The CAADP agenda asks African governments to adopt policies and programmes and raise investments to achieve a growth rate of 6%, and a budget share of 10%, for the agricultural sector. This should be implemented through country-led comprehensive development programmes that seek to:

- attain food security;
- improve agricultural productivity to attain a 6% annual agricultural growth rate;
- develop dynamic regional and sub-regional agricultural markets;
- integrate farmers into a market economy; and
- achieve a more equitable distribution of wealth by 2015

The objectives of the project are to facilitate a national process of stocktaking, consultation and analysis to produce a South African National Agriculture and Food Security Investment Plan under the CAADP.

Accelerated agriculture growth

The University of Pretoria was asked to support the seven-step process required to develop a nationally-owned CAADP Compact. This sets

out the priority programmes for the country, the CAADP targets and a national investment plan that aligns national programmes and commits government and its partners to accelerated agricultural growth and poverty reduction.

The process includes:

- identifying constraints to agricultural growth and food security in the country;
- estimating the magnitude of change required to meet the CAADP targets;
- creating an inventory of options for government to consider;
- prioritising these interventions;
- packaging them as a programme with clear implementation mechanisms and targets; and
- gaining support from the in-country and international development community in implementation.

The UP team worked closely with the National CAADP Focal Person, Mrs Noncedo Vutula, and the DAFF team to design a unique provincial consultation process to identify the constraints, opportunities and priorities for agricultural growth and poverty reduction in the provinces.



FAO-funded project

A productive meeting was held with private sector representatives as well as a workshop at the annual Agricultural Economics Association of Southern Africa conference. These consultations have produced a rich picture of the context of agriculture and food security in the provinces and contribute to the building of a matrix of priorities to consider in the design of the South African Compact and Investment Plan. Simultaneously, an analysis of various aspects of the South African agriculture and food systems is being conducted including reviews of policies, programmes and trends.

The provincial workshops were exciting opportunities to build an understanding of the realities on the ground for many people in South Africa. The active participation of small farmers, cooperative groups and women's organisations has been a real highlight. A farmer from Limpopo stated: *"Never have I seen or attended such a workshop and seen the seriousness of the government in trying to help farmers"*.

A farmer from the Eastern Cape commented: *"I am seeing for the first time farmers participating in government processes. In such meetings, there are usually quarrels and disagreements. But here there was agreement between officials and farmers!"*

The process is closely observed by the international development community as it is a unique approach to ensure a bottom-up and nationally owned development process.

The opportunity to support DAFF in the identification of key priorities to stimulate economic growth and ensure food security is an excellent example of the trans-disciplinary nature of the IFNuW's work.

Building a clearer picture

Each provincial consultation builds a clearer picture of the realities on the ground and identifies priority programmes through interaction with multiple stakeholders. Instead of top-down desk research, the project provides an opportunity to experience and then conduct the empirical research to test the potential of the identified programmes.

In parallel, a series of papers are being prepared by the UP, South African and international authors for special journal issues that will support the multi-sectoral analysis. In addition to the academic outputs flowing from the research, the project has numerous other benefits to the IRT, including building a sound relationship with DAFF; an opportunity to work with the Food and Agriculture Organisation, provincial departments and the private sector.

Most importantly this initiative provides the IFNuW an opportunity to make a tangible contribution to address the issue of food security and invest directly in the future of the country.

The project supports the development of the CAADP Compact – a set of priority programmes that government will commit to – and the accompanying National Agriculture and Food Security Investment Plan.

The Compact will be endorsed by Cabinet and signed at a ceremony hosted by the Southern African Development Community (SADC), the African Union and NEPAD. The Investment Plan will be reviewed by a team appointed by the AU/NEPAD and presented to the international development community.

Project leader

- Prof Sheryl Hendriks – **see profile on page 12**

Team members:

- Mr Mmatlou Kalaba of the UP Department of Agricultural Economics, Extension and Rural Development, in partnership with the Food and Agricultural Organisation and the Department for Agriculture, Forestry and Fisheries.
- The project is managed by BE@UP.

Students working on the project:

- Dr Mjabuliseni Ngidi;
- Mr Christopher Manyamba;
- Ms Maria Molokomme

Project partners:

This project is an exciting partnership with active engagement with Mrs Noncedo Vutula (Chief Director: International Relations and Trade, DAFF), Mr Winston Makabanyane (Director, Africa Relations, DAFF), Ms Bongeka Mdleleleni (Africa Relations, DAFF), Dr Tobias Takaravasha (Representative of FAO in South Africa), Mr Lot Malati (Assistant FAO Representative for Programmes) and the African Union/NEPAD Coordinating Agency through a Letter of Agreement administered by Business Enterprises at the University of Pretoria.

The province of Gauteng is currently developing a 20-year food security plan to reduce the levels of hunger by 50% and increase access to food by 2030.

This involves a comprehensive process of consultation with communities, stakeholders, officials and academics to determine the extent of food insecurity and map out strategies to address it.

Strategic programmes will be implemented to achieve specific targets by 2030, including:

- No more than 5% of the population should experience hunger;
- No more than 10% of the population should experience inadequate access to food; and
- No more than 13% per cent should live in poverty by 2030.

The Institute for Food, Nutrition and Well-being is working in partnership with the Gauteng Department of Agriculture and Rural Development (GDARD) to develop and implement the food security plan.

Long-term food security

The objective of the research is to produce a Gauteng Food Security Situational Analysis and design an information system capable of long-term monitoring and evaluation of food insecurity levels in the province in support of a plan of action to ensure food security for all in Gauteng.

The outcome of the project will be the delivery of a 20-year Food Security Plan for Gauteng.

The project has been a most exciting partnership between GDARD and the project team. The study highlighted that nearly one in five individuals in Gauteng experiences hunger, difficulty in accessing enough food and lives in poverty. The numerous on-going projects implemented by the Province are not coordinated into an efficient, targeted and comprehensive programme.

There is no comprehensive map of food insecure populations in Gauteng available to

guide the targeting of communities, households and individuals and assessments have been carried out to determine the impact of current programmes and projects.

Meeting the Province's ambitious targets will require concerted, coordinated effort through carefully designed programmes that meet the real needs of the food insecure portions of the population. It should also facilitate the inclusion of a large number of people into the economy through increased agricultural production, improved purchasing power and sustainable livelihoods.

Priority programmes

Seven priority programmes were identified through two consultative workshops – one with national, provincial and municipal participants and the second, with community members from the four Community Rural Development Programme sites in Gauteng. The plan was finalised in consultation with Provincial Management.

The identified programmes are:

- Capacity building for unemployed women and out of school youth;
- Encouraging the establishment of household and community food gardens;
- Establish a nutritional feeding scheme (including strengthening of school feeding programmes);
- Input supplies to stimulate and boost production by smallholders and subsistence producers;
- Facilitating access to markets through direct contracting;
- Provision of public goods to support food production and marketing through the Comprehensive Agricultural Support

Programme (CASP) to support smallholder production;

- Coordination, monitoring, evaluation and reporting.

The plan is currently under discussion at various levels and management structures in the province and will be submitted to the Gauteng Provincial Legislature for approval.

Community engagement

A highlight of the programme so far has been the engagement with communities and officials during consultative workshops. Participatory group activities enabled community members to understand the causes of hunger and poverty and contribute to the discussions about coping strategies and opportunities to overcome it.

Numerous practical suggestions were made by the participants regarding the programmes the Province should be offering to support food production and marketing, capacity building and food assistance programmes for those not able to provide for themselves.

The project has provided opportunities to hear first-hand from communities about their struggles to produce and secure enough food to feed their families. The participatory discussions

have provided a rich understanding of people's every-day struggles and clear direction on what is needed to overcome hunger and poverty to ensure food security in the Province.

The interaction with officials gave researchers an insight into the institutional constraints facing officials who really want to make a difference in the lives of people they serve. The workshops included pre-and post-testing of knowledge on food security to help identify learning gaps that will inform future teaching and learning at the University of Pretoria.

Project leader:

- Prof Sheryl Hendriks – see profile on page 12

Students funded working on the project:

- Mr Christopher Manyamba;
- Ms Maria Molokomme.

Project partners:

- The Gauteng Department of Agriculture and Rural Development;
- Business Enterprises at the University of Pretoria.

Project 7: COPC Living Laboratory

The project looks at the disparity between health care inputs and the health status of a large part of the South African society. It examines the implementation of Community-oriented Primary Care as an element in the re-engineering of primary health care and as basis for the future introduction of a National Health Insurance system.

The intention is to contribute to a functioning, effective and efficient primary health care system which supports improvements in the health status of communities. It will support the delivery of Community-oriented Primary Care (COPC) within the City of Tshwane and its integration into the National Health Insurance System.

Among its envisaged outcomes are:

- a sustained improvement in the delivery of primary health care services;
- more experience for students, professional practitioners and community health workers in primary health care, based on authentic learning;
- inter-disciplinary and inter-professional practice;
- strengthened research activities.

Improving community health

Through this project the research team wants to improve the health of communities and gather appropriate evidence and knowledge that can guide future development.

The Living Laboratory project sets out to achieve a number of objectives:

- To develop and research the process and impact of COPC and community engagement on student learning, learning of COPC team including community health workers and community health.
- To contribute to a deeper understanding of the issues through communicating the findings of the project to students, service providers, learning institutes and communities;

- To maintain COPC Living Laboratory as a continuous learning platform for students, health care practitioners and members of the community;
- To encourage undergraduate and post-graduate student involvement in COPC and primary care re-engineering.

COPC was implemented in a number of sites through Municipal Ward-based Outreach Teams. The COPC teams, consisting of community health workers, nurses and doctors, deliver comprehensive on-going care in specific geographical areas in the City of Tshwane

Initial findings demonstrate the way in which major complex epidemics are present in communities and the inability of the existing health services to identify and respond adequately and timeously.

The LCAS (Longitudinal Community Attachment for Students) programme in collaboration with the Department of Construction Economics was awarded the UP Laureate Education Innovation Award in 2012. The Department of Family Medicine Team has been awarded the 2013 HELTASA Education Award.

A long term collaboration agreement with the City of Tshwane to implement COPC on a large scale is being finalized. In this the Department of Family Medicine will be responsible for the ICT and data management and the education and research in the project. This will provide a stable COPC education and research platform in Tshwane.

The COPC Living Laboratory provides a service-learning-research platform for community-





Photo Credit: COPC Living Laboratory

based practice in the City of Tshwane. It is built on an on-going, real-time, household-based information system that provides basic information on health and social issues, including nutrition and wellness.

Project leader



Prof Jannie Hugo

As Head of the UP's Department of Family Medicine Prof Hugo is accountable to a society that suffers from disproportionate poor health. He sees his academic mandate as teacher and primary care practitioner as a platform to have an impact on health care not only now, but through his students in the next 20+ years.

Building and guiding an unbelievably creative, committed and diverse team at UP Family Medicine is a fascinating journey that requires on-going decisive action, reflection and adaptation.

Prof Hugo learnt his trade at the University of the Free State, gained experience in primary care practice in the mountain villages of QwaQwa, and grew up as an academic in the Medunsa Family Medicine department from 1989 to 2006.

He participates in local, national and international primary health care and education through memberships of the Health Professions Council of SA, the Collaboration for Health Equity through Education and Research, Primafamed (Primary care and family medicine network for Africa) and the Madibeng Centre for Research.

Through these experiences he has learnt to view and engage education and health care from the local individual – patient and student – level to the household, ward, district, national and international system levels.

Team members:

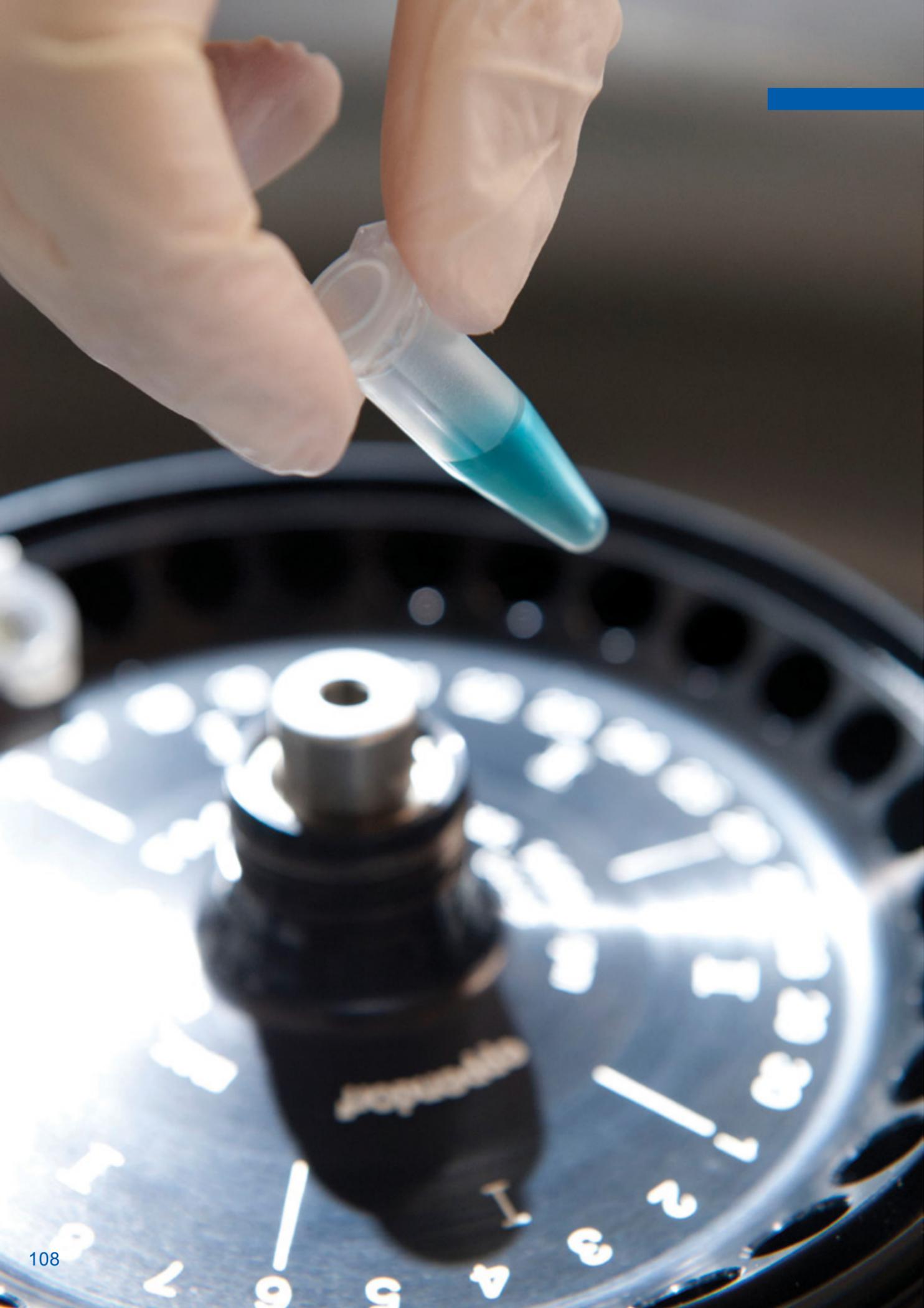
- Prof Tessa Marcus - Extraordinary Professor, Department of Family Medicine.
- Ms Nomonde Bam - Associate Professor, Department of Family Medicine.
- Dr Philemon Mahuma - Family Physician, Senior Lecturer, Department of Family Medicine.
- Dr Fritz Kinkel – Research, Department of Family Medicine.
- Ms Nina Honiball – Communication Specialist, Department of Communication Design.
- Dr Sarie Oosthuizen - Family Physician, Senior Lecturer, Department of Family Medicine.
- Prof Selma Smith - Adjunct Professor, Department of Family Medicine.
- Dr Marietjie van Rooyen - Family Physician, Senior Lecturer, Department of Family Medicine.
- Dr Ellenore Meyer - Family Physician, Senior Lecturer, Department of Family Medicine.
- Mr Riaan Jansen - Senior Lecturer, Department of Construction Economics.

Students:

- Ms Jeannie van der Linde
- Dr Joven Ongole
- Dr Mologadi Chauke
- Dr Taurai Gororo
- Dr Owen Eales
- Dr Raj Lamlall
- Dr Urvi Bhoora
- Dr Dalene Chan
- Dr Paul Ajemba

Project partners:

- The National Department of Health;
- The Gauteng Department of Health;
- City of Tshwane;
- The Foundation for Professional Development;
- The Council for Scientific and Industrial Research (CSIR);
- Mezzanine;
- Synaxon;
- Wellnicity;
- Get Connected.



IFNuW's Advisory Board members



Dr. Ousmane Badiane is the Africa Director for the International Food Policy Research Institute (IFPRI). In this role, he coordinates IFPRI's work program in the areas of food policy research, capacity strengthening, and policy communications in Africa. He is also in charge of IFPRI's partnerships with African institutions dealing with the above areas.

Dr. Badiane, a national of Senegal, was Lead Specialist for Food and Agricultural Policy for the Africa Region at the World Bank from January 1998 to August 2008. He previously worked at IFPRI as Senior Research Fellow from 1989 to 1997, when he led the institute's work on market reforms and development. While at IFPRI, he taught, as adjunct professor, at Johns Hopkins' School of Advance International Studies from 1993 to 2003. Dr. Badiane received a Masters Degree and PhD in agricultural economics from the University of Kiel in Germany. He was awarded a Doctorate Degree Honoris Causa from the University of KwaZulu Natal in 2010 and inducted as "Distinguished Fellow" of the African Association of Agricultural Economists the same year.



Ms Brenda Koornneef joined Tiger Brands 10 years ago as Category Director for the Main Meal category, and subsequently became Managing Executive for the Tastic Rice Corporation. Six years ago she was appointed as Business Executive, responsible for Group Marketing and Corporate Strategy Executive. She is a member of the Tiger Brands Executive Committee and Board member for subsidiaries Haco Tiger Brands in Kenya and Chococam in Cameroon

Having obtained her B.Com degree, she started her marketing career with Unilever as a trainee graduate, and spent 15 years with the organization both locally and internationally, progressing to Marketing Director, Unilever Detergents South Africa. She left Unilever to join the SABC as general manager for SABC2 (formerly TV One), where she spent several years working to successfully commercialise the channel. After leaving the SABC, Brenda was appointed Managing Director of Games Africa and Moribu Limited— the listed lottery organization which developed and managed the successful lottery games Ithuba, Viva and Zama-Zama.

From there Brenda joined Tiger Brands.

Brenda has served on several non-profit organization and industry Boards and continues to do so, in addition to serving on the Boards of Tiger Brands subsidiaries in Africa



Mr Janusz Lutrek holds degrees in both Chemical Engineering from the University of Pretoria and Law from UNISA and is a registered Attorney, Patent Attorney, and a Professional Engineer. In 1997 Janusz became a partner of Hahn & Hahn attorneys, a boutique law firm founded in 1951 and specializing in technology law and intellectual property law. Janusz is a Custodian Member of the South African Association for Food Science and Technology (SAAFoST) and sits on both the Industry Affairs and the Food Law committees of the Consumer Goods Council of South Africa as well as sitting on the Food Law Advisory Group of the Department of Health.

Janusz has assisted many leading listed companies as well as the CGCSA and SAAFoST with their various Foodstuffs, Comsetics, and Disinfectants Act and Regulations, Medicines and Related Substances Act and Regulations, and Consumer Protection Act submissions to various Government Departments and Parliament as well as implementation in their businesses. In particular, Janusz has been extensively involved in the GMO debate having made submissions to DTI and the NCC on these issues and having assisted CGCSA in its endeavour to clarify the situation with the Commissioner of the NCC.

This in depth and on-going involvement in the process has given Janusz special insight into Food Law, the Consumer Protection Act, and the GMO aspects thereof.



Prof Lucky Mathebula is a businessman with active ownership in a number of companies. He is a policy analyst and a strategic planning consultant. His experience includes scenario planning, political risk analysis, public sector consulting, political advisory services to a number of politicians (across the continent). He holds a Ph.D in Public Administration and a Harvard Business School Executive Leadership Development Certificate as well as a Fribourg University Diploma in Intergovernmental Relations. His professional strengths include group think facilitation, strategy development, socio-political risk analysis, coalition building, change management and stakeholder relationship management.



Prof Richard Mkandawire is a Socio-economist and a rural development expert. He is a graduate of the University of Malawi (Bachelor of Social Science), University of Missouri, Columbia USA (MA and MSc.), and the University of East Anglia, UK (PhD). Prof. Mkandawire has previously taught in the Universities of Malawi, Zambia, and in South Africa.

He is currently Vice President of the African Fertilizer and Agribusiness Partnership. Before taking this position he worked as a Senior Advisor to New Partnership for Africa's Development (NEPAD), and leading the conceptualization and implementation of the Comprehensive Africa Agriculture Development Programme (CAADP). Professor Mkandawire is a member of the Malawi Presidential Advisory Committee on the Economy, and is a member of the National Development Council of Malawi

Prof. Mkandawire has received the following awards for his work in spearheading the agenda: awarded an 'Honorary Doctorate' in 2009 (DSc Honoris Causa University of KwaZulu-Natal) CAADP agenda and rallying continental and global support towards agriculture in Africa and the 'Drivers of Change' award in 2008 for leadership in advocating and convincing African leaders and the international community that Africa can master the ability and political will to overcome hunger and poverty through CAADP. In recognition of his work in Agricultural Policy Development and Advocacy, Prof. Mkandawire was appointed by the University of Pretoria in 2012 as Extra- Ordinary Professor.

Prof. Mkandawire has also previously worked with the Commonwealth Secretariat as the

Commonwealth Youth Programme Regional Director for Africa. He has extensive experience in development initiatives in Southern Africa spanning a period of over two decades. He has researched and published extensively in the following areas: Agriculture and Food Policies in Southern Africa, Artisanal Fisheries Development, Land Tenure Systems and Agrarian Development, Gender and Development and the Youth and Reproductive Health among other areas.



Dr. Tobias Takavarasha is currently since February 2013 the United Nations Food and Agriculture Organization (FAO) Representative for South Africa. Before that he worked as a Senior Agricultural Policy & Investment Officer at the NEPAD Planning and Coordinating Agency (NPCA) in South Africa seconded from the FAO to support the Comprehensive Africa Agriculture Development Program (CAADP) and agriculture and food security related programs in Africa. He also worked previously as Director for Strategy, Monitoring and Evaluation at the Alliance for a Green Revolution in Africa (AGRA) in Nairobi, Kenya (2008-2010) and is a former Permanent Secretary for the Ministry of Agriculture in Zimbabwe (1996-2000). He has worked extensively in Malawi and in the SADC region within the agricultural public and private sectors. Tobias holds a PhD. in Agricultural Policy (University of Zimbabwe), a Masters Degree in Agricultural Economics and a Bachelors degree in Economics respectively from Leeds and Birmingham Universities in the United Kingdom.

IFNuW's Inter-Faculty Board of Management

The Deans of the collaborating faculties have been actively engaged in the development of the Institutional Research Theme and continue this active leadership and oversight through the Inter-Faculty Board of Management.



Prof André Boraine is Dean of the Faculty of Law. He was previously the Head of the Department of Procedural Law from 1999 to October 2011. He was appointed as Senior Lecturer in the Department of Mercantile Law at the University of Pretoria in 1985, promoted to Associate Professor and to the rank of Professor in 1997. He holds a LLB (Pret) LLM *cum laude* (Wits) and LLD (Pret).

He is a co-founder and Director of the Centre for Advanced Corporate and Insolvency Law, which has been extensively involved in the drafting of new insolvency legislation. Prof Boraine is frequently invited to present papers at national and international conferences and he has published extensively in the field of Insolvency Law. He is co-author of the third edition of Silberberg and Schoeman's "Law of Property" and Meskin's "Insolvency Law". Both these volumes are regarded as leading textbooks in the respective fields of Property Law and Insolvency Law in South Africa.

Prof Boraine serves on the editorial panel of the *International Insolvency Law Review*. He also serves on the management board of the

Academics Group of Insol International and is an Honorary Member of the Association of Insolvency Practitioners of South Africa. Recently he was appointed as a consultant to the World Bank for a diagnostic analysis of the legal framework in South Africa for regulating insolvency law and the rights of debtors and creditors.

Prof Eric Buch is a medical doctor and registered specialist in Community Medicine. Prior to his appointment as Dean of the Faculty of Health Sciences in 2000, he was Professor of Health Policy and Management in the School of Health Systems and Public Health at the University of Pretoria and Health Adviser to the New Partnership for Africa's Development (NEPAD).

Before joining the University of Pretoria, Prof Buch was Deputy Director General for Health Care of Gauteng; Executive Director for Health, Housing and Urbanisation of metropolitan Johannesburg and a founder and Director of the Centre for Health Policy at the University of the Witwatersrand. He served as General Secretary of the National Progressive Primary Health Care Network and was an active member of the National Medical and Dental Association. He began his career with an MRC research fellowship and by co-founding the Wits Rural Health Services Development Unit in Bushbuckridge, where he co-ordinated the team



that ran one of the first Primary Health Care (PHC) nurse training courses. He is a founding member of the Board of the Global Health Workforce Alliance.

Over the past 30 years Prof Buch has gained executive experience in academic, government, NGO and global health environments in the fields of health policy and management, health systems, the health workforce and in research, education and community service and has built skills in strategic development. Over the past decade he has grown his expertise in the field of Human Resources for Health at the continental and global levels. He is currently working on developing an Executive Leadership Programme in Health in collaboration with Harvard and Fort Hare Universities. He is the scientific co-ordinator of a European Union Incodev Project on Global Health Initiatives in Africa.



Prof Irma Eloff is the Dean of the Faculty of Education at the University of Pretoria. She is an NRF-rated researcher and registered psychologist. She works in positive psychology, early intervention and inclusive education and has received several awards for her research in Education and Educational Psychology. She studied at the Universities of Pretoria, Stellenbosch and North-West, receiving both her honours-and master's degrees with distinction.

Prof Eloff was a visiting professor at Yale University during 2001-2002 and has presented lectures across the globe. She is a past President of the Education Association of South Africa and currently the Chair of the Education Commission of the *SA Akademie vir Wetenskap en Kuns*.

Prof Eloff has published more than 55 academic articles and book chapters and 45 master's and

doctoral students have completed their studies under her supervision. She co-authored the book *Life Skills & Assets* and is co-editor of the book *Keys to Educational Psychology*.



Prof Anton Ströh has been Dean of the Faculty of Natural and Agricultural Sciences since May 2004. He completed his postgraduate studies at UP where he obtained his BSc (Honours) and MSc degrees cum laude and was awarded his PhD in 1989 at the age of 24. In 1988 he was appointed as Lecturer in the Department of Mathematics and Applied Mathematics. In 1994, the renowned Banach Centre in Warsaw invited him to do research for a period of six months. During this visit, he completed a Riesz decomposition theory relative to closed ideals in operator algebras by solving – in its most general form – a question on ideal structures of operator algebras with Prof L Zsido from Rome, Italy. In July of the same year he received the University's Young Researcher of the Year Award. Prof Ströh was promoted to Associate Professor in 1996 and to Professor in 2000. At the same time, he was appointed as the Head of the Department of Mathematics and Applied Mathematics.

In 2000 he was appointed as the Chairperson of the School of Mathematical Sciences, which consisted of the departments of Mathematics and Applied Mathematics, Statistics and Insurance and Actuarial Science. In 2008 he was elected by the Senate as a member of the Council of the University and by Council on the Standing Committee of Council in 2010. He was elected as Chair of the National Science Deans Forum (NSDF) in 2009.

Over the past ten years, Prof Ströh has made significant contributions to the research field

of functional analysis with interpretations in quantum statistical mechanics. In a series of papers, starting with a fundamental paper of more than 50 pages published in 2003 in the *Journal of Operator Theory*, Prof Ströh and his local and international collaborators introduced the notions of ergodic theory, mixing and recurrence properties in quantum dynamical systems for the first time. This work has gained considerable attention worldwide.

Prof Ströh has delivered papers at various local and international conferences and has been a co-organiser of five international conferences. He is the author of various research articles in internationally accredited journals. In 2001, he received a gold medal from the South African Mathematical Society for his contribution to research capacity building and in 2003, 2006, 2009 and 2012 he received an Exceptional Achievers Award from the University of Pretoria.



Prof Gerry Swan qualified as a veterinarian in 1973 at the Faculty of Veterinary Science at Onderstepoort, was awarded a MMedVet specialist degree in Veterinary Pharmacology and Toxicology at the University of Pretoria in 1988 and his PhD (Pharmacology) at the Potchefstroom University, now the North-West University in South Africa in 1997.

He spent short periods in private practice and state veterinary practices and then served for 10 years in the veterinary pharmaceutical industry – mainly as Manager of an International Animal Science Research Laboratory responsible for the development of veterinary medicines. In 1985 he joined the Faculty of Veterinary Science and progressed through the ranks starting as Senior Lecturer through Professor and Head of Department. In October 2005 he was appointed

the Dean of the Faculty of Veterinary Science, University of Pretoria, the position he still holds.

He has served on several national and international professional and expert bodies, including President of the South African Veterinary Association, Member of the Medicines Control Council (MCC) of South Africa, expert consultant to the WHO and OIE and as Fellow of the American Pharmacology Society. He was the longest serving member of the MCC from 1987 through 2009 (22 years) when he decided to step down.

He is a standing member of the Joint FAO/WHO Expert Committee of Food Additives (JECFA) dealing with risk assessment of veterinary product residues in food and has recently been nominated as a member of the SA Academy of Science. More recently he has been appointed to the SANParks Board.

He has published extensively with 74 scientific papers to his credit in ISI accredited scientific journals. His research is currently focused on wildlife and has recently contributed in the containment of vulture mortalities due to the Non-Steroidal Anti-Inflammatory Drug (NSAIDs) diclofenac, in Asia. He is a rated scientist with the NRF and has been the recipient of several professional and research awards. In 2005 he received the Sasol Vulture Conservationist award for his research on NSAIDs in vultures.



Prof John Annandale was appointed as a lecturer at UP in the Department of Plant Production where he also completed his MScAgric degree, and then his PhD in Soil Physics at Washington State University in 1991. Prof Annandale returned to the Department in 1992 and has climbed the ranks to Full Professor and is now acting Head of the Department. Professor Annandale has developed and taught courses in Agronomy, Irrigation Management, Agricultural Climatology and Environmental Biophysics. He has supervised or co-supervised over 20 masters' and 10 PhD students, and his group has received numerous awards for their papers and presentations at congresses. He is a Fellow of the South African Society of Crop Production and has published close to 60 peer reviewed papers in scientific journals.

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Dr Natalie Aneck-Hahn is a Director of the Environmental Chemical Pollution and Health (ECPH) Research Unit in the Faculty of Health Sciences at UP. She is also currently an Extra-ordinary Lecturer in the School of Health Systems and Public Health.

Dr Aneck-Hahn obtained her Dtech degree in 2003 and completed a Post-fellowship at the School of Health Systems and Public Health under the leadership of Prof Christiaan de Jager. She is currently on the Global Water Research Coalition's EDC Toolbox II project, investigating additional EDC bioassays.

Dr Aneck-Hahn has 13 publications in peer-reviewed/refereed journals and seven published full-length conference papers/keynote addresses as co-author.

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Prof Roumen Anguelov is a professor in the Department of Mathematics and Applied Mathematics at UP. His primary research area is differential equations and their numerical analysis with the main emphasis on reliable numerical computations.

In recent years Prof Anguelov's work has focused largely on applications to biological sciences. He plays a key role at the University in promoting inter-disciplinary collaboration in the general field of biomathematics and is instrumental in the organisation of initiatives such as the Biomath Forum series of lectures. His research can be applied to issues such as population dynamics and epidemiology: zoonotic diseases, vector-borne infections, mosquito control, gene-drive into population and ecological systems.

Prof Anguelov received a B-rating from the NRF.

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Prof Zeno Apostolides is Head of the Complementary and Alternative Medicines Laboratory at the UP. He completed his BSc, and MSc degrees, majoring in Chemistry and Biochemistry, at the University of Pretoria. His DSc was partly done at the UP and the University of Delaware in the USA while on a Fulbright Scholarship.

He is the founder and leader of the Tea Research Laboratory that had been doing research on various projects in the tea industry. He has presented keynote addresses at international conferences in Kenya, China and Japan.

He has served on the editorial boards of several journals, and is the former editor of the *International Journal of Tea Science*. His current h-index = 13 and NRF rating = C. Prof Apostolides has a passion for medicinal plants and identifying the best cultivars (chemotypes) for high-potency health properties by metabolomic and genomic studies. He also acts as co-supervisor for students evaluating health properties of peptides and functional biomolecules.

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Prof Theresa Aveling is associate professor in Microbiology and Plant Pathology in the UP Faculty of Natural and Agricultural Sciences. She is a widely-regarded seed scientist with experience in seed technology, vigour, germination and seed health. Prof Aveling served as Chair of the International Seed Testing Association (ISTA) Seed Health Committee since 2006. She is a work package leader in the EU FP7 TESTA project on seed research and has conducted private research for chemical and seed companies.

Her participation in the IFNuW programme recognises the importance of securing food production through the safeguarding of the seed. The research involves general seed health and the role of seed treatments, both chemical and alternative, and the improvement of seed germination and vigour of a range of crops.

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Prof Megan Bester – Associate Professor, Head of Section: Histology, Cell Biology and Embryology, Department of Anatomy, Faculty of Health Sciences, University of Pretoria.

Prof Bester has a PhD in Medical Biochemistry and is an established in the field of research related to the evaluation of molecules and complex mixtures for toxicity and health benefits. Expertise has been developed in the field of cell- and animal based models for the evaluation of safety, toxicity of these products at a tissue and cellular. A well-established postgraduate program allows students to obtain research based degrees in this field. Other research areas within this group related to Food, Nutrition and Well-being is the role of functional food products in reducing heavy metal induced oxidative damage.

Field of interest relevant to the IRT: Use of cell based models for the evaluation of functional food for health benefits such as antioxidant and anti-inflammatory effects. Products evaluated include honey from southern Africa, tea, medicinal plants and bio-active peptides. Identification of constituent molecules and understanding the mode of action is an area of research.

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Prof Chris Blignaut is Professor in Agricultural Economics, Extension and Rural Development. He obtained his B and MSc degrees from the UP and his doctorate from the University of the Free State, where he was a member of the faculty and head of the Department of Agricultural Economics when he left during 1986 to join government.

He currently teaches agricultural finance and international trade in agricultural products. As from the beginning of 2012 he has chaired Milk SA's Board of Directors and researched and compiled the Dairy Development Initiative (2000). He has published more than 35 scientific and more than 100 popular articles, and contributed chapters to two books and wrote many official and scientific reports. Prof Blignaut contributed to the Committee Investigating Increasing Food Prices (2002) and the Price Monitoring Committee (2003). He is an honorary member of the Agricultural Economics Association of SA (AEASA), as well as having received various study and travel bursaries and grants.

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Prof Riana Bornman is Head of Andrology and Extraordinary Professor at the UP Department of Urology. Since 2002 her Public Health focus has been on health effects in malarial areas where insecticides, including DDT – a known endocrine disrupter and toxicant – are applied for mosquito vector control with inadvertent exposure of humans and the environment.

She is an NRF-rated researcher, member of the UP Centre for Sustainable Malaria Vector Control (UPCSMC) and served on several World Health Organisation committees. Scientific data from human and environmental studies in Vhembe were incorporated in the WHO DDT Health Risk Assessment (2011). She has compiled various reports for the Water Research Commission on endocrine disrupters, DDT and human and environmental health effects.

Most recently she served on the expert panel that compiled “*The State of the Science on EDC 2012*” for the United Nations Environment Programme (UNEP) and the World Health Organisation. Prof Bornman holds membership of various national and international societies, including the International Society of Environmental Epidemiology (ISEE), the Society of Environmental Toxicology and Chemistry (Europe) (SETAC) and the African Branch of the Society of Environmental Toxicology and Chemistry (SETAC Africa).

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Dr Francien Botha is a senior lecturer in the Department of Paraclinical Sciences, Phytomedicine Programme in the UP Faculty of Veterinary Sciences. She has lectured Microbiology in different faculties. She acquired an MSc Veterinary Microbiology and worked at the Faculty of Veterinary Sciences at MEDUNSA, the Department of Microbiology and Plant Pathology University of Pretoria, and at the Animal and Dairy Science Research Institute.

Her research focuses on antimicrobial activity of natural products against zoonotic diseases and infection by several microorganisms and fungi, trying to improve animal and human health and to make food products from animals more safe for consumption. She is the author and co-author of several scientific publications and abstracts published in scientific journals and deliver numerous scientific presentations at national and international congresses.

Dr Botha is also involved in a variety of research projects in collaboration with the following Departments and Institutions: the Laboratory for Microscopy and Microanalysis, the Department of Botany, the Department of Food Sciences, the Faculty of Natural and Agricultural Science, at the University of Pretoria and the Onderstepoort Veterinary Institute.

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Ms Karien Botha is a lecturer in Educational Psychology at the UP. She is interested in the psycho-social well-being and support given by teachers to learners and their communities within the school environment – especially in resource-constrained communities.

She holds expertise in the field of learning support methods to accommodate diverse learners. Through her teaching experience she has formed a well-constructed body of knowledge about children, teaching and learning support. Her experience in learning support and teaching gave her the opportunity to establish networks that promote effective communication between learners, teachers and parents, as well as with government organisations. Community development also became evident in the development of her professional career. During her studies thus far she has been involved in a variety of projects aimed to benefit communities and individuals.

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Ms Cerkia Bramley is a qualified attorney and agricultural economist. She is an agricultural and food law specialist with a particular interest in the role of law in food system governance. Ms Bramley is currently a researcher at the Institute for Food, Nutrition and Well-being (IFNUW) at the University of Pretoria.

She completed a master's degree in Agricultural Economics at the University of Pretoria. Her thesis explored the relevance of geographical indications in the South African Agricultural sector.

She has participated in various projects related to the economics of food quality. Her research interests include intellectual property and food labelling issues in an international trade context, food standards and the role of the State in supporting differentiation strategies in the agricultural sector.

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Prof Elna Buys obtained her BSc degree in microbiology at Stellenbosch University, her MSc at the University of Pretoria and her PhD degree from the University of the Witwatersrand. She was employed as a researcher at the Agricultural Research Council, Irene for 11 years and joined the Department of Food Science, University of Pretoria in 2001. She was appointed Head of the Department of Food Science at the UP in February 2012.

Her research has focused on the shelf life extension of meat and dairy products and in particularly elucidating the effect that food processing has on the physiology and structure of spoilage and pathogenic bacteria. She is a NRF C2-rated scientist and recently spent five months studying and conducting research at the University of Valencia Spain.

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Prof Norman Casey graduated from the University of Natal (BSc (Agric); MSc (Agric)) and the University of Pretoria (DSc (Agric)). In 1979, he accepted an academic appointment at the University of Pretoria in livestock production physiology. As professor, he was the Head of the Department of Animal and Wildlife Sciences from 1992 to 2005. He is chairperson of the Ethics Committee of the Faculty of Natural and Agricultural Sciences and sits on the Senate Committee on Research Ethics and Integrity. He is Honorary President and a former President of the South African Society of Animal Science and is a Ministerial appointee on the Council for Natural Scientific Professions of which he is currently the President. He is President of the World Association of Animal Production, was Vice-president of the International Goat Association and chaired the 8th International Conference on Goats and 9th International Symposium on Ruminant Physiology.

His research, academic prowess and intense interest in Animal Science have been recognised through numerous awards. His publications are 85 in science journals; 24 scripts in books and reference manuals; more than a hundred and sixty associated with conference contributions, information publications and technical reports. Sixty-nine graduate candidates have signed off under his supervision. He has more than three decades of experience in livestock science and water quality for livestock. He has done extensive research on water quality and its effect on animal health and has written guidelines and easy to use hand reference documents. His research and publications are continuing in the field of livestock production physiology.

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Dr Magdalena Coetzee is a senior lecturer in UP's Physiology Department. She is co-author of a number of research publications and acts as supervisor for postgraduate students. She conducted research visits to various international facilities including the Department of Medical Sciences, Uppsala University Hospital, Sweden; Nordic Bioscience, Herlev, Denmark; and the Institute of Food, Nutrition and Human Health, Massey University, New Zealand.

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Dr Nicoleen Coetzee obtained her PhD (Psychology) in 2006 at the University of Limpopo: Medunsa Campus. She lectured at the University of Limpopo and acted as the Coordinator for the Research Methodology Course (REME) as well as the Protocol Development Course (PROD). In 2006 she accepted a position at the University of Johannesburg and focused her research on Sport Psychology. She joined the University of Pretoria in 2010. She is currently the coordinator for the coursework MA Research Psychology Programme. She has lectured supervised studies and reviewed book chapters as well as articles related to the field of Positive Psychology.

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Prof Steve Cornelius is professor in the Department of Private Law and holds the degrees Bluris LLB (Unisa) LLD (Pret). He is admitted as Advocate of the High Court of South Africa. He teaches Law of Contract, Intellectual Property Law and Capita Selecta Private Law (an elective in the LLB program).

He joined the UP Department of Private Law as Professor in 2010 after serving in the Department of Private Law at the University of Johannesburg and Department of Justice, Public Prosecutor and Legal Officer in the Branch: Legislation Research. He played an important part in the drafting of regulations required for the functioning of the Human Rights Commission, the Truth and Reconciliation Commission and the Special Investigating Unit.

He was a Visiting Fellow at Anglia Ruskin University, Chelmsford, England. Prof Cornelius is a Member of the Editorial Advisory Board of the *International Sports Law Journal* and national rapporteur for the *International Sports Law Review Pandektis*, which is the official journal of the International Association of Sports Law.

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Prof Tiaan de Jager is Deputy Dean of Research at the School of Health Systems and Public Health. He graduated in 1996 at UP with a PhD in Reproductive Biology and completed the Management Development Programme (MDP) in 1998. He did an international post-doctoral study at Laval University, Quebec City, Canada from 2000 to 2001.

He is a Professor in Environmental Health and an Extraordinary Professor in Andrology in the School of Medicine. He is also the Director of the UP Centre for Sustainable Malaria Control. Prof De Jager plays an active role in the Environmental Chemical Pollution and Health Research Unit, the UP Water Institute and the Institute for Food, Nutrition and Well-being (IFNuW).

He is research active and supervises students in the cluster on food safety, looking at pesticides and food. His research varies from food safety to water quality with a special focus on environmental endocrine disrupting chemicals (EDCs), toxicology and male reproductive health. Prof de Jager has a C NRF-rating (2011-2016), recognising him as an established scientist with international recognition.

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Prof Elmarie de Klerk has a strong research focus on socio-psychological and cognitive aspects of consumer behaviour, including food and nutritional behaviour. As professor and Head of the Department of Consumer Science, she has worked with postgraduate students on, amongst others, middle-childhood girls' experience of weight gain, anorexia nervosa girls' experience of the self, and life stages that could be associated with excessive weight gain in obese men. In these studies a symbolic interactionism and life course perspective was adopted as point of departure.

Although she is also working quantitatively, Prof De Klerk is an experienced qualitative researcher who has on many occasions done research amongst children. Prof De Klerk has received a C-3 rating from the NRF.

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Prof Riëtte de Kock is recognised as an established Sensory Food Science Researcher with a sustained record of productivity (NRF C-rating) since 2008. She is co-author of 28 papers in accredited journals. She is responsible for teaching modules on Sensory Science, Food Product Development and Meat Science and Technology.

She is a Mentor of the African Women in Agricultural Research Development (AWARD) programme of the Consultative Group on International Agricultural Research (CGIAR) 2009- 2010. Her recent involvement with international research projects include participation in the Development of Innovative and Healthful Marama Bean Products Targeting Niche Markets (European Union 2007 – 2009); Beef palatability in South Africa – implications for niche-marketing strategies (ACIAR 2009); and as Project Coordinator: Robustness of Cross-Modal Sensory Interaction (European Sensory Network 2013.)

She is a founder of the African Network for Sensory Evaluation Research for Improved Nutrition (ANSWER) in 2011 with the aim to engage scientists from cross-disciplinary fields in Africa with a mutual research interest in Sensory and Consumer Science.

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Prof Ned Donkin is an Associate Professor in the Department of Animal and Wildlife Sciences in the Faculty of Natural and Agricultural Sciences at the University of Pretoria.

He began teaching at the newly established Faculty of Veterinary Science at the Medical University of South Africa (Medunsa) and initiated the Milk Goat Project in 1987 within the Department of Animal Health and Production.

Prof Donkin is the vice-president of the International Goat Association, has served on its board between 2004 and 2008 and is a regular participant at international symposiums including as a member of the organizing committee of the International Goat Conference, held in Pretoria in 2004.

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Dr Gerrie du Rand specialises in the research field of local food production and consumption and the relevance to consumer behaviour. She is the head of the Food and Nutrition Section of the Department of Consumer Science.

Under her guidance six postgraduate students have received their degrees. She has published 11 contributions in numerous international journals and books, three technical reports for industry, with more than 26 contributions to conferences. Dr Du Rand manages all the food related programmes, laboratories and activities in the Consumer Science Department and her competence as teacher was recognised in 2009 with the Dux Docents award for best lecturer.

She collaborates widely with industry and other international partners and was invited as visiting scholar to Iowa State University in 2013.

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Prof Peet du Toit is senior lecturer in the Department of Physiology at the UP. As part of his drive to improve education methods, he has developed a number of multimedia packages, including: Sports Vision, Health Genius, Body Genius Performance Kit, Profile Genius and the Eye-drills online performance evaluation package. The Health Genius package, the Body Genius Performance Kit and the TEARS principle system were awarded Telematic Education Innovation Awards at the University of Pretoria. He is one of two nominees selected to represent UP at the National Heltasa Teaching Awards.

Prof Du Toit's lectures are evidence-based and therefore his research contributes significantly to the industry. He is currently supervising seven honours, 14 MSc and two PhD students. He has published 47 articles and presented at 73 conferences, workshops and short courses

He is a reviewer for SA Journal for *Research in Sport; Physical Education and Recreation; Stress; Journal of Anthropology; South African Journal of Education* and the *Journal of Sports Science and Medicine*. Prof Du Toit is a member of the Physiological Society of Southern Africa (PSSA), a member of the ACBSP-Accreditation Council For Business Schools & Programs, USA and a member of the ECBE-European Council For Business Education, Switzerland. He is also a founding member and chair of the Neuroscience research group at the University of Pretoria, Institute for Cellular and Molecular Medicine and an associate of the Institute for Food, Nutrition and Well-being.

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Prof Kwaku Gyebi Duodu holds a PhD in Food Science and is Associate Professor of Food Chemistry and Food Engineering in UP's Food Science Department. His research focus area is "*Health-promoting African foods and beverages*" in which several interrelated topics are being researched.

Since 2003, Prof Duodu has acted as supervisor or co-supervisor of 16 master's and doctoral students who have completed their degrees. He has been the main author or co-author of 30 articles in international peer-reviewed journals and five book chapters. Prof Duodu is a member of the editorial board of the *Journal of Food Composition and Analysis* and holds a C3 rating from the National Research Foundation.

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Ms Anette Durand is Quality Assurance Officer in the Department of Paraclinical Science. She comes from a background in feed and food quality research, specialising in hygiene management in abattoirs, food, feed and by-product plants. She then moved to the field of quality management. She obtained her MBL-degree in 1989. Her field of research interest is establishing quality management systems for laboratories on the Onderstepoort campus and achieving accreditation for selected facilities. This will support the IRT as quality of research forming part of the programme will be proven by the quality management systems.

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Prof Liesel Ebersöhn heads the Unit for Education Research in AIDS situated in the UP Faculty of Education. As a National Research Foundation-rated researcher she interrogates resilience as sustained transactional-ecological processes within resource-scarce education environments.

Her participation in the IRT stems from likeminded collaborative and trans-disciplinary inquiry in significant risk settings where sustainable resource management informs continued positive adaptation (resilience). In this regard she remains involved in participatory intervention studies in schools – with teachers – and in remote rural community settings. She has been principal- as well as co-investigator in several international and national studies.

She was appointed as associate professor and research fellow respectively in Yale University's Department of Psychology and Centre for Interdisciplinary Research in AIDS. She is a Past President of the Education Association of South Africa and serves on the council of the World Education Research Association (2010-2013). Prof Ebersöhn is the Editor of the *South African Journal of Education*.

She has published more than 44 articles in peer-reviewed journals, five books and contributed numerous chapters to international education-specific books. She has supervised 58 postgraduate students to completion – many of whom are now young education scholars at higher education institutions.

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Prof Marthie Ehlers obtained her PhD (Microbiology) at the University of Pretoria with a thesis entitled: *Bacterial community structure of activated sludge determined with SDS-PAGE*. She was a Claude Harris Leon Foundation Postdoctoral Fellow. She is currently Head of Research in the Department of Medical Microbiology and Senior Medical Scientist at the National Health Laboratory Service (NHLS). She established the postgraduate research programme in the Department of Medical Microbiology, which includes the TB research programme, the antibiotic resistance programme and the emerging and re-emerging pathogens programme.

Her research findings have been presented at 21 national and 29 international conferences. She is the author and co-author of 40 scientific publication and six handbook chapters. She has received several awards including the FRD Bursary, George Farrar Bursary and the HF Verwoerd Research Trust-Prestige award. She is a NRF Crated scientist. Prof Ehlers has supervised and co-supervised 24 BSc (Hons), three MMed, 21 MSc, six PhD and one Postdoctoral fellow.

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Prof JN (Kobus) Eloff is the founder and leader of the interdisciplinary Phytomedicine Programme, Department Paraclinical Sciences in the UP Faculty of Veterinary Science. His primary research and teaching focus on using plants to increase animal health and productivity.

He is a previous Executive Director of the National Botanic Gardens and Research Director at the National Botanical Institute. He has been a promoter for 46 MSc and 31 PhD students. Prof Eloff served as Editor of the *SA Journal of Botany*, the *SA Tydskrif vir Natuurwetenskap en Tegnologie*, the *International Journal for Phytomedicine*, *BMC Complementary and Alternative Medicine*.

He has presented more than 170 papers at international scientific conferences and more than 200 peer-evaluated scientific publications. He has been invited to review manuscripts for 144 different scientific journals. Prof Eloff received the Senior Medal for Botany, honorary life membership and Gold medal from South African Association of Botanists, the Havenga medal and the Gold medal from the Suid-Afrikaanse Akademie vir Wetenskap en Kuns, the Eskom Prize for capacity development from the National Science and Technology Forum and a Gold medal from the Academy for Science of South Africa.

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Dr Mohammad Naushad Emmambux is a senior lecturer in UP's Food Science department. He teaches food chemistry, cereal science and food rheology. His research deals with the science and technology of carbohydrate-based food biopolymers, with a focus on food nanotechnology. He has specific expertise in the isolation, characterisation, modification and application of indigenous African grain starches in food and non-food systems.

A highlight is that Dr Emmambux and his research team have successfully isolated starch nanomaterials from indigenous African cereal grains. They have shown that these nanomaterials have considerable potential as low kilojoule fat replacers in foods and as nanofillers in bioplastic films. His research is also focussed on 'in situ' modification of starches with food-friendly chemicals for low GI foods.

Dr Emmambux has a PhD in Food Science from UP and is a member of the SA Association of Food Science and Technology and the American Association of Cereal Chemists.

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Dr Folorunso Fasina is a senior lecturer in the Department of Production Animal Studies in the Faculty of Veterinary Science. He lectures on porcine health and production and supervises professional and research-based postgraduate students.

He has conducted research on highly pathogenic avian influenza H5N1, African swine fever (ASF), Foot-and-Mouth disease, Newcastle disease and other animal diseases. His recent work involved the use of a combination of classical epidemiologic, economic, laboratory and evidence-based tools to determine the prevalence of ASF in Nigeria.

Dr Fasina received the 2013 Exceptional Young Researcher of the Year Award from the University of Pretoria; the 2010 Personal Development Grant of the UN Food and Agriculture Organization; and the 2009 Animal and Human Health for the Environment and Development (AHEAD) Award of IUCN/WCS. He has authored over 55 publications in peer reviewed journals and contributed to a forthcoming book.

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Prof Ronél Ferreira is head of the Department of Educational Psychology at the University of Pretoria. She is also Theme Leader of the Institute for Food, Nutrition and Well-being at the same institution, leading a group of researchers across faculties in an interdisciplinary research project. She has been involved in various research projects, some of which involve international affiliations. Her research focus areas are psychosocial support within the context of vulnerability, HIV&AIDS, asset-based psychosocial coping and resilience, and the use of action research in combination with intervention-based studies that could improve community-based coping.

She is a Y-rated researcher and recipient of the Samuel Henry Prince Dissertation Award of the International Sociological Association (2009), the Young Researcher Award of the University of Pretoria (2009), the Young Researcher Award of the Education Association of South Africa (2007), and the Faculty of Education (University of Pretoria) Best PhD Dissertation Award (2006). In 2012, Ronél was visiting professor at both Fordham University (USA) and Providence College, Rhode Island (USA). She was recently appointed as associate editor of the newly established *Global Journal of Counselling and Guidance*. She has also been co-editor of the *South African Journal of Early Childhood* since 2010, associate editor of the *International Journal of Learning* during 2011 and 2012, and consulting editor for *IRCAB Journal of Arts and Education* in 2011. She serves on the editorial boards of *Educational Research for Social Change* and the *South African Journal of Education*. In January 2013 she was elected as incoming chair of the Education Association of South Africa.

Prof Ferreira has supervised/co-supervised 27 master's students and six PhD students. She has published 22 articles in peer reviewed journals, 13 chapters in scholarly books and one scholarly book.

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Prof Lorenzo Fioramonti is an associated professor of Political Science and Jean Monnet Chair in Regional Integration and Governance Studies at the UP. He is also the Director of the Centre for the Study of Governance. He is a senior fellow at the Centre for Social Investment at the University of Heidelberg and at the Hertie School of Governance, Germany and an associate fellow at the United Nations University Comparative Regional Integration Studies, Belgium.

He holds a PhD in Comparative and European Politics and has published over 40 scientific articles in international journals. Prof Fioramonti has coordinated the activities of three research groups within the prestigious EU FP7 programme and received funding from a number of sources including the European Commission, the SA Department of Science and Technology, the Italian Ministry of International Affairs and the Compagnia di San Paolo.

He is the first and only Jean Monnet Chair in Africa – a prestigious recognition awarded by the European Community to distinguished academics in the fields of regional integration and comparative regionalism studies.

In 2012, Prof. Fioramonti received the UP Exceptional Young Researcher Award.

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Prof Geoffrey T. Fosgate received his BS degree (Animal Science) and his veterinary qualifications (DVM) from Cornell University in Ithaca, New York, USA. He spent two years in private veterinary practice working predominantly in the field of large animal medicine and surgery. He subsequently obtained his PhD in Epidemiology from the University of California, Davis, USA and qualified as a diplomate of the American College of Veterinary Preventive Medicine.

Prof Fosgate is currently a Professor in the Department of Production Animal Studies and an Associate Editor for the journal *Preventive Veterinary Medicine*. His research interests include trans-boundary animal diseases and his expertise is the validation of diagnostic tests for surveillance and control of infectious diseases of cattle.

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Prof William Fraser is a chartered biologist (CBIOL), Fellow of the Society of Biology (FSB) and member of the South African Academy for Science and Arts (M.Acad.SA). He serves as adviser on the editorial boards of the *Turkish Journal of Distance Education*, the *Journal of Instruction and the Journal of Biological Education*. He is currently also a guest editor to the *South African Journal for Science and Technology*.

He is a member of the Education Association of South Africa, the South African Association for Research and Development in Higher Education, the European Association for Research on Learning and Instruction (EARLI) and the European Researchers in Didactics of Biology (ERIDOB). Prof Fraser has received numerous research and teaching awards from both the University of Pretoria and Unisa and holds a C2 rating from the NRF.

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Prof Anabella Gaspar is a Biochemist by training and has a C-rating from the NRF. She leads the Biotherapeutics Research Group and her current research is the structural and functional characterisation of antimicrobial peptides from ticks. Resistance of micro-organisms to antibiotics is a major problem and peptides may serve as templates for the design of novel anti-infective agents.

Her research has been presented at both national and international conferences and reported in peer-reviewed journals. To date she has supervised and co-supervised nine MSc and three PhD students and has acted as external examiner to local and international postgraduate students. She has served as council member of SASBMB, as reviewer for journals and is currently on the editorial advisory board of the *Brazilian Journal of Veterinary Parasitology*.

The focus of Prof Gaspar's research is the identification and characterisation of food-derived peptides with antihypertensive, antioxidant and anti-inflammatory properties. Mode of action and structure-function studies are required for pharmacological application of these peptides.

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Mrs Gerda Gericke is Head of the Department of Human Nutrition at the University of Pretoria. With an MDiet from the UP her primary fields of research interest relevant to this study are eating behaviour; nutrition education to promote good health and nutrition behaviour change.

She has supervised several theses for the M Dietetics degree on food intake and eating behaviour which contributed to her experience in the development of appropriate methodology and data collection techniques.

She was actively involved in the National Food Consumption Survey – Food Fortification Study in 2005. Ms Gericke was responsible for developing and verifying the Knowledge, Attitude and Behaviour Questionnaire used for data collection and quality control and for interpreting and reporting the findings. In 1999 she was involved in a similar national study (National Food Consumption Survey-Food Fortification Baseline Study I) on the food consumption of children aged one to nine years. She served on an advisory committee for the SA National Health and Nutrition Survey (2012/13) and is the co-author of World Health Organisation publication on food security.

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Dr Craig Grobbelaar is a lecturer in Physiology and focuses his research on nutrition and exercise. He holds an MBChB from the University of KwaZulu-Natal with a master's in Sports Medicine. For this he conducted research on the effects of probiotic supplementation on athletic performance. He is currently doing his PhD on the influence of Kisspeptin in female athletes with athletic amenorrhea/anorexia nervosa.

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Prof Sheryl Hendriks is the founding Director of the Institute for Food Nutrition and Well-being (IFNuW) at the University of Pretoria. She holds an MSc Home Econ and a PhD in Agricultural Economics from the University of Natal and served as professor in the Department of Agricultural Economics and Rural Development at the UP prior to the launch of the IFNuW in 2011.

Prof Hendriks served as the first female the President of the Agricultural Economics Association of South Africa (AEASA) when she was elected to this position during the Association 50th anniversary conference in 2012.

She is also one of only three experts from Africa appointed to the Committee for World Food Security (CFS) High Level Panel of Experts for Food Security and Nutrition (HLPE). The CFS is the foremost international and intergovernmental platform dealing with food security and nutrition.

She is a global leader in the area of food security and has voluntarily led the African Union and NEPAD's Comprehensive African Agricultural Development Programme's (CAADP) Food Security initiatives since 2006.

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As head of the UP's Department of Family Medicine, **Prof Jannie Hugo** is accountable to a society that suffers from disproportionate poor health. He sees his academic mandate as teacher and primary care practitioner as a platform to have an impact on health care not only now, but through his students in the next 20+ years.

He participates in local, national and international primary health care and education through memberships of the Health Professions Council of SA, the Collaboration for Health Equity through Education and Research, Primafamed (Primary care and family medicine network for Africa) and the Madibeng Centre for Research.

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A graduate of the University of Pretoria, **Prof Pete Irons** has practiced as a veterinarian and worked in academia in both the United States of America and South Africa. He holds a PhD, is a registered specialist and a Diplomate of the American College of Theriogenologists. Prof Irons has a C-rating from the National Research Foundation.

In addition to teaching and research activities he is also an active clinician and specialist consultant in animal reproduction. As head of the clinical department responsible for the training of veterinarians to serve the agricultural sector he has a passion for food security and the central role that the veterinary profession can play at the interface between animal, human and environmental health.

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Dr Akin Jenkins is a lecturer in the UP Department of Veterinary Tropical Diseases. His current research focuses on mycobacterial interactions between environmental mycobacteria and the efficacy of BCG vaccine and diagnostic markers in naturally infected and experimental cattle. He previously worked on the epidemiology of zoonotic tuberculosis in wildlife, livestock and humans, resulting in about peer reviewed 11 publications.

He was awarded a PhD fellowship by WOTRO, the Netherlands. Dr Jenkins has participated in significant international exchanges as a young researcher, firstly at the University of Paris XI/CNRS Orsay, France and later as a visiting researcher at the, Norwegian Veterinary School, Department of Artic Veterinary Medicine, Tromso, Norway. He served as a facilitator at a training workshop on Zoonotic Diseases for the University of Zambia's, Department of Disease Control in conjunction with the Norwegian Council for Higher Education and Development.

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Prof Annie Joubert is a professor in the Department of Physiology at the UP Faculty of Health Sciences. Her research focus entails the design and synthesis of new anti-cancer compounds and the study of the mechanisms of how these novel drugs kill cancer cells while leaving normal cells unharmed.

Prof Joubert collaborates with iThemba Pharmaceuticals (Pty) (Ltd) and researchers in France, the Netherlands, Turkey, Finland and the USA. She has received research awards and prizes including the University of Pretoria's Exceptional Young Researcher Award in 2005, best publication award in the Faculty of Health Sciences, the Albert Beyers travelling fellowship from the University of Oxford and the Cancer Association of SA, AG Oetlé silver medal for cancer research. Prof Joubert received a C3-rating from the NRF.

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Mr Mmatlou Kalaba is an Agricultural and Trade Economist by training who worked in the areas of international trade, regional and multilateral integration, the development of trade databases and also a member of Bureau for Food and Agricultural Policy Unit. He has worked with government departments on issues of trade and agricultural policy and assisted Parliamentary portfolio committees with policy strategies debates and preparations for discussions.

He is also working with the South African representatives to the Comprehensive Africa Agriculture Development Programme to formulate the country strategy. Mr Kalaba, a lecturer in the UP Department of Agricultural Economics, Extension and Rural Development, has co-authored two books, *South African Trade Diplomacy* and *Deepening Integration in SADC: South Africa-SADC's Economic Engine*.

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Dr Magnus Killander is head of research at the Centre for Human Rights, at the UP Faculty of Law. He is editor-in-chief of the *African Human Rights Law Reports* and an editor of the International Law in Domestic Courts and International Human Rights Law modules of the *Oxford Reports on International Law*.

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Dr Hans-Friedemann (Fritz) Kinkel is a specialist in General Medicine (Germany) and holds a master's degree in International Health. His areas of expertise include Community Oriented Primary Care (COPC) and Infectious Diseases. Dr Kinkel has successfully initiated, conducted and completed research, inter alia, on the implementation of COPC service quality of primary care (ART service, cervix cancer screening etc.) and diagnostic screening (schistosomiasis). He is also involved as investigator in HIV treatment trials.

Dr Kinkel presented nationally and internationally and published in peer reviewed journals. In 2012 FPD awarded Dr Kinkel the excellence in research award. He is an extraordinary lecturer/senior programme evaluator/researcher and his main interest is research on Community Oriented Primary Care (COPC) (e.g. outcome on community health and epidemiological impact) and primary care in general (e.g. clinical practice, quality of primary care etc.). His specific areas of interest include infectious diseases (HIV, TB) and Cervix cancer.

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Prof Johann Kirsten is Professor and head of the Department of Agricultural Economics, Extension and Rural Development at the University of Pretoria. Recently Prof Kirsten has co-authored a number of papers reviewing agricultural policy in South Africa from a historical, analytical and futuristic perspective.

He completed his MSc Agric (cum laude) at UP and then spent two years in London as South Africa's agricultural attaché.

He has published 112 articles in peer reviewed journals as author and co-author and also co-edited four books. A total of 51 master's students and 20 PhD students completed their studies under his supervision.

His main research interests relate to the commercialisation of farming in poor communities, land reform, and agricultural policy. In recent years his focus areas also include aspects related to price transmission and the role of market power in supply chains and the economics of origin based foods.

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Prof Darryn Knobel is the head of the research group, "Populations, Pathogens and People at Interfaces (3PI Group)", in the UP Department of Veterinary Tropical Diseases. The mission of the group is to better understand the epidemiology and impact on health and livelihoods of infectious diseases through a multidisciplinary – One Health – approach. He holds a degree in Veterinary Science from the University of Edinburgh. He was awarded the University of Edinburgh's Centre for Infectious diseases Ker Memorial Prize for outstanding research in infectious diseases by a PhD candidate in 2008. His research findings have been presented at 16 international conferences and he is (co)-author of 22 scientific publications and two book chapters. In 2012, Prof Knobel was rated by the National Research Foundation in South Africa as a Promising Young Researcher (Y1).

His research interest is to better understand the epidemiology, impact and control of infectious diseases that affect the health and production of communal livestock at the wildlife interface, through a multidisciplinary approach. He achieves this through the establishment of continuous longitudinal demographic and health monitoring (Health and Demographic Surveillance Systems) in geographically defined livestock populations on communal land at the wildlife interface in Mpumalanga.

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Dr Marleen Kock obtained her BSc, BSc Hons (*cum laude*), MSc (*cum laude*) and PhD at the University of Pretoria in the Department of Microbiology and Plant Pathology. After completion of her PhD she worked as a contract researcher at the Sappi Biotechnology Institute (Innovation Hub) until 2006 when she was appointed as a postdoctoral fellow in the Department of Medical Microbiology.

In July 2007 she was jointly appointed as a lecturer / senior medical scientist in the Department of Medical Microbiology (UP/NHLS). She has published 13 research papers and handbook chapters.

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Prof Lise Korsten is a professor in the Department of Microbiology and Plant Pathology in the Faculty of Natural and Agricultural Sciences at the University of Pretoria. She serves on the boards of the National Laboratory Association, the Post-harvest Innovation programme of the Department of Science and Technology and the Fresh Produce Exporters Forum. She is also a member of the Specialist Technical Committee of the South African National Accreditation System.

Prof Korsten developed South Africa's first biological control agent for fruit and has established a research group in sanitary and phytosanitary aspects of international trade. She has expanded her research portfolio to include aspects related to post-harvest pathology and food safety in the fresh produce supply chain.

She is a three-time recipient of the University of Pretoria's Exceptional Achiever Award and twice received special recognition from the South African National Accreditation System (SANAS) for her significant contribution to improving and promoting SANAS accreditation. Prof Korsten holds a B2-rating from the NRF.

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Prof Ernst Kruger studied at the University of Pretoria and obtained the DPhil degree in 1986 and the HED degree in 1988. In 1984 he was appointed as lecturer in the Department of Human Movement Studies and promoted to professor in the Department of Biokinetics, Sport and Leisure Sciences in 2001.

In 1996 Prof Kruger was appointed as Director of the Institute for Sport Research (ISR). He has published 78 articles in accredited journals, wrote more than 75 articles in popular journals, and was promoter for 25 masters' and 18 doctoral students. He has acted as external examiner for 33 master's and 11 doctoral studies.

He has been involved with the evaluation of all South Africa's teams participating in the Olympic Games, Commonwealth Games and African Games since 1992. His field of expertise is biokinetics and sport science with a special interest in Long-term Athlete Development. As Director of the ISR, all the facilities and laboratory equipment for research in work physiology and biokinetics are available to the members of the theme's research team.

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Dr Johanita Kruger was recently appointed as a researcher under the IFNuW in the Department of Food science. In 2013 she was awarded her PhD in Nutrition from UP, titled; *"Improved iron and zinc availability in sorghum by phytate reduction through genetic modification, fermentation and phytase addition"*. In 2013 she continued her research at the Department of Food Science as a Post-Doctoral Fellow. Her main research interests are micronutrient nutrition and bioavailability, especially that of minerals and vitamin A. Her research aims to help increase nutritional security in Sub-Saharan Africa by increasing mineral availability in staple foods.

Johanita is alumni of the African Nutrition Leadership Program and a member of various national and international food and nutrition societies. Through international peer reviewed publications and national as well as international collaborations, she actively contributes to the body of knowledge on nutrition and nutrient bioavailability.

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Prof Kerstin Krüger is the leader of a research group in applied entomology – crop protection. She serves on the board of the African Regional Postgraduate Programme in Insect Science (ARPPIS), an initiative of icipe (African Insect Science for Food and Health), and as a member of the Aster Yellows Working Group of the Department of Agriculture, Forestry and Fisheries. She is a South African country representative for a European COST (Cooperation in Science and Technology) action on "Integrated Management of Phytoplasma Epidemics in Different Crop Systems".

The focus of Prof Krüger's research is on the interactions between plants, herbivorous insects and their natural enemies, and plant disease–insect vector relationships. The emphasis in both fields is on insect pests of crops to improve sustainable food production through the development of safe and environmentally friendly pest management strategies.

As Associate Professor in the Department of Zoology and Entomology her current research involves the development of biological and integrated control of insect vectors of plant diseases, as well as studies on the transmission biology of plant diseases by insect vectors.

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Prof Marlena Kruger is Professor of Nutritional Physiology, Deputy Head of the Institute of Food, Nutrition and Human Health (IFNHH) and Director of Research for the College of Health at Massey University, New Zealand.

She obtained a PhD in 1986. After completing a six month's science exchange through the German Academic Exchange Service (DAAD) she progressed to a three year postdoctorate in Biochemistry at the University of Texas, Austin, USA. She joined UP's Physiology Department in 1991, and subsequently set up a bone research laboratory with the focus on fatty acids and bone health.

She joined Massey University in 2000, as Senior Scientist at the IFNHH, where her role was to help establish bone research at the university. She was appointed Associate Professor in 2002, Director of the Division of Human Nutrition and Member of the Executive of IFNHH in 2005, and was also promoted to her current position as Chair of Nutritional Physiology in 2005. She took on the role of Director of Research for the College of Health in 2013. Prof Kruger was appointed as extraordinary professor in Human Nutrition at the University of Pretoria, in 2012.

Professor Kruger has over 95 publications in international peer reviewed journals. Her current research focus is nutrition and bone health with an emphasis on dairy foods, polyphenols and lipids.

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Dr Johan Labuschagné is a Chemical Engineer by training and specialises in polymer systems. He has erected a pilot facility for the manufacturing of synthetic anionic clays (with application in the plastics and pharmaceutical industries) in collaboration with TIA and industry. He is currently involved in the design and building of two more pilot facilities – one for a pharmaceutical application (in collaboration with Department of Plant Science, UP) and one for synthetic clays production (in collaboration with the National Centre for Nanostructured Materials, CSIR).

Another of his research and commercial projects is on the development and up-scaling of the extraction of proteins from plant material to be used for bio-based applications including bio-films and bio-materials, in collaboration with the Department of Food Science, UP.

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Prof Nico Labuschagne is Associate Professor in Plant Pathology in the Department of Microbiology and Plant Pathology.

During the more than three decades that Prof Labuschagne has been involved in research in the fields of Plant Pathology and Phytonematology he has contributed to a vast spectrum of scientific publications including chapters in books, research articles in high ranking scientific journals, papers at national and international congresses and numerous articles in industry-related journals and has supervised more than 40 post graduate students. During the last eight years Prof Labuschagne has established a strong research program focusing on application of Plant Growth Promoting Rhizobacteria for plant growth enhancement and biocontrol of plant diseases. This work has led to successful innovation of the research, culminating in various biological products being patented and commercialised.

Prof Labuschagne's field of interest encompasses management of soilborne diseases of agricultural crops with specific emphasis on application of plant growth promoting rhizobacteria (PGPR) as biofertilisers and biocontrol agents.

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Dr Rendani Ladzani's primary field of expertise is community nutrition and the prevention of nutrition problems in communities. She is interested in dietary behaviour change and food security, working with women and their young children, school children and the elderly. She has also worked on prevention of mother-to-child transmission of HIV in rural communities.

Dr Ladzani has published articles on dietary practices, infant feeding, food security and HIV and the prevention of mother-to-child transmission of HIV. A lecturer in the Department of Human Nutrition at UP she has also written four research reports on prevention of mother-to-child transmission of HIV.

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Prof Andre Louw completed his BSc (Agric-economics) at Stellenbosch and master's at the University of Pretoria where he also received his DSc (Agric) in Agricultural Economics in 1979. He then gained vast experience in banking, in insurance and project management and specialises in agribusiness, strategy, financial, marketing and risk management in the private sector for 20 years.

He joined the University of Pretoria in 2003 where he is currently professor in Agribusiness and involved in teaching and research in the various fields of agribusiness e.g. strategy and business planning, supply chain management, finance, risk and marketing. Prof Louw has been involved in various development projects and leadership programmes. In 1997 he received the prestigious FR Tomlinson medal for his contribution to Agricultural Economics and Agribusiness in South Africa. During his career he has maintained significant international contact with academic and business communities in various countries.

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Dr Carien Lubbe – de Beer's major research focus and scholarly contribution relates to the well-being and functioning of same-gendered families embedded within a positive psychological framework, against the backdrop of heteronormativity. She has represented the Psychological Association of South Africa (PsySSA), together with Prof Juan Nel (Unisa), on INET (The International Network on Lesbian, Gay and Bisexual concerns and Transgender matters in Psychology), hosted by the American Psychological Association (APA) since 2008.

Dr Lubbe - de Beer is currently establishing Psychological Guidelines for LGBTI-Affirmative Practice through a grant from the Arcus Foundation. As part of the Institute's Theme D project she will work with vulnerable families, exploring the possible value and application of Expressive Sandwork-therapy with children in schools, as psycho-social support.

She is a senior lecturer in the UP Department of Educational Psychology and is actively involved in the training of psychological counsellors (BEd Honours programme) and psychologists (master's programme). She has published 12 peer-reviewed articles, four chapters in edited books and one published conference proceeding.

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Prof Jean Lubuma was Head of the Department of Mathematics and Applied Mathematics at the University of Pretoria. He received his PhD from the University of Louvain in Belgium in 1985 and was a post-doctoral fellow at the International Centre for Theoretical Physics in Italy. After joining the UP in 2000, Prof Lubuma initiated – and continues to lead – a highly successful research group. He is the chair holder of the SARChI Chair in Mathematical Models and Methods in Bioengineering and Biosciences at the UP

He has published widely in several prestigious journals and conference proceedings series. He has trained several postgraduate students and is involved in multiple regional centres of excellence. Prof Lubuma renders a vital service to the scientific community through his extensive involvement as a referee for several journals.

He is a fellow of the African Academy of Sciences and the South African Academy of Science. Prof Lubuma was the convener of the NRF specialist Committee for Mathematical Sciences. He received UP's Exceptional Academic Achiever Awards in 2007 and 2010 and the SA Mathematical Society Award for Research Distinction in 2011. Prof Lubuma has a Brating from the NRF.

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Prof Charles Machethe is Professor of Agricultural Economics and Director of the School of Agriculture and Rural Development at the UP. Following the completion of a master's degree at the University of the North he obtained a PhD in Agricultural Economics at Michigan State University in 1997.

His academic career began at the University of Fort Hare in 1980 when he was appointed as Junior Lecturer in Agricultural Economics. In 1982, he joined the University of the North as Lecturer in Agricultural Economics. He subsequently served as Professor and Head of the Department of Agricultural Economics, Dean of the Faculty of Agriculture and Acting Vice-Chancellor at the University of the North. In addition, he served as a Board member of the Agricultural Research Council of South Africa, the National Botanical Institute, and as Chairperson of the Board of Directors of the Northern Province Agricultural and Rural Development Corporation. Prof Machethe served on the Board of the South Africa-Netherlands Research Programme on Alternatives in Development (SANPAD) and was a member of the Ministerial Committee on the Review of Agricultural Marketing in South Africa.

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Prof Una MacIntyre holds MSc (Dietetics), PhD (Nutrition) degrees and the Diploma in Datametrics. From 1982 to 2011 she was employed by the University of Limpopo (Medunsa Campus). She worked as Lecturer in the Department of Human Nutrition before her appointment as Assistant Director: Medical Natural Sciences in the Department of Paediatrics and Child Health. She was promoted to Associate Professor (Ad Hominem) in August 2004.

In August 2005 she was appointed as Professor / Director: Institute for Human Nutrition, a position she held until retirement in 2011. She is presently employed in a part-time capacity in the Department of Human Nutrition, University of Pretoria where she is responsible for the Postgraduate Nutritional epidemiology and research module and for the supervision of masters' and doctoral students

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Dr Philemon Mahuma is a Family Physician, at the Steve Biko Academic Hospital and Lecturer, at the University of Pretoria (UP). He holds a MBChB (Cape Town), MMed (Family Medicine) (Pretoria) and served the community of Tshwane District Hospital (TDH). His involvement in teaching and learning includes being a facilitator to third-year BCMP students at TDH; GP Diploma facilitator (UP); Essential Steps in the Management of Obstetric Emergencies trainer. His area of research and interests is Medical teaching and Learning theories. Among his conference presentations was one delivered at the UP Faculty Day 2012: *A study of the cigarette smoking practices, general knowledge and opinions about smoking of medical students at the University of Pretoria.*

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Ms Lorraine Makena is a Programme Coordinator for the Institute for Food, Nutrition and Well-being at the University of Pretoria. Her professional field of expertise is in the area of project management and coordination. She has worked for Matingi and Associates as a Project Coordinator for eight years. Her main duties involved project management and coordination, research, fieldwork, and development and strategic planning. Her work included project management consulting for a number of government departmental projects such as: the provision of management support for implementation of sustainable sanitation job creation in 50 Water Service Authorities; the implementation of Clinics and Schools Water and Sanitation programme management support (Department of Water Affairs and Forestry); Settlement Growth Patterns (Department of Land Affairs); the provision of management support for the implementation of Municipal Infrastructure Grants; and the evaluation of the regeneration of Jeppestown and Faraday Precincts in Johannesburg. (Johannesburg Development Agency, Completed, 2005).

She completed both her undergraduate and postgraduate degrees in Community Development with UP's Faculty of Humanities and a Postgraduate Diploma in Development Planning with the University of the Witwatersrand.

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Prof Tessa Marcus is an Extraordinary Professor, in Family Medicine and a Sociologist. She holds a PhD Sociology from University of Lodz, Poland, and BSc Sociology from London School of Economics, UK. Her teaching and supervision experience include; the Family Medicine Team Teaching, Undergraduate: SA3, SA5, and Postgraduate: Community Oriented Primary Care.

Working in medical and health education has made her profoundly aware of how important social science is to student education and training as health professionals. It has made her aware of how poorly they are served by their extremely limited and tangential exposure to social science. She also become acutely aware of how the divisions between the sciences and humanities as well as disciplinary specialisation within each of these domains impoverish all intellectually and in practice. Prof Marcus is an active participant at in the Department of Family Medicine's on-going efforts to create the intellectual architecture as well as the physical platform for health professionals.

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Prof Cheryl McCrindle is Emeritus Professor and Extraordinary Professor in the Department of Veterinary Public Health. She has had considerable experience in private practice as well as academia over the last four decades. She is an NRF rated researcher with many publications and conference proceedings. Her research interests cover One Health, environmental health, all aspects of food safety, participatory risk analysis and risk communication.

Prof McCrindle received a C-rating from the NRF.

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Dr Lyndy McGaw obtained a PhD (Botany and has completed postdoctoral fellowships at King's College London and at the University of Pretoria, and worked at the University of Adelaide, Australia, before being appointed as a Senior Lecturer at the UP in 2011.

She is currently Deputy Leader of the Phytomedicine Programme, a research group comprising 25 MSc and PhD students. Two BSc (Hons), four MSc and seven PhD students have completed their degrees under her supervision or co-supervision. She has authored 45 scientific publications and seven book chapters, and has presented research at many international and national conferences.

Dr McGaw has a Crating from the NRF and is an editor of *South African Journal of Botany* and BMC Complementary and Alternative Medicine. Awards received include "Young Researcher of the Year (non-teaching staff) 2009", Faculty of Veterinary Science, University of Pretoria, and Finalist, DST "Women in Science" awards 2005 (Best Emerging Young Woman Scientist).

Her major field of research interest lies in investigating biological activity and toxicity of plant-derived extracts and isolated compounds. These plant extracts and compounds may have application in combating diseases affecting food security in plants and animals.

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Dr Ellenore Meyer is the Manager Daspoort Polyclinic. She holds MBChB (UP); MSc [Bio-ethics & Health Law] (Wits); SAFRI fellow; Certificate in Assessment and Moderation in Education (with Distinction) (Rhodes); Certificate in Research Methodology (Medunsa). She has served the community of Daspoort clinic, NHI and COPC (community-oriented primary care) site. Dr Meyer's involvement in teaching and learning includes service learning of students representative of the multi-disciplinary team including medical, nursing, occupational therapy, physiotherapy, speech and language pathology, dietetic, social, IT and other disciplines in a community based clinic. The Daspoort clinic is also a University of Pretoria NHI (National Health Insurance) and COPC pilot site. Among her responsibilities are collaborating with private and community health and technology partners to strategise, research and propose a model for community based care as a tool to unlock patient health.

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Prof Ferdinand Meyer holds the position as Director of the Bureau for Food and Agricultural Policy (BFAP) and associate professor in the Department of Agricultural Economics, Extension and Rural Development at the University of Pretoria. He served on the National Crop Estimates Committee and is a Board Member of the Protein Research Foundation (PRF) and the Regional network of Agricultural Policy Research Institutes (ReNAPRI). He holds a rating as young researcher from the National Research Foundation (NRF), 14 masters and four doctoral students have graduated under his supervision, and under BFAP he has led 35 research reports and delivered 74 national and international presentations at conferences as invited speaker.

His field of interest relevant to the IRT includes developing future scenarios for agricultural markets and food systems through econometric modelling and scenario thinking techniques; future scenarios highlight future supply, demand, trade and price patterns under a range of assumptions; o-integration of various key drivers in the value supply chains is analysed and the impact on price risk and volatility measured.

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Prof Anita Michel is a qualified veterinarian and Associate Professor in the UP Department of Veterinary Tropical Diseases. She enjoys considerable international recognition for her research on mycobacterial diseases and is widely regarded as an expert in the field of animal tuberculosis, especially as it pertains to the wildlife/livestock interface. Her research interests centre on the development of new diagnostic tools, the study of the epidemiology and the control of animal tuberculosis in both livestock and wildlife.

Prof Michel has a doctorate from the Max Planck Institute for Virology in Germany and has published more than 42 articles in peer-review journals and 61 conference proceedings. She received the Agricultural Research Council President's Award for important contributions to the advancement of diagnostic services

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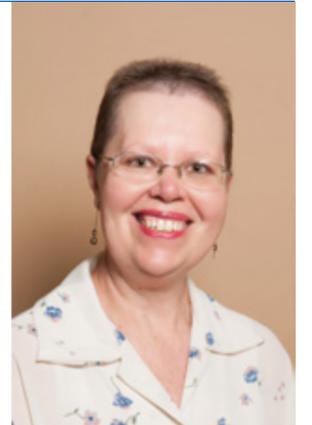


Prof Amanda Minnaar is Professor in the Department of Food Science. Her research focuses on the use of modern food processing technologies to improve the quality (nutritional, phytochemical, physico-chemical and sensory), safety and shelf-life of plant foods. Specific areas of research expertise include thermal processing, ionising irradiation and legume processing science and technology.

She is the author and co-author of some 50 scientific papers in international peer-reviewed journals. As a NRF-rated scientist Prof Minnaar has supervised and co-supervised some 37 master's and doctoral students. She won the first prize in the category of Capacity Development at the European-South African Science and Technology Advancement Programme (ESASTAP) in 2011. She is responsible for the coordination of various international research projects.

Prof Minnaar is a member of the South African Association for Food Science and Technology (SAAFoST) and a member of the Institute of Food Technology (IFT, USA).

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Dr Rebone Moerane has worked as a state veterinarian for over 21 years and, was during this period, exposed to various development programmes in livestock development. He participated in the development of the livestock sector policy in South Africa and played an active role in the training of farmers and as part of a new initiative on primary animal health care in the country.

Dr Moerane primary research areas are to improve livestock production with particular focus on empowering farmers – mainly small-scale farmers and farm workers – to implement basic skills on animal health and production management practices with regular support from local professionals. This involves training and assessment of the behavioural change of farmers and farm workers.

He is currently the Chair of Primary Animal Health Care in the UP's Faculty of Veterinary Science and serves as President of the SA Veterinary Council.

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Dr Jan Myburgh is a senior lecturer in the Department of Paraclinical Sciences at the UP Faculty of Veterinary Science. He qualified as a veterinarian in 1984 and, for the first part of his research career he focused mostly on bovine medicine, reproduction and surgery (in the Department of Production Animal Studies, University of Pretoria).

He is an active member of the American Association of Bovine Practitioners, USA; Society for Theriogenology, USA; and the South African Veterinary Association and Wildlife Group of the South African Veterinary Association.

During 2002 he moved over to the Department of Paraclinical Sciences to focus more on environmental issues e.g. toxicology and conservation medicine. Dr Myburgh's research interests are in Environmental Toxicology, aquatic species, Medical Geology, quality of water for animal use, Conservation Medicine, and Bovine Medicine and Theriogenology.

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Prof Vinny Naidoo is Director of the University of Pretoria Biomedical Research Centre (UPBRC) and Associate Professor in Veterinary Pharmacology. His research interests are environmental toxicity of chemicals in Southern African Vultures. Prof Naidoo has been the youngest veterinarian to achieve a PhD in veterinary science. He was named one of the top 300 young South Africans by the *Mail & Guardian* in 2009.

He was an Outstanding Young Achiever of the University of Pretoria in 2009. Prof Naidoo is a member of the Medicines Control Council of South Africa, Chair of the Veterinary Clinical Committee, member of the Science and Ethics Committee of the National Zoological Gardens and Chair of the Medicines Committee of the South African Veterinary Association.

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Dr Kim Nolte is a qualified biokineticist and has various qualifications in the fitness, sport and business fields. Apart from her clinical experience as a biokineticist, she has extensive experience in the management and administration of elite sport. Dr Nolte currently lectures various modules for the University of Pretoria's Department of Biokinetics, Sport and Leisure Sciences and coordinates research for the Institute for Sports Research (ISR).

She has a keen interest in ageing and exercise, the management of sports injuries, biomechanics and the use of exercise therapy in the treatment of rheumatic diseases.

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Prof André Oelofse is an Associate Professor in the Department of Human Nutrition in the Faculty of Health Sciences at the University of Pretoria.

His primary research interest lies with infant and young child nutrition and health. He has conducted and published on numerous studies assessing the nutritional and health status of vulnerable infants in different communities in both South Africa and other developing countries. He has also been working on the potential contribution of indigenous foods to the nutrient and health status of young children. This work has culminated in a comprehensive report on the nutritional value of indigenous green leafy vegetables to alleviate malnutrition. Nutrients of particular interest to his work are Vitamin A, iron and zinc.

Prof Oelofse has initiated work on assessing the bioavailability of key nutrients (Vitamin A, iron and zinc) through human cell line models in collaboration with international partners. He holds an MSc from Stellenbosch University and a PhD from Wageningen University in the Netherlands. Prior to joining the UP he was employed by the Nutrition Intervention Research Unit of the Medical Research Council. Prof Oelofse received a C-rating from the NRF.

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Prof Nic Olivier has more than 25 years of experience in higher education, government administration and management of a significant number of both governmental related and academic programmes and projects. His key areas of expertise are in governance and development, programme management strategic management, policy analysis, human rights and legal pluralism. He has published widely in academic journals and contributed to a number of text-books.

He has managed and co-managed a number of transformative national programmes, e.g. as co-author of the SA national language legislation, National Programme Co-ordinator for the National White Paper Programme on Traditional Leadership and other Traditional Institutions in SA, the National Policy Research Programme on Vulnerable Communities and various other national programmes for the SA Government.

He has access to extensive networks within the transnational – SADC – context as well as in North America, Europe and in Australasia. He studied at the universities of Pretoria, Leiden, Potchefstroom and South Africa where he obtained the following degrees: BA (Law), LLB, LLD (Leiden), LLD (Pretoria), BA (Honours) (Development Administration), MA (Afrikaans and Linguistics) and DPhil. He is currently Director of the SADC Centre for Land-related, Regional and Development Law and Policy at the UP.

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Dr Sarie Oosthuizen is a specialist in Family Medicine, with 34 years' clinical experience in District Health, District Hospital services and Primary Health Care. Her current focus is Community Orientated Primary Care (COPC). She led the start-up of the Medico-Legal Crisis Centre in Tshwane, and was clinical leader during the establishment of the Tshwane District Hospital. She is now leading the District Clinical Specialist Team, established in 2012 to achieve the Health Care Millennium goals for South Africa.

She has taken part in research on areas of health systems information and audits for attaining compliance with accepted standards of care. Dr Oosthuizen's main interest is the provision of quality primary health care to all communities. She works towards reducing morbidity and mortality in mothers and children, and the management of risk in communities.

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After more than 20 years in biological research and obtaining doctorates in Zoology and Entomology, **Prof Mary-Louise Penrith** qualified as a veterinarian at Onderstepoort in 1991 and was employed in the Pathology Section of the Onderstepoort Veterinary Institute. Since 1996 she has consulted for the Food and Agriculture Organization of United Nations on the epidemiology and control of African swine fever in nine African countries as well as in the Republics of Georgia and Armenia in the Caucasus. She is an advisor to a DANIDA-funded sequel to the project, *Sustainable livelihoods through improved pig production* in Tanzania and Mozambique. She is Extra-ordinary Professor in Veterinary Tropical Diseases at the UP and presents courses on Animal Health Management and High Impact Diseases for the web-based 'One Health' MSc degree. She has published more than 82 peer-reviewed scientific articles and 20 book chapters. She is a member of the SA Veterinary Council and the Entomological Society of Southern Africa.

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Prof Michael Pepper is Director of the Institute for Cellular and Molecular Medicine, and a professor in the Department of Immunology in the Faculty of Health Sciences. He is also *professeur associé* in the Department of Genetic Medicine and Development in the Faculty of Medicine at the University of Geneva, Switzerland.

He obtained his MBChB in 1982 from the Faculty of Medicine at the University of Cape Town, and moved to Geneva in 1986, where he obtained his PhD in 1990 and MD in 1992. In 1997 he obtained his Habilitation and had the title Privat Dozent conferred on him. He returned to South Africa in July 2004.

Prof Pepper has worked extensively in the field of clinically-oriented (translational) molecular cell biology, and his current interests include stem cells and the human genome. He is also co-responsible for the Southern African Human Genome Programme which was launched in January 2011. He is a member of the National Advisory Committee on Innovation and has developed a 5-day continuing education course in bio-entrepreneurship. Prof Pepper has 200 medical and scientific publications and has received a number of awards for his research. He has been extensively involved in teaching at undergraduate and postgraduate levels and is a frequent speaker at local and international meetings. He interacts regularly with the media and writes for the lay press on medical and scientific matters.

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Prof Paul Rheeder is the acting Chairperson of the School of Health Systems and Public Health. He is a trained specialist physician and clinical epidemiologist. Prof Rheeder is responsible for the Clinical Epidemiology training programme and heads the Epidemiology and Biostatistics track. He has a part time appointment as a diabetologist at the Pretoria Academic Hospital, Department of Internal Medicine. His main research interests are in diabetes and diabetes-related complications and management.

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Prof Maxi Schoeman is Head of the Department of Political Science and Chairperson of the Basic Social Sciences Cluster in the Faculty of Humanities.

She has a PhD in International Relations from the University of Wales. Prof Schoeman participated in the EU Framework 7 MERCURY (2009-2012) project and currently manages a Mellon project on peace and conflict in Africa. She co-founded the UP Centre for Mediation in Africa and is acting director of the UP Institute for Strategic and Political Affairs.

Prof Schoeman serves on the board of the African Peace Network of the Social Science Research Council (SSRC) in New York and is an adjunct professor in the School of Public Policy at George Mason University in the US. She served on the 2013 BRICS Academic Forum Steering Committee and currently serves on the steering group for the establishment of a South African BRICS think-tank. She is deputy chairperson of the board of the Institute for Global Dialogue and a Trustee of the Institute for Security Studies.

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Professor Hettie Schönfeldt is a NRF C-rated researcher and a registered Natural Scientist (nutritionist and food scientist) and mentor in the fields of human nutrition and food composition. She is a Professor Extraordinaire in the Faculty of Natural and Agricultural Sciences, Department of Animal and Wildlife Sciences and an Associate of the Institute of Food, Nutrition and Well-being

Under her guidance 25 postgraduate students have received their degrees and has published more than 60 contributions in numerous international journals and books, 117 technical reports for industry and more than 130 contributions to conferences.

She was chief rapporteur for the Food and Agriculture Organization (FAO) of the United Nations Expert Consultation on Protein Requirements for Human Health and evaluating team of the FAO's work in Nutrition.

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Dr Langelihle Simela is an industry leader, academic and researcher in the fields of animal nutrition, food science and livestock management. With a PhD in Animal Science and master's in Veterinary Tropical Diseases she manages the research efforts relating to Theme A – *Production in a Resource-constrained environment*.

She is the Chief Executive Officer of the National Emergent Red Meat Producers' Organisation (NERPO).

Dr Simela was a Senior Livestock Sector Development Specialist for a World Bank contract to perform a livestock sector analysis and develop an investment framework in Zimbabwe.

She serves as Director of the International Meat Quality Assurance Services (IMQAS), on the Advisory Board of the UP Faculty of Veterinary Science and as Country Representative of the International Goat Association. Dr Simela has published widely in academic journals and publications and serves on the editorial board of *Small Ruminant Research* (Elsevier) and the *Bulletin for Animal Health and Production in Africa* (BAHPA).

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Prof Gerry Swan qualified as a veterinarian in 1973 at the Faculty of Veterinary Science at Onderstepoort, was awarded a MMedVet specialist degree in Veterinary Pharmacology and Toxicology at the University of Pretoria in 1988 and his PhD (Pharmacology) at the Potchefstroom University, now the North-West University in South Africa in 1997. He has been Dean of the Faculty of Veterinary Science, University of Pretoria, since 2005.

He has served on several national and international professional and expert bodies, including President of the South African Veterinary Association, Member of the Medicines Control Council (MCC) of South Africa, expert consultant to the WHO and OIE and as Fellow of the American Pharmacology Society. He is a standing member of the Joint FAO/WHO Expert Committee of Food Additives (JECFA) and is a member of the SA Academy of Science. More recently he has been appointed to the SANParks Board.

He has published extensively with 74 scientific papers to his credit. His research is currently focused on wildlife and has recently contributed in the containment of vulture mortalities due to the Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) diclofenac in Asia. He is a rated scientist with the NRF and has been the recipient of several professional and research awards. In 2005 he received the Sasol Vulture Conservationist award for his research on NSAIDs in vultures.

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Dr Janet Taylor holds a PhD in Food Science from the University of Pretoria and is a Research Officer in the Department of Food Science. In addition to research, her responsibilities include the co-supervision of postgraduate students both at a master's and PhD level. Her main research interests are in the functional properties of plant protein based bioplastics and biomaterials, with specific interest in the prolamin proteins of sorghum and maize.

She has authored and co-authored a number of papers in international peer reviewed journals on various aspects of sorghum prolamin protein digestibility and as biomaterials and this work has been presented at numerous international and national conferences. She is also the co-author (with Prof John Taylor) of a series of International Association for Cereal Science and Technology Sorghum Grain Quality Standards. These standards are widely used in the sorghum industry.

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Prof John Taylor is the Theme Leader for the Institute's theme on Functional Biomolecules and Health-promoting Foods. A full professor of Food Science at the University of Pretoria, he is globally recognised for his research into the science and technology of African cereal grains, especially sorghum and millets.

He is author and co-author of some 140 papers in peer-reviewed scientific journals, 20 book chapters, many technical reports to industry, and has co-edited a monograph on Pseudocereals and Less Common Cereals. He is an Editor of the *Journal of Cereal Science* (Elsevier) and a member of the Editorial Boards of two other journals.

During 2009 to 2010 he served as President of the International Association for Cereal Science and Technology (ICC). Prof Taylor has been supervisor and co-supervisor of some 80 MSc and PhD graduates and postdoctorals from across sub-Saharan Africa, many of whom now hold senior positions in academia, industry and government in Africa and across the world. He is a B-rated scientist.

Prof Taylor is a recipient of several awards, including: Member of the Academy of Science of South Africa, AACC International's Excellence in Teaching Award, Fellow of AACC International, Fellow of the International Academy of Food Science and Technology, Fellow of the ICC Academy and recipient of the University of Pretoria's Chancellor's Award for Research.

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Prof Maureen Taylor is an associate professor / medical scientist in the Department of Medical Virology in the Faculty of Health Sciences and at the National Health Laboratory Service. Her research focuses on the prevalence and molecular epidemiology of enteric viruses, which include hepatitis a virus, norovirus, sapovirus and rotavirus, in clinical and environmental samples with specific reference to viruses that are potentially food- and waterborne.

She has excelled in the field of virology with over 50 publications in ISI-rated journals and is a member of the editorial boards of *Food and Experimental Virology*, the *Journal of Applied Microbiology* and *Letters in Applied Microbiology*. She is a mentor to a postdoctoral student and supervises a number of postgraduate students, many of whom have received awards for their publications and presentations.

Prof Taylor has been re-awarded a C-rating by the National Research Foundation.

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Prof Gavin Thomson is an Extraordinary Professor, Department of Veterinary Tropical Diseases, at the UP Faculty of Veterinary Science. In addition he is a private consultant and Director of the company TAD Scientific with particular specialisation in foot and mouth disease (FMD) and international trade standards for animal commodities/products. In addition to a BVSc (UP) he has MSc (Birmingham, UK) and PhD (London) degrees in immunology and virology respectively and more than 100 scientific publications.

Dr Thompson has also been contracted by various international organisations to work on other animal disease projects in Asia and Africa. For 12 years (1994-2006) he was an elected member of the World Organisation for Animal Health's (OIE) Scientific Commission for Animal Diseases, and served as President of the Commission for three of those years. In 1999 he was awarded the South African Veterinary Association Gold Medal for outstanding scientific achievement and the advancement of veterinary science.

His primary research interests relate to the mitigation of SPS risk in situations where the proximity of wildlife conservation initiatives, transfrontier conservation areas (TFCAs) and trade standards related to animal diseases result in a conflict of interest which has endured for many decades.

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Prof Peter Thompson is associated professor in Veterinary Epidemiology at the UP. He graduated as a veterinarian and obtained a MMedVet degree in Production Animal Medicine and a PhD in Veterinary Epidemiology. He served on the Executive of the Southern African Society for Veterinary Epidemiology and Preventive Medicine from 2000 to 2008 and as Chair of the International Society for Veterinary Epidemiology and Economics from 2009 to 2012.

He has been involved in research on a broad range of animal diseases, including international projects on foot-and-mouth disease and Newcastle disease. His present research interests focus on the epidemiology of diseases at the wildlife/livestock/human interface and of diseases and conditions affecting livestock production.

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Dr Wayne Truter holds a BSc Agric degree in Animal / Pasture Science, an MSc Agric in Rangeland and Forage Science, and a PhD in Integrated Agricultural and Environmental Sciences. His main field of specialisation is to understand the inter-relationships between soil, vegetation, water and animals in reclaimed mined land and disturbed agricultural land.

Currently Dr Truter manages research projects for the South African Water Research Commission, pasture seed companies, the Coal Mining Research Association of the South African Chamber of Mines and related large mining enterprises. He is a founder member and President of the Land Rehabilitation Society of Southern Africa (LaRSSA), a former president of the Grassland Society of Southern Africa (GSSA), vice-president of the South African Coal Ash Association, principal advisor to Grass SA, Head: Land Rehabilitation Services Unit at Business Enterprises of the UP and member of Trans-Caledon Tunnel Authority's panel of experts on land rehabilitation.

He also serves as a steering committee member for the Department of Environmental Affairs on National Carbon Sinks Assessment and is an Associate Editor for the *African Journal of Range and Forage Science*.

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Dr Michael van der Laan is a senior lecturer in the University of Pretoria's Department of Plant Production and Soil Science. He is responsible for lecturing undergraduate courses on sustainable crop production systems and agro-climatology. He is primarily involved in research on crop water use and water foot printing, acid mine drainage, solute leaching, cropping system carbon and nitrogen dynamics, and the use of life cycle assessment to determine the environmental footprint of agriculture.

Dr Van der Laan also serves as an Associate Editor for the *South African Journal of Plant and Soil* and is the secretary for the International Commission on Irrigation and Drainage's Working Group for the Environment.

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Dr Jacquie van der Waals is senior lecturer in the Department of Microbiology and Plant Pathology in the Faculty of Natural and Agricultural Sciences. She was awarded her PhD on the topic *Epidemiology of early blight potatoes in South Africa*. She is manager of the Potato Pathology Programme at UP and is a member of various national and international professional bodies.

Dr Van der Waals has received many research grants pertaining to diseases of the potato plant

She also received the UP's Outstanding Student Award (1997 and 2000) and the publicity award of the Southern African Society of Plant Pathology (2009). Dr Van der Waals has authored and co-authored 34 papers on potato diseases and related information for presentation at national and international meetings and conferences. She regularly contributes to popular scientific publications to educate farmers on how to deal with potato growing and relevant diseases.

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Mr Jacques van Rooyen is the research coordinator of the Mnsi Community Programme of the University of Pretoria and busy completing a PhD in Veterinary Tropical Diseases. He is an animal scientist and ecologist with extensive experience in wildlife management in southern Africa.

Mr Van Rooyen is currently a research officer in the Department of Veterinary Tropical Diseases at the UP Faculty of Veterinary where he mainly focuses on One Health related research topics associated with the livestock-wildlife interface. His teaching and research interests are multidisciplinary, integrated systems approaches to aspects of wildlife and livestock health and production, trade and marketing, natural resource utilisation, rural development and conservation in resource constrained communities at the livestock-wildlife interface in southern Africa.

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Dr Marietjie van Rooyen is a senior lecturer with MMed (FamMed) and MBChB (Pret) degrees. She has served as registrar consultant and community health worker at the Daspoort Clinic.

She has received a number of awards including a third prize for poster at the International Association for Medical Education in Genoa; education innovation certificates in 2008 and 2010 and the education innovation Ultimate Laureate in 2012. Her specific research interest is in HIV needle stick injuries.



Dr Annemarie Viljoen's research experience relates to the food practices and food-related behaviour of different cultural and ethnic groups in Southern Africa. In her doctoral thesis she described the food practices of a South African community from a socio-cultural and socio-psychological perspective. She has experience in cross-cultural studies on food practices, food and dietary intake, and studies on the preference and acceptability of food.

As senior lecturer in Foods and Nutrition at the UP she is currently involved in various research projects investigating the food habits, nutrition transition and food purchasing behaviour of primary school children, adolescents and adults in South Africa, Swaziland and Botswana.

She is a founder member of the Association for Dietetics in Southern Africa (ADSA); the treasurer of the South African Association for Family Ecology and a member of the executive committee of the SA Association for Family Ecology and Consumer Science (SAAF ECS).

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Prof Frans Viljoen is the Director of the Centre for Human Rights in the Faculty of Law. His research area is international human rights law with a focus on the African regional human rights system, established under the auspices of the African Union.

He has been involved in advocacy and training on the African regional human rights system, and published widely on international human rights law, including International Human Rights Law in Africa.

He is editor-in-chief of the *African Human Rights Law Journal* and co-editor of the English and French versions of the *African Human Rights Law Reports*. Prof Viljoen is also the Academic coordinator for the LLM (Human Rights and Democratisation in Africa) presented by the Centre in collaboration with 12 partner law faculties across Africa.

In 2012 the Centre received the Human Rights Prize of the African Union's Commission on Human and Peoples' Rights. Prof Viljoen holds a B1-rating from the NRF.

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Dr Carina Visser attained her MSc (Agric) and PhD (Agric) Animal Science degrees at the University of Pretoria. Her PhD study was partly performed at Wageningen University and Research Centre (Netherlands), where she was awarded an Erasmus Mundus fellowship.

She joined the University of Pretoria in 2005 specialising in animal breeding and genetics. Her research focuses on the genetic improvement of small-stock. Dr Visser has several publications in local and international journals and also regularly contributes to conferences.

She is currently the Vice-President of the International Goat Association. She is professionally registered with SA Council for Natural Scientific Professions and serves on the Northern branch committee of the South African Society of Animal Science (SASAS).

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Prof Coleen Vogel is a climatologist by training who works in climate change and climate variability with a strong focus on climate change adaptation. She was one of chapter lead authors for the Africa chapter in the IPCC Fourth Assessment Report (and part of the team that received the Nobel Peace Prize shared by Al Gore). She is currently an author on the Chapter on Human Security for the 5th Assessment report of the IPCC, Working Group 2. She has received the Burtoni Award, international recognition by her peers for her work in climate change adaptation. She also assists government in various efforts related to climate change and disaster risk reduction. Her field of interest relevant to the IRT is climate change and climate variability including the social and human dimensions.

A particular focus of Prof Vogel's current research is on transformation and climate change including transformative adaptation. The role of climate knowledge and modes of knowledge production (e.g. transdisciplinarity) in the process of climate risk management forms an essential part of such research efforts.

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Dr Juan Vorster did his undergraduate degree in plant physiology and a MSc in molecular biology at the University of Pretoria. During his PhD studies he spent more than a year conducting research in whole genome comparisons at Case Western Reserve University in Cleveland, Ohio, before returning to the University of Pretoria to complete his PhD in 2008.

This was followed by a Postdoctoral Fellowship at the Université Laval in Quebec City, Canada, focusing on recombinant protein expression as well as protein modelling and rational design of proteins for improved function. In 2010 he was appointed in the Department of Plant Production and Soil Science at the University of Pretoria. His main research is focused on plant cysteine protease inhibitors (Cystatins) and their interaction with cysteine proteases from both plants and insects or pathogens during development and stress.

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Prof Eddie Webb is Head of the Department of Animal and Wildlife Sciences at the University of Pretoria. A graduate of the University he completed his postdoctoral studies at the University of Ghent in Belgium and Nutreco in The Netherlands on aspects of fatty acid synthesis in ruminants and growth modelling.

He has been President of the South African Society of Animal Science since 2008 and Deputy-editor of the *SA Journal of Animal Science*. He also serves on the editorial board of *Small Ruminant Research*.

Prof Webb served on the organising committee and as special editor of the International Conference for Meat Science and Technology held in Cape Town in 2008. He is a member of the advisory committee on meat science research for the Agricultural Research Commission

During his career Prof Webb has published 72 papers in peer-reviewed scientific journals, delivered 85 papers at international conferences and participated as guest lecturer at international symposia and universities.

He holds a C-rating from the NRF and has mentored eight PhD and 33 master's students. Prof Webb is registered professionally with the SA Council for Natural and Scientific Professions, the SA Association for Professional Animal Scientists and the SA Society for Animal Science.

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Dr Friede Wenhold is senior lecturer in the Department of Human Nutrition at the UP Faculty of Health Sciences. Her professional field of expertise is in the area of nutritional assessment of individuals and for research.

She has conducted research on behalf of the Water Research Commission on rain-fed and irrigated production of food crops and its potential to meet all year round nutritional requirements of rural people in North-West, Limpopo, KwaZulu-Natal and Eastern Cape Provinces. Dr Wenhold is co-author of the National Agriculture and Food security Investment Plan (Comprehensive African Agricultural Development Plan) "Food security and nutrition".

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Dr Zelda White is a senior lecturer in the Department of Human Nutrition and a member of the Nutrition Society of South Africa.

Dr White has a good knowledge base in basic and advanced nutrition and how diet-related behaviours can affect health outcomes. To investigate behaviour change one needs to intervene with regards to dietary/lifestyle behaviour and measure the impact of these changes. One of the best ways to investigate these effects is through experimental research.

She has a PhD in Nutrition from the North-West University and has basic and advanced training in good clinical practice and experience in quantitative research methodology.

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Dr Paola Wood is a Senior Lecturer and biokineticist in the Department of Biokinetics, Sport and Leisure Sciences at the University of Pretoria (UP). Paola obtained the degree BA (HMS) (Hons) in Biokinetics, MA (HMS) and DPhil (HMS) at UP. She practiced as a Biokineticist for 15 years before joining the academics. Dr Wood has published 27 peer-reviewed articles in the last six years, presented at numerous congresses, and is a subject editor and reviewer for several ISI journals. She currently serves on the Biokinetics Association of South Africa Ethics Committee. She has a special interest in physical activity, training injuries and their causes. Her field of interest relevant to the IRT includes physical activity in children and its effect on the motor development and health of children.

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IFNuW output as at end 2013 (period 2011–2013)

Published articles

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15. Booysen, L., Viljoen, A.T. and Schönfeldt, H.C., (2013) 'A comparison of the eating quality of selected potato cultivars from two potato production regions in South Africa', *Journal of the Science of Food and Agriculture*, 93(3):509-516.

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17. Bouwman, H., Kylin, H., Sereda, B. and Bornman, R., (2012) 'High levels of DDT in breast milk: Intake, risk, lactation duration, and involvement of gender', *Environmental Pollution*, 170: 63-70.
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Patents

Patent granted in USA, Europe and South Africa – Process for producing protein microparticles, University of Pretoria. Inventors: Prof J Taylor and Prof JRN Taylor.



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