



VU University Amsterdam-NRF South Africa

Desmond Tutu Doctoral Programme

Fourteen PhD Positions: Phase One Call

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Background: The Desmond Tutu Programme

The Desmond Tutu Programme is an academic Programme of VU University Amsterdam and the National Research Foundation (NRF), South Africa that aims to strengthen the cooperation between VU University Amsterdam and South African Higher Education Institutions. The Programme, which is established in 2009 in honor of Archbishop Emeritus Desmond Tutu, has as its' central theme "Bridging Diversities for Academic Advancement". The second phase of the Programme starts in 2014 and will provide scholarships to 20 South African PhD students per year.

VU University

VU University Amsterdam is one of the leading institutions for higher education in Europe and aims to be inspiring, innovative, and committed to societal welfare. It comprises twelve faculties and has teaching facilities for 25,000 students.

Background information on 'Bridging Diversities for Academic Advancement' (further referred to as 'Bridging Diversities')

The PhD Training Programme 'Bridging Diversities for Academic Advancement' aims to contribute to a more equal world by integral thinking in which diversities are considered enriching rather than threatening. It means making connections: the Programme stands for dialogue and engaged scholarship. Research undertaken in this Programme aims to provide a safe space for thinking through the ambiguities and paradoxes of diversities. It aspires to make a difference to society: 'academic advancement' is here understood as relevant to, and serving the improvement of, society.

VU University Amsterdam and the South African National Research Foundation are in agreement that following a trans disciplinary, multidisciplinary or interdisciplinary approach will bring together diverse knowledge partners and beneficiaries. Research undertaken in this framework (i.e. 'bridging science and society') strives for high quality research in a context of equitable opportunities, access and outcomes for a broad and diverse range of beneficiaries. The following two themes with key areas for research are suggested:

I. Prosperous Societies:

Research themes: food industry; HIV; identities; reconciliation; security; service delivery; development of high potentials; culture and communication; corporate social responsibility.

II. Sustainable Energy:

Research themes: environment; sustainability; climate change; natural resource management; energy provision.

Priority will be given to the above-mentioned themes or any combination of themes, in such a way that 'pockets' of research will emerge. In addition, PhD positions for multidisciplinary and interdisciplinary projects are considered and for innovative single projects outside these themes.

Scholarship

South African students with a research Master's degree or who are in the process of completing the requirements for such a degree and are looking to pursue research doctoral studies are eligible to apply for the NRF - VU University Amsterdam Desmond Tutu Doctoral scholarships. The award will amount to the value of approximately **R334, 500** each year (depending on the exchange rate) toward doctoral study costs in South Africa and will cover, among other things, flights to and from Amsterdam, accommodation, living costs, and a scholarship.

The Programme is designed in a sandwich format where students:

- Register and obtain their research doctoral degrees from VU University Amsterdam and the South African home university;
- Will be jointly supervised by academic researchers at VU University Amsterdam and at a South African Higher Education Institution;
- If required, will complete coursework for doctoral studies both in South Africa and in the Netherlands;
- Spend one to two months per year over a four year period at VU University Amsterdam to undertake course and thesis-related work, while carrying out their research in South Africa.

Application

Applicants are requested to register in the NRF Online Submission System (<https://nrfs submission.nrf.ac.za/>), before the deadline of **29 August 2014**. A copy of the application (research proposal), a motivation letter (personal statement), curriculum vitae, contact information of at least one potential reference and two letters of support should be sent to all names listed in the table below:

(Project Leader)	(Professional Officer)	(Executive Assistant)	(SAVUSA Office)
<p>Nosisa Dube Desmond Tutu Programme Reviews and Evaluation Domain National Research Foundation E-mail: ndube@nrf.ac.za</p>	<p>Sindi Kayi Desmond Tutu Programme Human and Infrastructure Capacity Development National Research Foundation Email: sindi.kayi@nrf.ac.za</p>	<p>Tarryn Ludwig Human and Infrastructure Capacity Development National Research Foundation Email: tarryn.ludwig@nrf.ac.za</p>	<p>Marise Amersfoort, m.r.van.amersfoort@vu.nl Cc: savusa@vu.nl</p>

1. PhD-position 'Interacting networks - how does complexity transfer from one network to another?' - Ref. No: DTP270514001

Background information Faculty/Department/Research group, in which the PhD student will be based

The research group (Coordination Dynamics) is part of the MOVE Research Institute at the Faculty of Human Movement sciences, VU University Amsterdam

The research group has expertise in complex dynamics in biological systems using nonlinear dynamics and synergetics. The research agenda includes various studies on the stability and variability of coordinated movement in relation to its neuromuscular control. That includes the analysis and modeling of kinematic, electromyographic, and encephalographic data alike. Current theorizing in motor control includes the interplay of deterministic and stochastic aspects of neural dynamics, modeling of mirror movements, phase transitions in rhythmic movements and accompanying patterns of cortical activity, and more general aspects of neural synchronization.

Contents of the research project

How and under which circumstances do network characteristics transfer between networks? Plan is to identify mathematical similarities between large biological and large social systems that involve interconnected networks acting on *distinct temporal scales*. Despite their diversity we expect these systems to show similarities, which will ultimately allow for predicting one systems' behavior by studying the other, at least in a qualitative way. First, patterns of brain activity will be investigated which often resemble scale-free networks of slow and fast neural oscillations. For this we do have a substantial database of M/EEG recordings available. Here we expect a significant spillover between activities that may manifest itself in between-network synchrony (presumably from slow to fast). Hubs are likely to play a crucial role in this process as they can channel the transfer between networks. A similar transfer is expected in social system, here networks of football players that are generated during a match versus the social networks among players. Performance will be quantified in terms of graph analysis and similar to the brain we expect that hubs in the one network will induce hubs in the other, both between opposing teams and between the social network and the football networks. While the social network is slowly changing, performance on the pitch can alter rapidly implying that social characteristics affect the interaction during matches in a more sustained way (i.e. between-network interaction primarily from slow to fast); again we will employ experimental data from related projects.

Both between-network dynamics will be cast in mathematical forms lent from graph theory and nonlinear dynamics. There is mounting evidence that the complex structure of brain networks collapses in disorders like Alzheimer's disease, brain tumors and schizophrenia. Scale-free topologies provide a general framework for understanding how different types of network damage may cause these pathological network changes. It is unlikely that such network damages remain restricted to a single neural network as they rather transfer to another one, which indeed may explain the avalanche-like spread of neuro-degeneration.

For team sports our research may lead to develop meaningful key performance indicators with strategic impact, which in turn may give an edge to its users and may also be implemented in software packages, like those accompanying commercially available tracking systems. The analysis of football matches is likely to provide invaluable insights into team performance, players' interactions, competition between teams, and team strategies.

Requirements

- Master degree in Physics, Mathematics or related fields
- Proficiency in English
- Experience with Computer programming (e.g., Matlab)

For additional project information please contact:

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2. PhD-position 'Motor control & learning: the development of high potential in sport, physical education or in a rehabilitation/clinical context' – Ref. No: DTP270514002

Background information Faculty/Department/Research group, in which the PhD student will be based

The research group (Motor control) is part of the research institute MOVE of the Faculty of Human Movement sciences, VU University Amsterdam

The research of the current program focuses talent identification and development. More specific, it is examined how perceptual-motor control at the different time scales of motor development, motor learning and peak performance is brought about by the constraints on the actor-environment system. At the different time scales particular changes in the interaction between the constraints may act as rate-limiting factors in the emergence and mastering of perceptual-motor co-ordination. The use of particular visual information can act as such a constraint. The main objective is to identify the relative contribution of these constraints to perceptual-motor control and the changes therein at the different time scales. By manipulating these constraints in experimental settings, descriptions and explanations will be deduced what constraints are involved and how they induce perceptual-motor co-ordination at the different time scales. From this theoretical perspective, the core of the research in South Africa lies with the interaction between the task (e.g., task instructions) and organismic constraints (e.g., skill level or expertise level) with special emphasis on the use of visual information and in particular how the information is used for anticipation and decision-making in sport, or in development of sport and/or rehabilitation/clinical setting.

Contents of the research project

In the last decade, numerous studies have shown that experts have superior anticipation skills compared to novices. In fact, research has demonstrated that the fundamental difference between experts and novices appears to follow from their ability to pick up useful visual information in advance. The PhD projects would examine whether differences in visual search and motor behavior can be identified in a group of young, talented players in any sport or players with a handicap. The PhD student will work closely together on the issues of talent identification and development. More specific, *what* information and *how* information is used (or is learned to use) to control movement in either a fundamental skill (e.g. catching, reaching and grasping of objects), in sport settings (optimal training methods and talent development) or in rehabilitation settings (effects of obesity or ageing), or any combination of these.

Research objectives:

- 1) To identify which perceptual sources of information constrain the developmental and learning changes, and induce (optimal) performance in perceptual-motor control, and to unravel processes that underlie these changes;
- 2) To gain insight in how learning in (optimal or suboptimal) perceptual-motor co-ordination can be best facilitated (e.g., through implicit versus explicit learning processes).

In sum, the PhD projects are aimed at identifying the variables that are most important in distinguishing skilled from less-skilled athletes or athletes with a handicap. These variables are essential in an attempt to detect and develop talent, and only when our understanding of them is enhanced, it is possible to develop adequate tests for talent identification and training methods for optimal development.

Requirements

- Master degree in Sport Sciences, Human Movement sciences. A specialization in research matters is an asset
- Proficiency in English; Experience with elite athlete or children;
- Affinity with sport or rehabilitation, clinical setting and Willingness to spend time in the Netherlands

For additional Project information please contact:

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3. PhD-position 'Township economics'- Ref. No: DTP270514003

Background information Faculty/Department/Research group, in which the PhD student will be based

The research group Development Economics is part of the Department of Economics within the Faculty of Economics and Business Administration (FEWEB). The group has a prominent position in its field. Its dynamic nature and large international network attracts talented young researchers and PhD students. The group is well-known among development economists across the globe. Researchers in this group have published in top-ranked journals such as the American Economic Review, Econometrics, Review of Economic Studies, Review of Economics and Statistics, Journal of Health Economics, the World Bank Economic Review and World Development.

The research group adopts a strongly empirical approach, using survey data (for individual households or firms) for micro-econometric testing. The collection of such data and the design of survey instruments is therefore an important part of the group's research. Data collection and impact evaluations are facilitated by the Amsterdam Institute for International Development (AIID), through which this group closely collaborates with development economists from the University of Amsterdam and medical researchers from the Amsterdam Institute for Global Health and Development.

In the QANU research assessment 2009, conducted by a team of international experts, our group was awarded the excellent score of 18.5/20. The QANU report concludes:

"This is a relatively small group focused on microeconomic issues arising in the economics of development. It is well known internationally and publishes a good volume of research. Importantly, that research has real impact, as it deals with

crucially important problems in development economics and delivers answers that have implications for policy."

Contents of the research project

The dual nature of South Africa's society is clearly visible in the contrast between townships and the affluence of city centers. Access to public services is highly unequal both in terms of quality and quantities. Yet, townships are also communities with economies of their own, including income generation, distribution and the production of public goods. In this project we aim to study how township economies function within the wider South African economic context and how the various economic functions such as employment, investments, public facilities, and finance are organized within townships. We further want to establish the mutual dependence of townships and the overall South African economy. This should help to better understand what determines income generation, what the scope for local economic is growth and how the distribution of income, including poverty can be understood as the outcome of a dynamic process.

This study will make use of various methods: economic modeling, collection and analysis of survey data, interviews and case studies. Where possible existing data sources will be used. Townships of various economic potential will be compared.

Requirements

- Master's degree in Economics with specialization in applied microeconomics (preferably)
- Proficiency in English
- Experience in surveys and data analysis;
- Affinity for statistical analysis and considerable time for doing research

Information

For additional project information please contact:

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4. PhD-position 'Optimizing public value Contribution of NPO's to a sustainable development of South African communities' – Ref. No: DTP270514004

Background information Faculty/Department/Research group, in which the PhD student will be based

The PhD Student will be based at both the School of Public Leadership of Stellenbosch University (SPL) as well as at the University of Stellenbosch Business School (USB). Both institutions work actively in the field of (corporate and public) governance and leadership with the aim of strengthening organizations in Southern Africa. The two institutions join forces in the not-for-profit or non-profit sector research: SPL from an angle of Public Administration and USB from an angle of Business and Corporate administration. The Zijlstra Center of the VU University in Amsterdam is taking part from an angle of governance and management of non-profit organizations. SPL and USB are the two biggest entities within the Faculty of Economics of Stellenbosch University.

Contents of the research project

The social and organizational sustainability of organizations in the not-for profit sector in South Africa is weak. Although 35 billion Rand is channeled annually in this sector to approximately 101.000 registered NPO's, a limited shift in health care, educational, social development, housing and environmental outcomes is seen. While public needs grow and the municipalities seem to have great problems in their service delivery, donors of the non-profit organizations increasingly want to see a real return on their investment and perceive large sections of the sectors as largely ineffective, are more and more interested in accountability and are very keen on more participation of stakeholders around the non-profit organizations.

The proposed research deals with the growing demands on many (small) NPO's and their capability to deal with these demands. The research questions that will give insight in this situation are: "How can these NPO's optimize the public value of sustainable development in their area?"; "How do the NPO's respond to and deal with increasing demands?"; "What dilemmas do they come across?"; "How NPO's change and professionalize?"

Public Value theory focuses strongly on three parts: 1) values and goals, 2) the stakeholder environment and 3) the capacity building in cooperation (Moore 1995). The theory has in many ways changed the understanding of the processes of local government and is the starting point of the further development of theory on sustainable values in the South African context. The research project foresees in an action learning methodology with a group of non-profit organizations in Stellenbosch, called SOS: an umbrella organization of 24 participating NPO's in the greater Stellenbosch area. The research project will be implemented by the following parameters:

- a. Action learning as a methodology of change of the organizations during the time of the research project;
- b. Iterative process: the organizations will be involved in an iterative process of ideal design, goal setting, action implementation, change management, monitoring & evaluation and institutionalization;
- c. Participation of key stakeholders of the organizations;
- d. Replicable: the learning processes applied in the project will be designed to be replicable and transferable without being overly dependent on the inputs of experts.

The research will be enforced by workshops, training programmes, coaching and consulting. In that atmosphere a 'lab of change' is created.

During a time of four years the PhD student will focus on the above mentioned research question. He/she shall be part of a team with professors, trainers and consultants of SPL and USB who will do direct capacity building interventions. He/she will monitor, evaluate and create a data bank to get a sharp insight in the actions, reactions, dilemmas and challenges of the NPO's and their stakeholders and their production of public values.

Requirements

- Master's degree in sociology, public administration, business administration or relevant fields of social sciences;
- Be fluent in English and preferably in Afrikaans;
- The candidate sees the challenge to work as a researcher and organizer in a very diverse field of actors;
- The candidate has affinity with social capacity building processes

For additional project information please contact:

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5. PhD-position 'Parenting relationships and parent-child attachment: children with intellectual disabilities' – Ref. No: DTP270514005

[Background information Faculty/Department/Research group, in which the PhD student will be based]

VU University, Faculty Psychology and Pedagogics. Program: Challenges to childrearing relationships
Focus: Attachment and caregiving from a trans generational and developmental perspective. In our department we have 3 professors, 8 assistant professors, 4 teaching staff. 2 Researchers/postdoc, 17 PhD students, secretarial staff and guests.

The proposed study will be part of our research focus area: 'Caregiving of children with special needs'. Children who are vulnerable due to intellectual, physical, and/or visual disabilities or chronic illness need adequate care even more than other children. Goals for this topic are (1) to increase the impact of our stress-attachment model of challenging behavior in the field of research, training, and practice; (2) to validate assessments of caregiving and attachment in special needs populations; (3) to develop and test interventions that not only prevent mental health risks but that may also promote development through resilience against stress and increased motivation.

For more information see: <http://www.psy.vu.nl/en/about-the-faculty/departments/clinical-child-and-family-studies/index.asp>

Promoter of this study: Prof. Dr. F Finkenauer, Professor Child abuse and interpersonal relationships
Co-promoter and coordinator: Dr. P. S. Sterkenburg, Assistant professor 'Caregiving of children with special needs'. We have a long-term exchange project with the Skool vir Psigososiale Gedragwetenskappe, North-West University Potchefstroom, South Africa.

Contents of the research project.

This research will focus on the role of culture and communication during parenting of a child with a disability as well as the shared social responsibility to support parents with a child with a disability. Parenting may be very enjoyable but may also be very challenging. For parents with children with an intellectual disability establishing and maintaining a parent-child relationship can be a challenge as the children's behaviour and interaction, their attempts to communicate with their parents, are so different and difficult to understand. For example, parents may experience a feeling of rejection due to the child's lack of eye contact, the absence of reciprocal smiling or the absence of head movement following the parent as the parent moves around the room.

In addition, the parent may experience the child to be unresponsive due to absence of emotional expressions (e.g. the child having a blank face) or due to the relatively slow speed at which the child processes social information, which may cause delayed response to parental input, or even the absence of a reaction (Anderson, 2001). These child-characteristics may impair the parent-child attachment relationship and communication. Additionally, they may place a burden on the parental relationship and affect parents' behaviour and communication toward each other. The risk for disturbed marital relations is high as parents may need time to accept that their child is different from the child they expected to have during pregnancy. Parents may experience difficulties in their marital relationship; they may feel misunderstood, and unappreciated by their partner. Adding to the marital stress and distress, in some cultures having a child with an intellectual disability is seen as a 'curse', causing parents to feel isolated from the community.

This research project will examine cultural and communicational patterns in parents with a child with an intellectual disability or multiple disabilities (e.g. visual-and-intellectual; physical-and-intellectual). It aims to gain insight in the way parents, from different cultures, support each other and how they communicate with each other about the needs of their child with a

disability. Additionally it will illuminate how these relational processes affect the parent-child attachment relationship. These insights provide important knowledge for intervention, prevention, training, and psycho-educational programs for parents and children. It will contribute to enhance our knowledge of how to better support the parents with a child with an intellectual disability and to improve the parent-child relationship.

Requirements

- Master degree in Psychology; Proficiency in English; Experience in the treatment or care for persons with disabilities
- Affinity with persons and children with disabilities (e.g. intellectual disabilities, visual disabilities) and with research in the field of parenting and relationships; Willingness to do fieldwork also in rural areas of South Africa and wish to contribute to improve parenting for persons with disabilities; Present a research proposal on above mentioned outline of the research project.

For additional project information please contact:

Name: Dr. P.S. Sterkenburg (Clinical child and family studies)

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6. PhD-position 'South Africa's transition from apartheid to democracy: local-level aspects' – Ref. No: DTP270514006

Background information Faculty/Department/Research group, in which the PhD student will be based

The Department of Social and Cultural Anthropology is a small, internationally oriented department where the staff is very committed to their students. In contrast to other Dutch anthropology departments, its curriculum and research Programme are characterized by thematic rather than geographic specializations. Staff, postdoctoral researchers and PhD-students work with a broad range of themes in different parts of the world. Central, overarching themes in the department are Religion and Development & Globalization. Themes like ethnicity, nationalism, gender and power are also an important part of the research and teaching curricula.

The student will be based in the Anthropology Department at VU University Amsterdam. However, a specialization in Anthropology is not required. The position could cover a wide variety of disciplines from within the social sciences.

Contents of the research project

The period of South Africa's transition from apartheid to democracy, most notably between 1990 and 1994, was a formative period in the country's modern history. It witnessed the sealing of a grand political compact between leading political forces, a move towards national reconciliation, and a transformation of the country's institutions.

However, the period of South Africa's transition remains in need of further study, not least as various actors now, a generation further on, question the achievements of that period. A good deal is known about aspects of the transition at the national level of politics, but far less is known about some other aspects of the transition. This includes, for example, developments in the world of finance and business and in regard to the situation in local communities, some of which were torn by violence throughout the transitional period.

It is proposed to initiate two related projects on the transitional period in South Africa, with particular reference to the years

1990-1994. One of these will concern local-level aspects, and could take the form of a micro-study of a particular town, location, city or region. A second project will concern national finances, including in the private sector.

Requirements

Master degree in either (a) economics or finance or (b) in history, anthropology, sociology or similar

- Proficiency in English is essential
- Experience in working with archives or official documents would be an asset

For additional project information please contact:

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7. PhD-position 'Bridging confessional and socio-cultural identities within religious traditions.' – Ref. No: DTP270514007

Background information Faculty/Department/Research group, in which the PhD student will be based

Faculty of Theology and Religious Studies, VU University Amsterdam:

Religion plays a significant role in our world and is currently experiencing resurgence. Students who choose to study in the Faculty of Theology at VU University Amsterdam are opting for a rigorous, challenging Programme in a lively and varied faculty with an excellent reputation for its outstanding teaching and research and its unique profile. As an ecumenical-protestant faculty, the Faculty of Theology incorporates students and teaching staff with a wide range of world views and from various world religions. We take each other seriously and expect everyone to engage critically with their own traditions in order to learn to understand others without losing their own identity, both as theologians and as fellow citizens. As such, we represent a microcosm of wider society.

Anyone who studies here will not only develop in terms of academic knowledge and greater insights but also enhance their own life philosophy or faith and their understanding of the personal convictions of those around them. Theology, religion and life philosophy, Islamic theology, all of these focus on the self, the other and the world in which we live together.

Contents of the research project

Bridging confessional and socio-cultural identities within religious traditions

While European societies have only in recent decades experienced the challenge of living together with diversity of peoples, South Africa's history is the story of finding ways to bridge socio-economic gaps and socio-cultural differences. This research theme especially analyses the way religious traditions contribute to bridging socio-cultural and socio-economic gaps. Do faith communities bridge these gaps? And if so, how and under which conditions? Or is 'Sunday morning the most segregated hour', expressing that faith communities meet along national or ethnic lines? If so, why is this the case and how is this justified? Have religious identities been linked to specific socio-cultural identities in practises and/or theory? Formulated in theological language, how can our acknowledged and appreciated creational diversity be combined with embodied

membership of the one catholic church? Through a better theological understanding of the way socio-cultural and religious identities are related, faith traditions will be able to contribute to prosperous societies.

Requirements

- Master degree in theology or religious studies

For additional project information please contact:

Name: Prof. Dr. Ed. Van der Borgh

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8. PhD-position 'South Africa's religious discourse in the public Domain: a theological analysis' – Ref. No: DTP270514008

Background information Faculty/Department/Research group, in which the PhD student will be based

Faculty of Theology and Religious Studies, VU University Amsterdam

Religion plays a significant role in our world and is currently experiencing resurgence. Students who choose to study in the Faculty of Theology at VU University Amsterdam are opting for a rigorous, challenging Programme in a lively and varied faculty with an excellent reputation for its outstanding teaching and research and its unique profile. As an ecumenical-protestant faculty, the Faculty of Theology incorporates students and teaching staff with a wide range of world views and from various world religions. We take each other seriously and expect everyone to engage critically with their own traditions in order to learn to understand others without losing their own identity, both as theologians and as fellow citizens. As such, we represent a microcosm of wider society.

Anyone who studies here will not only develop in terms of academic knowledge and greater insights but will also enhance their own life philosophy or faith and their understanding of the personal convictions of those around them. Theology, religion and life philosophy as well as Islamic theology focus on the self, the other and the world in which we live together.

Contents of the research project

South Africa's religious discourse in the public domain: a theological analysis

Many religious beliefs have the potential to bring diverse people together with stories of common human origin and common human future, with claims of one offer of salvation for all people, with sets of ethical do's and don'ts, with rituals for all, with invitations to membership of a common faith community, etc. For this reason concepts with a religious connotation - such as rainbow nation, reconciliation, forgiveness and social justice - have accompanied and inspired the journey of South Africans to nation building in the new South Africa to come to terms with the violence and separation of the colonial and apartheid past. While the rest of the world has been fascinated by South Africa's transition, in the country itself each of these notions have become part of an ongoing debate on their legitimacy, their usefulness, their meaning, the conditions for their use, etc. This research theme maps these contestations in order to contribute to the clarification of this religious terminology within faith communities and in the public domain in South Africa and the rest of the world.

Requirements

- Master degree in theology or religious studies

For additional project information please contact:

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9. PhD-position 'Delivering public services through Corporate Social Responsibility' – Ref. No: DTP270514009

Background information Faculty/Department/Research group, in which the PhD student will be based

The PhD student will be based in the Department of Constitutional and Administrative Law of the VU. More specifically, the research is conducted within the Programme 'Public Contracts: Law & Governance'. This Programme is part of the research institute of the Faculty of Law of the VU, the 'Kooijmans Institute', in which it serves its central theme Law and Governance (Professional Services). This research group is also an active partner in the Netherlands Institute of Law and Governance (NILG). Prof Frank van Ommeren is the designated VU supervisor and will collaborate with Prof. Geo Quinot (Stellenbosch University) in this project. Therefore the successful applicant selected for this project will have to register their doctorate with the university of Stellenbosch.

Contents of the research project

In modern society governments are unable to perform all public duties by themselves. The key question is how other – private or semi-public – entities can be guided to help deliver social goods, in particular in delivering services. When commercial enterprises perform (aspects of) public functions, this has been referred to as their *Corporate Social Responsibility (CSR)*. In many states, also in South Africa and the Netherlands, CSR needs more attention.

From a legal point of view CSR is a difficult phenomenon to conceptualise, because it calls for the integration of divergent legal concepts. How can *private* (commercial) enterprises contribute to the *public* domain? From the well-known slogan 'People, Planet, Profit' one could say that although the corporation is focused on profit, CSR involves taking into consideration the way in which profits are generated. People, Planet and Profit are the three sectors of socially responsible business management. With Planet and People *public* interests – e.g. sustainability and social interests – are expressly taken into account: it concerns the achievement of interests that exceed the personal interest of the private party.

Research of CSR from a legal point of view evokes many questions:

- How can private companies that perform important functions in the public domain be bound to norms which originate from the domain of public law, like equality, (socio-economic) human rights, participation and accountability?
- Traditionally, law is conceptually divided into a public and a private part. With CSR the public-private law divide becomes blurred. This raises many important follow-up questions about this fundamental division.
- How are CSR-enterprises governed by legal rules that originate from public or private law? What does this legal framework look like?
- What relationships (should) exist between beneficiaries of public services and private providers and how does the law

generate those relationships within CSR?

- What is the meaning of this framework for the legislator and for the judiciary?
- Should the state, from a legal point of view, support CSR or are there other possibilities to perform public functions – e.g. *state* commercial activity – more attractive?

An in-depth study of CSR in South Africa and the Netherlands will contribute to a better mutual understanding of the law of both countries. It provides a better insight into the meaning of universal values such as equality, justice and the rule of law, taking into account the interwoven nature of the public and private spheres.

Requirements

- Master degree in law with specialization in public law, constitutional or administrative law
- Proficiency in English, fluently / very good

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10. PhD Position 'A genetic approach to unravel neurotropism of Mycobacterium tuberculosis: The bacterial side of tuberculosis meningitis' – Ref. No: DTP270514010

Background information Faculty/Department/Research group, in which the PhD student will be based

The current PhD application will be added to the existing international TBM network:

Amsterdam, The Netherlands, VU University Medical Center:

- Department of pediatric infectious diseases and immunology; Prof. Marceline van Furth (head; MD), Martijn van der Kuip (MD; PhD), Douwe Visser (MD; PhD in progress)
- Department of medical microbiology and infection prevention; Prof. Wilbert Bitter, Astrid van der Sar (PhD), Lisanne van

Leeuwen (MD; PhD student)

Cape Town, South Africa, Tygerberg Hospital/Stellenbosch University :

- Department of pediatrics and child health / pediatric neurology; Ronald van Toorn (head; MD; PhD in progress), Regan Solomons (MD; PhD in progress), Sabine van Elsland (PhD student)

- Department of neuropathology; Dan Zaharie (MD); Sanna Roest (MD, PhD student)

- Stellenbosch University Immunology Research Group (SUN-IRG); Prof. Gerhard Walzl (head; MD)

Potchefstroom, South Africa, North-West University:

- Centre for Human Metabolomics; Prof. Carools Reinecke, Shane Mason (PhD student)

Ann Arbor, Michigan, USA, Univeristy of Michigan Medical School

- Department of microbiology and immunology; Prof. Denise Kirschner, Mohammed el Kebir (PhD student)

This research for this PhD proposal will be performed at the department of microbiology* (head: Andrew Whitelaw MBBCh, FC(Path)SA, MSc) of Tygerberg hospital in Cape Town (University of Stellenbosch) in collaboration with the department of pediatric infectious diseases and immunology** of the VU University Medical Center in Amsterdam (head: Prof. A. Marceline van Furth) and the department of medical microbiology and infection control*** of the VU University Medical Center in Amsterdam (head: Prof. Christina M. Vandenbroucke-Grauls).

From Cape Town, Prof. Whitelaw*, Kim Hoek* and the **to be determined PhD** will be involved; from Amsterdam, Prof. W. Bitter***, A. van der Sar***, L. van Leeuwen***, Prof. A.M. van Furth** and M. van der Kuip** will be involved.

http://www.sun.ac.za/english/faculty/healthsciences/med_microbiology/Pages/Staff0621-5135.aspx

Contents of the research project

It is paramount to understand pathogen and host interaction in any infectious disease. Knowledge of this interaction provides insight to develop new antibiotic treatment strategies and also immunomodulatory drugs (vaccines and biologicals). For this study we will compare data from whole genome sequencing between *Mtb* strands that cause central nervous system infection versus *Mtb* strands that cause pulmonary tuberculosis. We will analyse genes that are suspected for neurotropisms (blood stream dissemination, passage of blood brain barrier, central nervous system seeding, survival end further meningeal dissemination) from our animal model in Amsterdam (zebrafish***). We hypothesize to unravel specific virulence factors involved in central nervous system infection.

The research will be subdivided in 3 parts:

1. An overview of the literature on the topic of the neurotropism of *Mtb*.
2. Whole genome sequencing of 100 *Mtb* culture positive patients (50 with pulmonary tuberculosis only and 50 with central nervous system tuberculosis)
3. Interpretation of data with 3 separate research questions:
 - What bacterial factors determine crossing the blood brain barrier?
 - What bacterial factors determine central nervous system survival?
 - What bacterial factors determine direct of post brain infection penetrance of the meninges?

Requirements

We will address a PhD student from the department of medical microbiology. This can be a medical or biology student, with special interest and skills in genetic research.

For additional project information please contact: M. van der Kuip, MD, PhD

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11. PhD Position 'The pathogenesis of central nervous system granuloma and in tuberculous meningitis: a neuropathology study of human postmortem brain' – Ref. No: DTP270514011

Background information Faculty/Department/Research group, in which the PhD student will be based

The research will be performed at the department of anatomical pathology (head: Prof. Colleen Wright) of Tygerberg hospital in Cape Town (Stellenbosch University) in collaboration with the department of pediatric infectious diseases and immunology of the VU University Medical Center in Amsterdam (head: Prof. A. Marceline van Furth). For this human post mortem neuropathology project, we have collected brain specimens of a unique historical cohort of infants, children and adults that died due to tuberculous meningitis between 1975 and 2010. Of a total of 90 patients, brain material is available for research. From November 2012 - April 2013 and November 2013 - April 2014, two Dutch medical students, Sanna Roest and Carmen van Dam collected and retained the available material with Dan Zaharie, neuropathologist. The first part involved the collection of clinical data, brain specimens, cutting and retaining brain specimens and a systematical analysis of CNS granuloma types. The staining techniques used on the brain specimens have been the standard techniques that can determine global nonetheless important features of CNS granuloma.

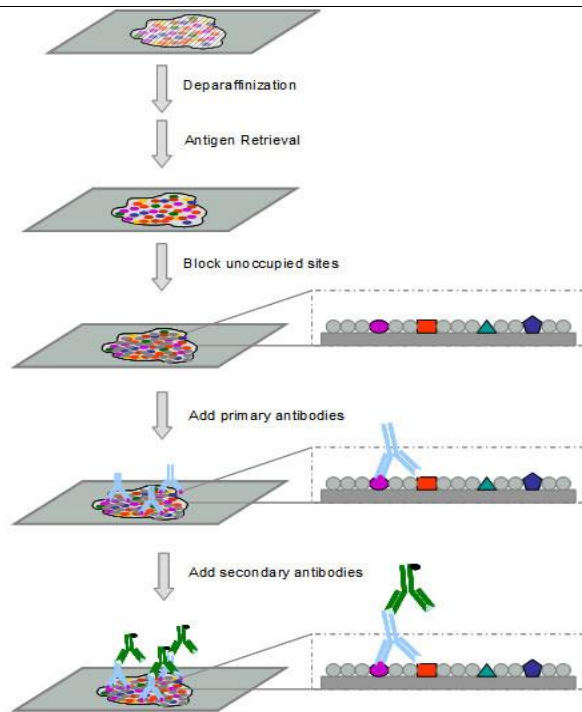
Contents of the research project

It is very important to perform novel techniques on historical and valuable material, because new techniques can give specific insight in the immune cells that are involved in the local CNS immune response. Earlier, these methods were not available and we believe that it is paramount to translate new insights to novel therapeutic approaches such as immunomodulating therapies. Therefore, this study aims to systematically analyse immunohistopathological findings of granuloma in a historic cohort of TBM infants, children and adult, to contribute to a better understanding of granuloma formation in the unique environment of the brain.

The research will be subdivided in 3 parts:

1. An overview of the literature on the topic of the pathophysiology of TBM in human.
2. Description of the clinical and standard histopathological findings in our cohort. Redefining granuloma types in TBM.
3. Immunohistopathology with 5 separate research questions:
 - What is the role of phagocytes (microglia, macrophages and granulocytes) during granuloma formation?
 - What is the role of T- and B lymphocytes during granuloma formation?
 - What is the role of the cytokine TNF alpha?
 - How many granuloma show apoptosis?
 - How many granuloma show neovascularization?

We will do qualitative and semiquantitative analysis on the different cell types and predominant cytokines in brain granuloma. The figure depicts the process of immunohistochemical staining.



Requirements

The applicant should have experience in neuropathology.

For additional information please contact: M. van der Kuip, MD, PhD

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12. PhD Position 'Life after the game: quantitative and qualitative analyses of long-term effects of injuries in Rugby Union players'– Ref. No: DTP270514012

Background information Faculty/Department/Research group, in which the PhD student will be based

The student will be based at the Medical Research Council/ University of Cape Town Research Unit for Exercise Science and Sports Medicine (ESSM), which is located in the Sports Science Institute of South Africa. ESSM is a division within the Department of Human Biology, in the Faculty of Health Sciences. The University of Cape Town is the leading academic institution in South Africa with 25 500 students.

ESSM has an existing and highly successful working relationship with the VUmc (Department of Public & Occupational Health/EMGO+ Institute), through a previous Desmond Tutu Scholarship recipient, James Brown who is expected to complete his PhD by December 2014. His practice-driven work was performed in close collaboration with South African

Rugby Union (SARU) and has fulfilled four functions; (i) he has answered the questions his thesis was designed to answer, (ii) his research has exposed further questions which need answering, (iii) his work has strengthened the relationship between SARU, ESSM and VUmc, placing this group in a unique position to answer relevant questions about safety in rugby, (iv) his research has led to academic output in peer-reviewed journals belonging to the top quartile of the field.

This international collaborative relationship facilitated by the Desmond Tutu scholarship has been mutually beneficial and successful both from the perspective of research outputs, as well as from a societal perspective. Therefore all three groups (ESSM, VUmc and SARU) are very supportive for the possibility to continue this collaborative relationship to support a new student.

Contents of the research project

Rugby union (henceforth "rugby") is one of the most popular team sports globally. It is particularly popular in South Africa with an estimated 600,000 participants. The South African national team is ranked 2nd in the world. The sport is also growing in the Netherlands.

Rugby is a sport characterised by short duration, high intensity bouts of exercise during which collisions occur between players. These demands are associated with both general and catastrophic injuries to players. SARU has a corporate societal responsibility to look after the wellbeing of all the players, including those who become seriously injured while playing the sport. This is a significant challenge with such a large participant base, particularly since the players are from diverse socioeconomic backgrounds, with a large proportion not having any medical insurance. In response, in 2009 SARU implemented the "BokSmart programme" in South Africa based on the success of the New Zealand injury prevention programme, RugbySmart. This injury prevention programme attempts to educate coaches and referees about "safe and effective" practices for rugby with the aim to reduce as many injuries as possible.

While our recent evaluations of the BokSmart programme indicate the programme is achieving some of its goals – the most important of which is the prevention of catastrophic injuries, there are some areas where the programme is less successful. These shortfalls could be ascribed, in part, to the enormous socioeconomic diversity that still exists in South Africa. Furthermore, some injury risk factors, specific to South Africa, have been identified during the evaluation of the BokSmart programme, particularly in youth populations. The South African Rugby Union has requested for on-going assistance from the existing ESSM/VUmc relationship to further improve the programme and to help ameliorate injury risk factors specific to the players of South Africa.

Therefore, this research project aims to develop intervention strategies to reduce identified barriers and injury risk factors to a minimum. As with any intervention, this would need to be formally evaluated, as per the "sequence of prevention" model for Sports Medicine. The overall success of the BokSmart programme would also need to continue to be evaluated, in parallel with this evaluation. These evaluations would require a "pragmatic research design" which includes both qualitative and quantitative research methods.

These evaluations would be possible with permission to access the South African Rugby Union data and populations, which is possible through the Human Research Ethics Committee of the University of Cape Town.

Requirements

- Master's degree in a health-sciences related degree
- Proficiency in English writing and speaking skills is a requirement.
- The ability to speak Afrikaans and another "Black African" language would be beneficial too.
- Experience with disabled patients would be beneficial. Experience in qualitative research would be an added bonus

- Very organised and above-average administrative and computer skills
- Willingness to travel within South Africa regularly and to the Netherlands irregularly.

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13. PhD-position 'Metrological traceability for the accurate quantification of brominated flame retardants in the South African environment'– Ref. No: DTP270514013

Background information Faculty/Department/Research group, in which the PhD student will be based

Established in 1971, IVM is a leading environmental research institute that is internationally recognized for its high quality research output in a range of environmental disciplines, as well as for its interdisciplinary work. The mission of the institute is to contribute to sustainable development and care for the environment through scientific research and teaching. IVM aims to do excellent problem-oriented research that is useful to a wide range of stakeholders in the Netherlands and internationally. A unique strength of our research is to understand sustainability problems in their social and economic context. The IVM Laboratory is specialized in chemical and biological analyses of environmental samples and holds ISO17025 Accreditation.

IVM's research community of about 140 scientists and support staff work within four departments: Chemistry and Biology; Environmental Economics; Environmental Policy Analysis; and Spatial Analysis and Decision Support. Since 2001 IVM has been part of the Faculty of Earth and Life Sciences at the VU University Amsterdam (legal name Stichting VU-VUmc). IVM is also a leading partner in the Amsterdam Global Change Institute launched in 2011. For more information see www.ivm.vu.nl.

The IVM envisages forging partnerships of scholarship between VU University Amsterdam and South African universities by collaborating in offering specialized training and research with focus towards joint PhD awards to South Africans in the field of science. The IVM is home to some of the most distinguished scientists in the world and has the capacity to provide world class research facilities. The PhD student will work closely together with Prof. Jacob de Boer (Head of the Department), Dr. Jana Weiss (Senior researcher) and highly skilled laboratory technicians. The group has long experience in analysis of the classic environmental pollutants as well as emerging contaminants and novel analytical techniques.

Contents of the research project

South Africa, as a signatory of the Stockholm Convention (SC) has the responsibility, to undertake appropriate research,

development, monitoring and cooperation pertaining to persistent organic pollutants. There is growing concern over the toxicity, environmental distribution and bioaccumulation of a number of classes of brominated flame retardants (BFRs) such as polybrominated diphenyl ethers (PBDEs), polybrominated biphenyls (PBBs) and hexabromocyclododecane (HBCD). BFRs have been linked to adverse effects on human health and the environment. Therefore, research and monitoring of PBDEs, PBBs and HBCD along with brominated and mixed bromo-chloro dioxins and furans are essential. In addition, stringent global regulations pose a potential threat to international trade and industry in a developing economy. South Africa must ensure the capability to accurately quantification of BFRs.

The challenge in accurate quantification of BFRs is due to variation in chemical properties, debromination and degradation. PBDEs co-elute and also co-elute with organochlorine pesticides and polychlorinated biphenyls. PBDEs and HBCD are thermally labile, temperatures throughout analysis are therefore critical. HBCD consists of three diastereomers, when analysed by GC/MS these diastereomers co-elute. LC/MS provides a better separation but lower sensitivity. Due to various BFRs found in the environment the extraction and clean-up process influence the quality of results as non-specific extraction results in co-elution with structurally related halogenated compounds. In addition, there is a lack of traceable calibrants along with the data gap concerning accurate and traceable measurements of BFRs in the South African environment.

The aim of this project is the development and validation of extraction and analysis capability for PBDEs, PBBs and other BFRs in environmental matrices. The development of this analytical capability will improve and complement the recently established dioxin and furan capability using comprehensive two-dimensional gas chromatography coupled with time-of-flight mass spectrometry (GC×GC-TOFMS), while investigating the use of ionic liquid columns. The applicability of GC/LC triple quadrupole mass spectrometry will be used as alternative method for quantification. It is important to develop appropriate extraction and clean-up method for South African environmental matrices. The use of pressurized liquid extraction with multi-column sample clean-up combined with gel permeation chromatography (GPC) will be evaluated. The validated GC- and LC-MS/MS methods will be used to confirm separation and selective detection for quantification.

This PhD project will provide objective evidence of the core competency crucial in maintaining international equivalence and preventing possible technical barriers to trade, while providing reference measurements and quantitative BFR exposure levels for the South African environment.

Requirements

- Master's degree in chemistry with specialization in analytical or environmental chemistry
- Proficiency in English
- Experience in gas and/or liquid chromatography
- Affinity with work on contaminants, mass spectrometry, metrology
- Willingness to stay in The Netherlands at regular periods of several months

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14. PhD-position 'Multidimensional truncated moment problems' - Ref. No: DTP270514014

Background information Faculty/Department/Research group, in which the PhD student will be based

The mathematics departments of VU University Amsterdam and of North West University (NWU), Potchefstroom campus have a long-standing connection. The research groups in linear analysis at the two universities have strong ties: at NWU two full professors (Groenewald and Ter Horst) are former PhD students of the VU, and one VU professor (Ran) is also extraordinary professor at NWU. The cooperation between the two groups is well-established: Ran and Kaashoek (emeritus at VU) are collaborating with Fourie, Groenewald, Ter Horst, Janse van Rensburg (NWU Potchefstroom) and in the past also with Petersen (NWU Mafikeng). In addition, Ran has been one of the PhD advisors of Janse van Rensburg. One of the current PhD students in the VU-NRF Desmond Tutu program, Hermann Rabe, is jointly supervised by Fourie, Groenewald and Ran.

Contents of the research project

The term "moment problem" was coined by T.J. Stieltjes in his 1894/1895 memoir for the problem "to find the distribution of positive mass on the interval $(0, \infty)$, given the moments of order $k = 0, 1, 2 \dots$ of the distribution." It played an essential role in the developments leading to the Hahn-Banach Extension Theorem in the 1920's and, for over a century, the problem and its many variations inspired scientists from various mathematical disciplines using different techniques and approaches. The book (2) gives a detailed account of the developments up to 1965. In the course of the last two decades, the focus shifted from 'classical' moment problems to multidimensional (truncated) versions. For the multidimensional moment problem one is given a domain in K and C^d or R^d , for some integrated $d > 1$, and a (multi-indexed) moment sequence:

$$(\alpha_{n_1, \dots, n_d})_{n_1, \dots, n_d \in \mathbb{N}}$$

The problem is to determine a multivariate mass distribution ω with support in K such that:

$$\alpha_{n_1, \dots, n_d} = \int_K z_1^{n_1} z_2^{n_2} \dots z_d^{n_d} d\omega(z_1, \dots, z_d) \quad ((n_1, \dots, n_d) \in \mathbb{N}^d).$$

The moments and distribution can be real or complex-valued, scalars or matrices. For truncated versions, only a (finite) subsequence of the moment sequence is given, and it is required to complete the moment sequence to one for which a multidimensional moment problems, making connections with semi-definite programming and sums-of-squares. Such truncated moment problems are intimately connected with metric constrained interpolation for function of several variables and completion problems for multi-indexed structured matrices. The research groups at VU University Amsterdam and at North West University both have a long tradition and strong background in these topics.

By now, the theory of scalar-valued multidimensional moment problems has reached a level of some maturity, although there are still many questions left. The aim of this project is to enhance the theory of matrix-valued multidimensional moment problems. So far only (2) and (3) deal with such problems, and there is much work to be done in this direction. This may also lead to new insights for the scalar-valued case.

1. Akhiezer, N.I. (1965). "The classical moment problem and some related questions in analysis," Hafner Publishing Co, New York.
2. Bakonyi, M. and Woerdeman, H.J. (2011). "Matrix completions, moments and sums of hermitian squares," Princeton University Press, Princeton, New Jersey.
3. Kimsey, D.P and Woerdeman, H.J. (2013). "The truncated matrix-valued K -moment problem on R^d , C^d and T^d ,"

Trans. Amer. Math. Soc. 365: pp 5393-5430

4. Lasserre, J.B. (2010). "*Moments, positive polynomials and their applications, Optimizations Series 1,*" Imperial College Press, London.

Requirements

- A Master's degree in mathematics, with a specialization in functional analysis and/or linear algebra, preferably both.
- Some affinity with applications of mathematics or willingness of the student to broaden his/her perspective into this direction could be beneficial, but is not necessary.
- Proficiency in English is required.

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