

CURRICULUM VITAE – CAMAREN PETER (PhD)

Personal Details

NAME: Camaren Peter (PhD)
OCCUPATION: Complexity Theory, Leadership and Sustainability
ACADEMIC APPOINTMENTS: Associate Professor, Allan Gray Centre for Values-Based Leadership, Graduate School of Business, University of Cape Town
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Brief Overview

Description: Systems and Complexity Theorist / Leadership / Sustainability Expert and Consultant / Writer / Academic

Short Biography: I am a pure scientist by training, having studied theoretical physics and astrophysics before obtaining a PhD in business administration at the Graduate School for Business (University of Cape Town). My core expertise (i.e. theoretical and applied) is in systems, complexity and sustainability, and I have worked on a wide variety of complex developmental challenges since 2001. I have, in this capacity, served as an extraordinary senior lecturer at the School of Public Leadership at Stellenbosch University since circa 2010, while consulting globally, regionally, nationally, provincially and at city scales on sustainable development challenges. I have acquired deep expertise in sustainability modelling, strategy and policy development, implementation and leadership, and have leveraged my knowledge in the areas of systems and complexity in order to do so. Over the past year I have been establishing a non-profit company, the Centre for Analytics and Behavioural Change, with a team of committed individuals who hail from a range of different industries, disciplinary backgrounds and expertise.



I also possess a strong track record in science, technology innovation and development having worked for eight years at the Council for Scientific and Industrial Research (CSIR). During my employment at the CSIR, I transitioned from the position of Systems Engineer, to Candidate Researcher, to Senior Researcher. It was after I left my post as a Senior Researcher at the CSIR that I completed my PhD and became a full-time research consultant with an academic appointment at Stellenbosch University.

I have worked closely with a wide range of local and global institutions, and have published widely. Locally, I have worked closely with the Sustainability Institute (Stellenbosch University) and the African Centre for Cities (University of Cape Town). Globally, I have worked with and participated in the programmes of United Nations Environment Programme (UNEP), the United Nations HABITAT programme, the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Department of Economic and Social Affairs (UNDESA), the United Nations Economic Commission for Africa (UNECA), the UN International Resource Panel (IRP) and the United Nations University (UNU in Ghana). Some of my publications include UNEP's position paper on cities for Rio+20¹, and the "State of the African Cities Report 2014"² for UN-HABITAT (for which I wrote the key introductory chapter and co-wrote

¹http://www.usp.br/fau/cursos/graduacao/arq_urbanismo/disciplinas/aut0221/Material_de_Apoio/Cidades/Sustainableresourceefficientcities.pdf

²<http://www.unhabitat.org/pmss/getElectronicVersion.aspx?nr=3528&alt=1>

every regional chapter). I have worked with the United Nations headquarters in Nairobi, Paris and New York. In June of 2015 I was invited to speak at UNDESA's global workshop on the Sustainable Development Goals (SDGs).

I have also worked with the German Development Agency (GIZ), Stockholm Environmental Institute (Nairobi branch), Academy of Science South Africa (ASSAF), Open Society of West Africa (OWISA), Cities Alliance Think Tank (CATT), Climate Development Knowledge Network (CDKN, SouthSouthNorth), Heinrich Boll, Isandla Institute, Southern African Development and Research Agency (SADRA), Citizen Research Centre (CRC), and the Citizen Dialogue Centre (CDC), among others.

Government agencies and departments I have consulted to and worked with the Development Bank of South Africa (DBSA), the Western Cape Province, the City of Johannesburg Central Strategic Office (COJ CSO), the Ethiopian Ministry of Finance and Economic Development and the Ghana Environmental Protection Agency. Research outputs that I participated in conducting and writing was taken up in South Africa's National Development Plan and the New Economic Growth Path documents.

I have served in a consulting and advisory capacity to numerous business, most prominently, J&J Group (<https://www.jandjgroup.com/>), Polycare Research Technology (<https://polycare.de/index.php/de/>), Urban Genesis Management (now sold; previously Kagiso Urban Management, see <https://www.facebook.com/UrbanGenesisManagement/>) and ARG Design (<http://argdesign.co.za/>). I also have strong civil society links, for example, with Development Action Group (DAG), the One Million Climate Jobs Campaign, Alternative Information and Development Centre (AIDC), Shack Dwellers International (SDI) and others.

Academic institutions and centres that I have collaborated and worked with include; the Institute for Advanced Sustainability Studies (IASS: Potsdam, Germany), Max Planck (Cognitive Science and Decision Support Unit: Gottingen, Germany), Sustainable Urban Regional Futures (SURF, Manchester University, UK), Chalmers University of Technology (Göteborg, Sweden), Indian Institute for Human Settlements (IIHS), Public Affairs Research Institute (PARI, Wits University), Eduardo Mondlane University (Maputo), United Nations University (in Ghana), Kampala University (Kampala, Uganda), Horn of Africa Regional Environmental Centre (HOAREC, Addis Ababa University), University of Legon (Ghana), University of Lisbon (Portugal), and a host of Chinese Universities.

I have served as a PhD and Masters level external examiner for both the University of Cape Town and the University of Stellenbosch, and have lectured extensively as a guest lecturer on systems, complexity, sustainability and urbanization on a variety of postgraduate programmes. I am currently delivering a 16 week module on "Sustainable Community Development" at Cornerstones University, which I designed and formulated myself and can re-use as I see fit. Cornerstones University is a private – previously divinities based university – that now offers one of the few Community Development Honours degrees in the country. I saw that as a key opportunity to seed sustainability thinking and practice at local levels and approached Cornerstones to play a role on their course. I have served extensively as an academic reviewer for a wide variety of prominent international journals and publishers such as Routledge and Taylor.

My first book – titled "Lazarus in the Multiple: Awakening to the Era of Complexity" (Zero Books, UK: <http://www.zero-books.net/books/lazarus-multiple>) – is a philosophical work that was published on January 29 2016. It is a posthumanist exploration of the 21st Century human condition. It deals with themes ranging from memory to forgiveness, reconciliation, ethics, freedom, disruption and the need for a transition to a new politics and society. It is aimed at leaders and strategists who are grappling with the challenges of the 21st Century, and offers them a new complexity theory based approach for doing so.

More recently, I was a contributing author to "Shadow State: The Politics of State Capture", which was released by Wits University Press in July 2018. The Shadow State is a key academic contribution towards understanding and framing the political changes that have unfolded in South Africa over the

past decade, in particular, the phenomenon of 'state capture' and widespread corruption in the political realm.

Education

2011 – 2013: Postdoctoral Fellowship Award, Complexity and Sustainability, National Research Foundation.

2007 - 2010: PhD, University of Cape Town, Graduate School of Business - Part-time, March 2007 - Feb 2010 PhD by dissertation. Graduated June 2010.

1998 - 2002: M.Sc. Astrophysics, University of Cape Town, Department of Astronomy/South African Astronomical Observatory - Full-time, Feb 98 to July 02 MSc by dissertation, intern at South African Astronomical Observatory, awarded DAAD funding.

1996 - 1997: B.Sc. Physics (Hons)*, University of Natal, Durban, Department of Physics - Full-time, Feb 96 to Nov 97: ***Passed Cum Laude: Theoretical and Applied Physics.**

1993 - 1995: B.Sc. Physics, University of Natal, Durban - Full-time, Feb 93 to Nov 95
Passed 2nd class with majors: Physics, Mathematics/ Mathematical Statistics.

Appointments & Affiliations

Career Experience:

Executive Head and Director (2018): Centre for Analytics and Behavioural (CABC NPC). CABC is a non-profit company that I am currently incubating, with the support of a group of high achieving mid-career professionals. The organisation is focusing on tackling behavioural change challenges in the realms of sustainability and active citizenry using information and knowledge era offerings to; (1) counter misinformation, information overload and fake news, (2) develop online platforms for organisation and mobilisation, and (3) to research and develop new, innovative approaches to behavioural change by drawing on interdisciplinary exchange and cutting edge theory.

2009-2017 Senior Consultant/Independent Researcher: For nearly a decade I played the role of senior consultant to the Sustainability Institute Projects consulting operation (note that this was not an employment role). Over this time I also secured project work independently of the Sustainability Institute, generally acting as an Independent Researcher. This involved conducting sustainability research for strategy, policy and planning decision support for leaders, decision-makers, policymakers and planners. In this role I consulted globally, in large part to the various arms of the United Nations, but also to a wide range of other development agencies, research groups and organisations, national and local governments, and so forth. Interdisciplinary research and multi-stakeholder engagement were the norm in these projects.

2008: Senior Researcher: Sustainability Science Group, Stellenbosch, Council for Scientific and Industrial Research (CSIR). In my role as Senior Researcher in the Sustainability Science Group I was responsible for proposal development, overseeing projects, as well as conducting research. Our major contribution was conducting a broad, interdisciplinary project to develop the conceptual framework for sustainability science in the Southern African context. This opened up wholly new avenues of research for CSIR researchers who, until then, were largely disciplinary focused, with the majority being

biodiversity and conservation biology specialists. Most of the (then) new theories on sustainability that were brought into the CSIR (e.g. Resilience Theory) emanates from this project. We eventually published as a book on the subject, drawing on contributions from this interdisciplinary team. I resigned from CSIR in March 2009 to pursue PhD studies and graduated in June 2010.

2004: Candidate Researcher: In 2004 I joined the Coast Group in Stellenbosch at the CSIR. I played the role of integrator and 'glue' between different disciplines, and was specifically tasked with developing the methodologies for mental modelling, hypotheses development, integrated modelling that underpins the processes of learning, participation, negotiation and coordination of interdisciplinary research. In this role I worked on international, national and provincial scale projects and eventually secured my own – first – large research project (ECO3: The Economics and Ecology of Ecosystems) of over R3m in 2005. It was in this project that I developed a full methodology for research design and integrated modelling for decision support using Bayesian networks (a probability theory based approach), which eventually yielded the outputs that enabled me to undertake a PhD.

2001–2004: Systems Engineer: CSIR, Defencetek, Pretoria, Defence Modelling and Simulation South Africa (DMSSA), Modelling and Simulation of Air Defence Systems (MSADS), Information, Research and Insight into Systems Centre of Excellence (IRIS COE). DMSSA focused on formulating and building virtual battlefield simulations in which a range of different weapon systems, command and control configurations, doctrine and defence layouts could be tested. In my role as systems engineer my role was to be the 'glue' between the various software developers so as to ensure that the simulation integrated in a scientifically verifiable manner. I also designed the experiments and conducted the analyses on the simulation outputs, translating these into communicable form for the client(s) (Armcor, Denel, SANDF). We worked on a wide range of projects. Most notably, I ran the process to develop the doctrine and command and control for joint operations between the different armed forces (army, navy, air force), and after experimenting with various methodologies, eventually came up with the idea of using Bayesian networks as an integration methodology. This would ultimately lead to a PhD on the subject many years later. At the same time I played two significant management roles; one as the elected Defencetek Transformation Action Group chairperson, and the Innovation Seed Fund manager (details in long biography at end of CV).

Academic:

Honours Course Module Lecturer (2018): I developed and am currently teaching a 15 week honours course module on sustainable community development; Community Development Honours Degree, Cornerstones University.

Extraordinary Senior Lecturer (2010-2017): School of Public Leadership, University of Stellenbosch, and research associate of the Transdisciplinary Sustainability Applied Modelling and Assessment Hub, (TSAMA Hub), African Centre for Cities (UCT) and the Sustainability Institute (SU). Active position – extraordinary appointments are non-paid academic appointments.

Supervisory, Examinations and Guest Lecturing:

MPhil Supervisor (2018): Graduate School of Business, University of Cape Town, Topic: Waste recycling: cooperatives and other mechanisms for improving waste recycling.

Mtek Supervisor (2018): Cape Peninsular University of Technology, Topic: Cleaner Production in South Africa: Barriers and Opportunities

External Examiner (2018): Urban Infrastructure (Elective Course: Hons), Programme: City and Regional Planning Elective: Bachelor of Architectural Studies (Hons.), School of Architecture, Planning and Geomatics, University of Cape Town.

2015-2016 Guest Lecturer: Sustainable Urban Systems (MSc/Mphil), Urban Infrastructure Development and Management. University of Cape Town: Faculty of Engineering and the Built Environment Department of Civil Engineering and the African Centre for Cities.

2013-2014 External-Examiner: Sustainable Urban Systems, Urban Infrastructure Development and Management. University of Cape Town: Faculty of Engineering and the Built Environment Department of Civil Engineering and the African Centre for Cities.

2010-2011 Guest-Lecturer: Urban Infrastructure Module, MPhil in Urban Management, African Centre for Cities, University of Cape Town.

Advisory and Other:

Special Advisor (2018): Polycare Research Technologies. Polycare is a German company that specialises in innovations in sustainable housing delivery for the Global South. They have developed a self-building technology that; utilises non-arable 'desert' soil or fly ash and polymer resin (from recycled plastic) to mould 'lego' styled bricks on site using very low water and energy inputs. The bricks are fire-proof, damp-proof and have a 150 year life span, are precision built so that no mortar is necessary and can easily be taken apart and reassembled. Housing developments can be developed using low-skilled and un-skilled workers, is light enough for women, and can be fully implemented in 6-8 weeks.

2011-2015: Head of Advisory Board - Urban Genesis (formerly Kagiso Urban Management). This involved overseeing place-making, cleaning, security, waste management and recycling and urban upkeep strategies for City Improvement Districts in the City of Johannesburg. In this role I was also drawn into a related developer operation (Trencon Projects), where I played an advisory role on developments that were undertaken.

2011: Associate Editor - Cityscapes Magazine, produced by the Tau Tavengwas and the African Centre for Cities. Cityscapes was produced to help bridge the gap between the academic and popular discourses on urbanisation, especially in the cities of the Global South. In this respect it has been a success, having integrated top academics, practitioners, decision-makers, artists, writers, and so forth in a compelling and interesting series of publications. Two new regional Cityscapes are now being produced; for Latin America and South East Asia.

Funding, Research Quality and Performance Awards

Funding Awards:

The research and development funding I directly helped lead and write proposals for, secure funds, and then manage (since joining CSIR, Natural Resources and Environment (NRE) in 2004) is listed: ECO3 (R3.375m); + DST (R440k); + SPEAR (EU funds: R880K); +DST(182K), HCD (R125k) and EXTERNAL CONTRACT (R360K), totalling approximately R5,2m. I have worked on four SRP projects, and has been involved in at least 10 SRP proposals from within CSIR and outside of it. More recently, in 2011, I

participated in a successful proposal to secure R5.5 million in funding over 3 years to institutionalise a green economy programme within the TSAMA-hub.

In 2011 I drafted and helped successfully secure over R3m in academic research funding from the NRF/DST/RISA for Stellenbosch University project that ran for three years. It was titled, "Greening the South African Developmental State and Economy". I also completed two other research applications over that period; one for a SARCHI chair and another for a full EU-funded project (these were not successful). In 2013-2015 I helped propose for, secure and run a UNEP project to the value of R3m to develop a Green Economy Tool Kit for planners, which was used to train planners in local government across five African countries.

As an MSc student I was the recipient of a South African Astronomical Observatory (SAAO) Scholarship award, as well as a DAAD scholarship award. As a postdoctoral fellow I was the recipient of NRF funding.

Excellence and Performance Awards:

Research and performance awards received include:

- 2001: Defencetek Modelling and Simulation South Africa (DMSSA/MSADS) team was awarded the annual "CSIR Outstanding Achievers Award for Fastest Growing Business Unit in 2001".
 - a. I was the systems engineer, responsible for systems integration of the first virtual battlefield simulation in SA, for designing and running experiments, and for recommending strategies for integration.
- 2006: Catchment2Coast Award for Cross-Boundary Collaboration (CSIR NRE):
 - a. "For demonstrating the ability to successfully undertake a complex multidisciplinary project requiring close cooperation between teams from different countries and different organisations with diverse operational cultures, resulting in effective and innovative outputs."
 - b. An international project linking catchment activities in South Africa to impacts at the coast in Mozambique i.e. trans-boundary catchment systems.
- 2008: "CSIR National Resources and Environment Excellence Awards: Cholera Team: For Outstanding Contribution by a Team" (CSIR NRE).

Publications List

Dissertations:

1. Peter, C., 2002, MSc Dissertation: Calculating the distance to the centre of the galaxy using red clump stars as an indicator, University of Cape Town.
2. Peter C., 2010. PhD Dissertation: Bayesian Participatory-Based Decision Analysis: An evolutionary adaptive formalism for integrated analysis of complex challenges to social-ecological systems sustainability, University of Cape Town.

Conference Papers:

3. Musango, J & Peter, C, 2007: A Bayesian Approach Towards Facilitating Climate Change Adaptation Research on the South African Agricultural Sector, 49th Conference of the Agricultural Economic Association of South Africa (AESA), Grahamstown, July 2007.
4. Peter, C., Potgieter A., Monteiro, P.M.S., De Wit M., 2007: Engineering Social-Ecological System Resilience, Building and Sustaining Resilience in Complex Organizations, 1st International Workshop on Complexity and Organizational Resilience, Phonpei, Micronesia, 24-25 May 2007.
5. Peter, C., Musango, J.K., De Lange, W., 2007: "Using Bayesian networks to model the impact of climate change scenarios on biofuels production from irrigated agriculture – analyzing water, energy and food sector interdependencies", Presented at Regional Expert Meeting, IPCC TGICA Expert Meeting Integrating Analysis of Regional Climate Change and Response Options, 20-22 June 2007, Nadi, Fiji – conference proceedings (2007). pp. 169-174.

Journal Papers:

5. Musango, J & Peter, C. (2007). A Bayesian Approach Towards Facilitating Climate Change Adaptation Research on the South African Agricultural Sector, *AGREKON, Journal of Agricultural Economics*.
6. Peter, C., de Lange, W., Musango, J.K., April, K., Potgieter, A.G.E. (2009). Applying Bayesian modelling to assess climate change impacts on biofuel production, *Climate Research, CR Special 20: Integrating analysis of regional climate change and response options*, v 20, pp. 249-260.
7. Peter C, & Swilling, M. (2014). Linking Complexity and Sustainability Theories: Implications for Modeling Sustainability Transitions, *Sustainability*, 6, 1594-1622.

Journal Papers in Progress (ready for submission):

8. Peter C. A Complexity-Based Perspective on Assemblage Theory: Implications for Modelling Urban Assemblages and their Role in Transitions to Sustainability, Paper completed and to be submitted to *Sustainability*. Currently a draft paper on Academia.edu.
9. Peter, C. An Assemblage and Complexity Theory Based Strategic Framework for Assessing Transitions to Urban Sustainability: The Case of South Africa, Paper completed and ready to be submitted to *Sustainability*. Currently a draft paper on Academia.edu.

Books:

10. Peter, C. (2015). *Lazarus in the Multiple: Awakening to the Era of Complexity*, Zero Books, John Hunt Publications (UK), forthcoming: January 29 2015, URL: <http://www.zero-books.net/books/lazarus-multiple>.

Book Chapters and Contributions:

11. Chipkin I., Swilling, M., Peter, C., Friedenstein, H., Borhat, I., Chipkin, I., Mondli, L., Swiling, M., Buthelezi, M., Qobo, M., Prins, N., Duma, S. (2018). *Shadow State: The Politics of State Capture*, Wits University Press, Johannesburg, South Africa, URL: <http://witspress.co.za/catalogue/shadow-state/>.
12. Peter, C., Potgieter A., Monteiro, P.M.S., De Wit M. (2007). *Engineering Social-Ecological System Resilience, Building and Sustaining Resilience in Complex Organizations*, Pre-Proceedings of the 1st International Workshop on Complexity and Organizational Resilience, Editors: Robert Kay and Kurt A. Richardson, ISBN: 0-9791688-4-8a.
13. Peter C. (2012). *Privatization, Urban Fragmentation and Sustainability*, Institute for Advanced Sustainability Studies. *Institutional and Social Innovation For Sustainable Urban Development* (Mieg & Töpfer, eds.), Earthsan/Routledge in 2012.
14. Peter, C. (2008). Complexity based modeling for sustainability and resilience of social-ecological systems. In A. Weaver, & M. Burns (Eds), *Exploring Sustainability Science: A Southern African Perspective*, Stellenbosch, SUN Press, pp. 471-505.
15. Swilling, M., Peter, C. & Wakeford, J. (2011). Chapter 7: *Transcending Resources and Energy Intensive Growth: Lessons from South Africa*, In: *Just Transitions to Sustainability*, Swilling, A. and Annecke, E., Juta.
16. Swilling, M., Musango, J., Robinson, B. & Peter., C. (2017). *Flows, Infrastructures and the African Urban Transition*. In Frantzeskaki, N., Castan Broto, V., Coenen, L. & Loorbach, D. (Eds). *Urban Sustainability Transitions*. Routledge.
17. Swilling, M., Peter, C, Robinson, B. (2015). *Infrastructure Planning for Resource Efficient Cities*, In *Greening the South African Economy: Scoping the Issues, Challenges and Possibilities*, (Eds) Swilling, M., Musango, J.K., Wakeford, J., UCT Press.

Policy Briefs and Position Papers:

18. Peter C. (2007). *Analytical review of the Western Cape climate change strategy and action plan: Water and energy as integrators*, for Department of Environmental Assessment and Development Planning, Western Cape Government, South Africa, GWDMS No: 174799.
19. Peter, C. (2010). *Position Paper on Environment for City of Johannesburg*, Study conducted for the Central Strategic Unit of the COJ (Mayoral Office). The recommendations of this study have been strongly taken up in the COJ Growth and Development Strategy (GDS, 2011).
20. Peter, C. (2011). *Greening the Growth Path for Durban/Ethekwini*. Study conducted for the Academy of Science South Africa, Published in "Towards a Low Carbon City – Focus on Durban", ASSAF, May 2011.
21. Peter, C. (2011). *Governance Arrangements: Human Settlements in South Africa*, Background paper for ISANDLA initiative to support Sustainable Human Settlement agenda.

22. Peter, C. (2011). Socio-Cultural Dimensions: Human Settlements in South Africa, Background paper for ISANDLA initiative to support Sustainable Human Settlement agenda.
23. Peter, C. & Swilling, M. (2011). Sustainable, Low Carbon Cities in the 21st Century: Making it Happen!, Position paper for the Gwangju Summit on the Urban Environmental Accords, Gwangju, South Korea, October 11-13.
24. Peter, C., & Swilling M. (2012). Sustainable, Resource-Efficient Cities in the 21st Century: Making it Happen! UNEP Position Paper for Rio+20.
25. Peter, C. (2016). Urban Policy Coalitions, Policy Brief, Cities Alliance Think Tank, URL: http://www.citiesalliance.org/sites/citiesalliance.org/files/CATTBriefs_Coalitions.pdf.
26. Peter, C. (2016). African Cities in the Urban Anthropocene, Cities Alliance Think Tank, URL: http://www.africancentreforcities.net/wp-content/uploads/2015/06/CATTBriefs_SmartCities_REVISED-1.pdf.

Research Publications:

27. Peter, C. (2011). Review of Urban Infrastructure Transitions to Sustainability. Study conducted for African Centre for Cities – background paper for International Workshop on Urban Infrastructures.
28. UN HABITAT (2014). State of the African Cities Report 2014: Re-imagining Sustainable Urban Transitions, United Nations HABITAT programme, C Peter (co-author).
29. Taylor, A. & Peter, C. (2014). Strengthening Climate Resilience in African Cities: A Framework for Working with Informality, African Centre for Cities, Climate Development Knowledge Network, May 2014, online at: http://cdkn.org/wp-content/uploads/2014/05/CDKN_ACC_WP_final_web-res.pdf. (Research collaboration with ACC and CDKN).
30. Peter, C. (2014). A Review of Resource Efficiency in Sub-Saharan African Cities, Research Report for Global Initiative on Resource Efficient Cities, United Nations Environment Programme (UNEP). In revision for submission to special edition of the International Journal of Sustainable Development.
31. SCRP (2017). Betrayal of the Promise: How South Africa is Being Stolen, State Capacities Research Project, May 2017, Convenor: Prof Mark Swilling, Authors: Prof Haroon Borhat, Dr Mbongesini Buthelezi, Prof Ivor Chipkin, Sikhulekhila Duma, Lumkile Mondi, Dr Camaren Peter, Prof Mzukisi Qobo, Hannah Friedenstien (pseudonym). A joint project of the Development Policy Research Unit (University of Cape Town), the South African Research Chair on African Diplomacy and Foreign Policy (University of Johannesburg), Public Affairs Research Institute (University of Witwatersrand) and the Centre for Complex Systems in Transition (University of Stellenbosch).
32. Peter, C. (2017). Regional Review of Projected Climate Change Impacts in Africa, Open Society for West Africa, OWISA.
33. Peter C. (2017). Review of Options for Small Producers in Africa to Foster Innovation & Access to Adapted Clean Energy Products, Open Society for West Africa, OWISA.
34. Peter, C. (2018). Sustainability Science in Southern Africa, UNESCO Management of Social Transformations (MOST).

Selected CSIR Reports:

35. ECO3 : Economics and Ecology of Ecosystems: Unlocking the complexity needs of sustainable development at the system scale, Final Report for the Period 31 Mar 2005 to Mar 26 2007, GWDMS No: 143948 PTA General.

36. Peter, C., Meder, B., von Maltitz, G., van der Merwe, M. (2007). Analysing Analysis! A study of causal reasoning for complex biophysical problem-solving and hypotheses making: Environmental Causes of Cholera, GWDMS No: 143891, PTA General.
37. Peter, C., Potgieter, A., Le Maitre, D., Meder, B. (2007). Critical Review and Conceptual Foundation for SRP II Thematic Application: SRP Thematic Proposal Concept Document, March 2007.
38. Peter, C., Potgieter, A., Le Maitre, D., Burns, M. (2007). SRP Thematic Proposal for Sisyphus II (Development Phase III): Transdisciplinary Modelling for Resilience and Emergence, Complexity Based Modelling and Simulation Demonstrator for Testing Resilience and Emergence in Multi-Scale Social-Ecological Systems, March 2007.
39. Peter C. (2009). Exploring the use of graphical causal maps and Bayesian networks to model integration of urban growth in Gauteng, CSIR Publication, February 2009.

A more complete list of CSIR reports and deliverables is outlined in Appendix A.

Periodicals:

40. Peter C. (2011). Urbanisation and the Transition to the Future, Cityscapes - Launch Issue, Tau Tavengwas and the African Centre for Cities.
41. Peter C. (2012). The Future of Seven Billion. Cityscapes - Second Issue, Tau Tavengwas and the African Centre for Cities.
42. Perspectives 3.12 (2012). What are Sustainable African Cities?, Eds C Peter, Heinrich Böll Stiftung.

Newspaper Publications

HEADLINE	DATE	PUBLICATION
Zuma's precarious balancing act	18 April 2009	Cape Argus
Measuring out ratios for true equality	20 May 2007	Sunday Tribune
Affirmative action's part of the big picture	15 May 2007	Cape Argus
Rich-poor gap promises a second wave of resistance	6 May 2007	Cape Argus
Identity makeovers will free us from race	29 December 2006	Cape Argus
The problem with Godzille and the DA	22 November 2006	Cape Argus
Rian Malan falls in bigot's trap	18 November 2006	Cape Argus
Why sustainability matters to all citizens	7 November 2012	Cape Argus
Changing the system for sustainable development	20 November 2017	Business Day/Live
Holistic education liberates potential	23 March 2018	Business Day/Live
Greening the Fourth Industrial Revolution	Forthcoming	Business Day/Live

**Please note: Newspaper article titles were formulated by editors of the respective newspapers.

Long Biography: Experience

General: I have a rigorous background in the sciences, majoring in physics, mathematics and statistics at undergraduate level, theoretical physics at honours level, and astrophysics at master's level. I then embarked on a career that, from 2001-2009, focussed on modelling complex systems and formulating strategies for decision-making. This was sparked a growing interest in systems and complexity theory, modelling and simulation and a need to engage with real-world challenges. This ultimately led to a career that has focussed on the integration challenges of ensuring the mutual sustainability of social, economic and ecological systems. My PhD research was concerned with how to integrate modelling approaches and strategy-making for sustainability utilising a combination of participatory processes models and probability-based Bayesian modelling techniques. My PhD case studies were conducted at a variety of scales i.e. models were built and tested at the municipal scale, magisterial district scale, provincial, national and regional scales. The largest model contained 1500 variables and modelled all the sectors of the Western Cape Province, illustrating the power of probability theory based modelling.

I have worked closely with decision-makers and sustainability problems at global, national, provincial and city scales to help determine how strategic transitions to sustainability can be achieved. I have also developed a special interest in climate change and global change effects (including emerging resource constraints), and how those influence development and increase the urgency for transitions to sustainability. Since 2009 I have been researching emerging theories governing transitions to sustainability at macro-scales and city scales, with a special emphasis on urban infrastructure transitions. In doing so, I have worked with a variety of international, regional, national and local organisations, from city governments to the Development Bank of South Africa and UNEP on sustainability and green economic transition strategies. I also participate in a variety of consulting-based projects that are run out of the Sustainability Institute (Stellenbosch, South Africa), as part of a broader consortium of disciplinary experts.

Integrated Modelling and Simulation: My research at the CSIR from 2001-2008 involving running participatory processes and researching, modelling and simulation of complex systems for strategic and implementation level decision support, in particular; dealing with the challenges involved in enabling sustainable development. Integration between different disciplines and systems (natural and social) constituted the core focus of my research at the CSIR. Over this period I have worked with the Sustainability Science Group, The Marine and Estuarine Ecosystems Group, the Biodiversity and Ecosystems group, the Built Environment Urban Dynamics Laboratory, and with local (UCT Agents and Robotics Laboratory, Complex Adaptive Systems Pty Ltd, Ndibano Pty Ltd, University of Stellenbosch Philosophy department and the Lynedoch Sustainability Institute) and international partners (Germany, Portugal, China, UK). I also worked in defence modelling and simulation, and coordinated the formulation and testing of virtual battlefield simulations – a highly advanced form of complexity-based modelling for decision-making. One of our major achievements was demonstrating that improvements in command and control could prove more effective than simply purchasing more expensive weapons. In 2008, as the Sustainability Science Group at the CSIR we published a book entitled 'Exploring Sustainability Science: A South African Perspective' (Burns and Weaver (Eds), 2008), which has since had a good reception amongst students and researchers in sustainability.

Strategy-Making & Decision Support: The majority of my *more recent* work involved formulating sustainability-oriented and green economic strategies at the regional, national, provincial and city-scales of implementation. I have worked closely with the Western Cape Government and conducted an interdisciplinary review of the integration of the Western Cape Climate Change Strategy with the

Growth and Development Strategy, the Western Cape Energy Strategy, and the Water Reconciliation Strategy. I have also worked closely with the City of Johannesburg, writing the position paper on environment for the City of Johannesburg, which has since been taken up in the Growth and Development Strategy for Gauteng in 2011. I co-authored a Green Economy report for the Development Bank of South Africa entitled, “Greening the South African Growth Path: Transitioning to Sustainability”, which has been taken up in the New Economic Growth Path (2011) for South Africa, and, and in the National Planning Commission’s diagnostic overview of the South African economy. I also authored a chapter on green economic development strategies for the Academy of Science South Africa (ASSAF) on the City of Durban/Ethekwini, and I have conducted research for Isandla on the governance arrangements and socio-cultural dimensions of human settlements in South Africa. I have worked extensively with the United Nations, with headquarters in Nairobi, Paris and New York. In June of 2015 I was invited to speak at UNDESA’s global workshop on the Sustainable Development Goals (SDGs).

Innovation: Between 2001 and 2004 I was in charge of the Defencetek Innovation Seed Fund, which administered R50K grants to employees who wanted to pursue proof of concept development for innovative ideas. Many of these projects developed into full scale innovations, and one of the individuals in particular – Werner Barnard – went on to base the remainder of his career on the ideas he developed under this fund. The team I worked in at Defencetek was a key innovator, building and conducting virtual battlefield simulations that supported weapons acquisition for joint armed forces in South Africa. Part of the team formed the early information warfare capability of Defencetek. When I moved to National Resource and Environment I pioneered the development of a wholly new methodology for inter and transdisciplinary research and modelling, as well as initiated the development of customised software for the purpose of probabilistic modelling that outshone commercially available software by far. This work eventually led to the completion of my PhD; it took seven years to develop the concept fully.

Cities & Urbanisation: I have developed a close working relationship with the African Centre (ACC) for cities since 2010, when I participated in African Urbanism Colloquium in Cairo. I am a writer and science editor for the newly launched ‘cityscapes’ periodical publication that ACC seeded and produced. Cityscapes issues are now being published in Latin America and Asia as well (i.e. Cityscapes has now gone regional). I also act as a guest lecturer at the Urban Infrastructure, Development and Management MPhil programme at the ACC. I delivered a keynote address at the Eschborn Dialogues in Germany, hosted by GIZ, and wrote the background paper for the Urban Environmental Accords Summit (2011) held in Gwangju, Korea for the United Nations Environmental Programme. More recent publications include UNEP’s position paper on cities for Rio+20, and the “State of the African Cities Report 2014” for UN-HABITAT. I have also worked practically with what was Johannesburg’s largest City Improvement District management company – Urban Genesis Management – and helped set up the first CID-related waste recycling operation in Johannesburg, which recycled several tonnes per day.

Teaching:

MPhil Urban Infrastructure Development and Management (UCT): After originally giving guest lectures on this course (on Urban Infrastructures) I was then later invited to lecture and participate in the Sustainable Urban Systems module of the course, where I lectured on Complexity and Sustainability, organised and participated in field trips with the class, and then examined the complexity essays that students elected to write. This course is now being redesigned and I have been invited to some of the workshop sessions to redesign the course.

MPhil: Sustainability (Stellenbosch): I have also lectured to the Mphil class on sustainability at Stellenbosch University; on how complexity theory relates to theories of sustainability such as resilience theory.

Hons: Sustainable Community Development (Cornerstones University): I have developed a full 15 week honours level course on sustainable community development that I am currently delivering. I adopted a constructive alignment based pedagogy for the course, which is in large majority attended by experienced community development practitioners. Thus far the engagement and results have been astounding and I am enjoying it immensely.

Reviewer & Examiner: I have worked extensively with research methodologies for supporting policy development, planning, implementation and adaptive management, for multi-sector economic development, and I have conducted a number of technology and innovation reviews. I have also served as a reviewer for the South African Journal of Humanities, Global Change Biology and FutureScience, as well as publishers such as Routledge and Taylor. I reviewed the United Nations Convention on Trade and Development's (UNCTAD) "Economic Development in Africa" (2012) report. I also assisted in setting up the Transdisciplinary Modelling and Assessment (TSAMA) Hub with the University of Stellenbosch - which offers the first and only *transdisciplinary* doctoral programme for sustainability in South Africa. . I have acted as both external examiner as well as guest lecturer on the Sustainable Urban Systems course on the MSc programme at the University of Cape Town and have examined and supervised postgraduate level studies. Over the past two years I have served as an external examiner on the "Urban Infrastructure Course, City and Regional Planning Programme" in the School of Architecture, Planning and Geomatics.

Organisational Management Experience: Between 2001 and 2004 I served as the elected Defencetek Transformation Action Group (DTAG) chairperson for the Defencetek Division of CSIR. This post required that I participate at all the highest level management meetings of Defencetek, which contributed greatly to my understanding of how a mid-sized research organisation (150 people) was run. I was then called up by the president of the CSIR Sibusiso Sibisi to participate at the corporate level of the CSIR in order to make contributions to the future strategic growth areas of the CSIR, as well as to contribute to its transformation agenda. I hence experienced dealing with difficult and often fraught engagements and negotiations at a very early stage in my career, and this has stood me in good stead since.

General

Orientation: I am passionate about bringing together different sector oriented and disciplinary approaches to ensure that sustainability and social justice are appropriately merged, and that research-based knowledge can be converted to actionable transformative knowledge, especially where developing world challenges and that of Africa, South Africa and the Global South are concerned. I am a keen follower of news and media, and am deeply engaged with global and local politics and what they mean for the future.

Disposition: Philosophical but problem driven. Gregarious and comfortable with strangers.

Hobbies: I am a broad reader and writer, and enjoy a range of fitness oriented activities such as trail running, mountain biking and cross-fit exercise routines. I also hold a first degree black belt in full contact Chinese Kung Fu, having fought at national and international levels, and have undergone five

years training in Tai Chi and Chi Gung and continue my practice in these disciplines. I am also a great lover of music, photography and art.

Writing and Blogging: I collaborate with artists, designers and photographers. I have collaborated with the eminent South African photographer David Lurie over the past few years, namely on “Morning After Dark” and “The Undercity”. I also maintain two very active blogs that have jointly exceeded 60,000 views per month, namely: ThoughtFactory (<http://thoughtfactory-cam.blogspot.co.za/>), which publishes political opinion and thought pieces; and WordFactory (<http://wordfactory-cam.blogspot.co.za/?m=>), which publishes poetry and creative writing pieces.

References

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Acronyms

CSIR: Council for Scientific and Industrial Research.

NRE: Natural Resources and Environment.

ECO3: The Economics and Ecology of Ecosystems.

SRP: Strategic Review Panel.

DMSSA: Defence Modelling and Simulation South Africa.

MSADS: Modelling and Simulation of Air Defence Systems.

IRIS COE: Information, Research and Insight into Systems Centre of Excellence.

Appendix A: Managed Outputs and CSIR Deliverables Table

Managed Outputs

SPEAR Project Publications:

1. Musango, J., De Wit, M. P., Lombard J. P., **Input-Output Relationships in Aquaculture: A Review**, – submitted to Aquaculture Economics & Management (International) Journal
 - a. GWDMS Number: CPT General, 739
2. J Musango, M P De Wit, **A Review of Waste Functions in Aquaculture**, – ongoing
 - a. GWDMS Number: CPT General, 1238
 - b. CSIR Doc No: CSIR/NRE/ECO/ER/2007/0065/C
 - c. International Institute for Environment and Development (IIED) website:
<http://www.iied.org/NR/forestry/documents/Ga-Selatirivercasestudy.pdf>
3. Musango, J., Wise R.M. Draft Publication: **Payments for Catchment Protection Services and Improved Livelihoods of South Africa: A Case Study of the Ga-Selati River**
 - a. GWDMS Number: CPT General, 1237
4. Musango, J., De Wit M. P., **An Empirical Analysis of Demand for Selected Shellfish species in China**, – submitted to Aquaculture Economics & Management (International) Journal
 - a. GWDMS Number: CPT General, 1236

SPEAR Project Deliverables:

5. Most deliverable available on SPEAR website www.bioagang.org
 - a. Musango, J., De Wit M. P., **Modelling demand function for aquaculture species**, GWDMS Number: CPT General 738
 - b. Musango, J., De Wit, M. P., Lombard J. P., Gu H., Luo Q., Ye C., Zhang X., Zhang Z., Zhu M. Estimating production functions in selected Chinese aquaculture production systems –to be submitted in a local Chinese journal
 - c. De Wit, M. P., Gu H., Musango, J., Ye C., Zhang X., Zhang Z., Zhu M. Production costs, income and profits in Chinese aquaculture.

Appendix A:

DEFENCETEK DELIVERABLES: CSIR REPORTS

DEFENCETEK DELIVERABLES: CSIR REPORTS									
DOCUMENT NUMBER	TITLE OF DOCUMENT		AUTHOR	SIGNED OFF BY		DOCUMENT STATUS		DOCUMENT TRACKING NUMBER	
DEFT-GBADS-00023	Definition of LWS Command and Control Time-line		C Peter		Yes	Confidential	1		Signed 2002-05-23.
DEFT-GBADS-00033	VV&A of IRST Model		C Peter	Dr JHS Roodt	Yes	Confidential	1		Signed 2002-05-02.
DEFT-GBADS-00062	Experiment Plan for Characterisation, Verification and Validation of SIM-ONE	doc	C Peter	CJ Combrink		Confidential	1	DEV_003	Signed 2003-09-12.
DEFT-MSDS-00017	STEP Tasks		C Peter				1		
DEFT-MSADS-00072	Experiments for VGD-2 Confidence Assessment Report		C Peter			Confidential	1		Signed 2002-07-25.
DEFT-MSADS-00076	VGD2 Synthetic Environment		C Peter	Dr JHS Roodt	Yes	Confidential	1		
DEFT-MSADS-00094	Requirements For OIL Design of Experiment	doc	C Peter	CJ Combrink	Yes	Confidential	1		Signed 2003-05-13.
DEFT-MSADS-00097	ADC Requirements Interpretation and Functional Description	doc	C Peter	CJ Combrink	Yes	Confidential	1		Signed 2003-04-25.

DEFT-MSADS-00099	Experiment Plan for Doctrine Support and LWS Optimisation	doc	C Peter	CJ Combrink	Yes	Confidential	1	DEV_002	Signed 2003-07-08.
DEFT-MSADS-00106	LWS Air Defence Control: Operator Description In A Graphical Notation	doc	C Peter	CJ Combrink	Yes	Restricted	1	INF_025	Signed 2003-07-08.
DEFT-MSADS-00106	LWS Air Defence Control: Operator Description In A Graphical Notation	doc	C Peter	CJ Combrink	Yes	Restricted	2	INF_029	Signed 2004-01-07.
DEFT-MSADS-00113	LWS Threat Profile Definitions	doc	C Peter			Confidential	1		Signed 2004-03-16.
DEFT-MSDS-00030	LWS Doctrine and MOE Concept Development		C Peter	C Peter		Confidential	1		
DEFT-MSADS-00093	Investigation to Represent VGD-2 Results with Bayesian Modelling Techniques	doc	C Peter & A Adams	CJ Combrink	Yes	Confidential	1		Signed 2003-03-14.
DEFT-MSADS-00102	Experiment Design (presentation)	ppt	C Peter & A Adams	???	No	Confidential	1		
DEFT-MSADS-00115	ADC Evaluation Report	doc	C Peter & JS Reddy	JJ Nel	PM Ndlovu	Restricted	1		Signed 2004-10-20.
DEFT-GBADS-00049	Results of VGD-2 For QinetiQ VV&A Exercise		C Peter?	C Peter?	Yes	Confidential			

NRE NRE REPORTS, AGREEMENTS, PROPOSALS AND KEY PRESENTATIONS

TITLE	FUNDING SOURCE	DOCUMENT NUMBER GWDMS
Pre-Proposal Development 2004:	SRP	Pretoria General, 118605
Thematic Proposal 2005:	SRP	Pretoria General, 143886
Science Plan:	SRP	Pretoria General, 143885
Mar 2006 Project Report:	SRP	Pretoria General, 143884
NRE Progress Report Nov 2006:	SRP	Pretoria General, 143884
Complex Adaptive Systems Subconsultancy Agreement (Sisyphus I), 2006:	SRP	CPT GENL, 1241
CSIR-CAS Joint Collaboration Agreement, 2007	SRP	Pretoria General, GWDMS 142852
Project Documents	SRP	Pretoria General, GWDMS 143901
CAS Project Documents: Scoping, Requirements & Change Management Documentation	SRP	GWDMS 143901

Marine Week Presentation:	COAST PROGRAMME	Too large for GWDMS system – available on request: cpeter1@csir.co.za
Sustainability Institute Lecture:	SRP	GWDMS Pretoria General, 14388
The Myth of Prediction : Presentation	Parliamentary Grant	GWDMS Pretoria General, 143893
C2C Workshop Presentation :	Parliamentary Grant	GWDMS Pretoria General, 143888
Peter, C., Meder, B., von Maltitz, G., van der Merwe, M., (draft, 2007), Analysing Analysis! A study of causal reasoning for complex Biophysical Problem-Solving and Hypotheses Making	SRP	Pretoria General, 143891
Peter, C., Potgieter, A., Le Maitre, D., Burns, M., Mar 2007, SRP Thematic Proposal for Sisyphus II (Development Phase III): Transdisciplinary Modelling for Resilience and Emergence, Complexity Based Modelling and Simulation Demonstrator for Testing Resilience and Emergence in Multi-Scale Social-Ecological Systems	SRP	GWDMS No: 143894
Peter, C., Potgieter, A., Le Maitre, D., Meder, B., Mar 2007, Critical Review and Conceptual Foundation for SRP II Thematic Application: SRP Thematic Proposal Concept Document	SRP	
Camaren Peter's PhD proposal submitted and registration completed at UCT Computer Science	SRP	GWDMS NO: 143890
FINAL REPORT: ECO3: The economics and ecology of ecosystems: Unlocking the complexity needs of sustainable development at system scale	SRP	143948
UCT Seminar Presentation:	SRP	Pretoria General, 143896

