

TAKUNDA YEUKAI CHITAKA

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EDUCATION

2016 – 2020 | University of Cape Town | PhD in Chemical Engineering

Thesis: Inclusion of leakage into life cycle management of products involving plastic as a material choice

- Quantified itemized plastic flows into the ocean based on a series of beach surveys
- Developed leakage rates for products identified as prone to accumulation in the oceans
- Explored life cycle management (LCM) approaches for plastic products in South Africa, via extensive engagement with stakeholders across the plastic value chain
- Developed product case studies whereby LCM approaches were investigated, and sustainability performances of different interventions evaluated
- Investigated feasibility and potential influence of using product specific leakage rates as a proxy indicator during plastic product LCM

2014 – 2015 | University of Cape Town | MPhil Specializing in Sustainable Mineral Resource Development

Thesis: Sustainability performance analysis and decision-making for minerals beneficiation: a South African iron and steel scrap case study

- Employed multi-criteria decision analysis to compare the sustainability performance of three alternatives for the fate of steel scrap (i.e. export, or beneficiation in foundries or steel mills)
- Investigated industry and institutional stakeholder challenges via interviews

This research was funded by KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs to inform the development of a mineral beneficiation strategy for the province.

2010 – 2013 | University of Cape Town | BSc (Hons) in Chemical Engineering

Thesis: Environmental assessment of plastics recycling in Cape Town

- Employed Life Cycle Assessment to compare the energy requirements and global warming potential associated with recycling of LDPE, HDPE and PET plastics in Cape Town

RESEARCH EXPERIENCE

2023 – present | University of Bordeaux | Postdoctoral Researcher

- Transensus LCA - developing a baseline for a European-wide harmonised, commonly accepted and applied single life cycle assessment (LCA) approach for a zero-emission road transport system.
 - Development of guidelines for the life cycle assessment of zero-emission vehicles

This research is funded by the European Union

- EIT ALCASIM: advanced simulation program
 - Development and delivering of course material on the use of LCA in the sustainability of batteries

This research is funded by EIT Raw Materials which is cofounded by the European Union

- SOPAM - Develop biodegradable mulching solutions for market gardening
 - Conducting a comparative life cycle assessment of agricultural film mulches

General Duties

- Conduct administrative duties related to the projects
- Conduct and manage research including contributing to the design and execution of projects e.g. timetabling and meeting project milestones; participating in regular discussions with collaborative partners.
- Write and review research results for publication in peer-reviewed academic literature
- Assist in the supervision of 2 masters and 2 PhD students

2020 – 2023 | University of the Western Cape | Postdoctoral Research Fellow

- Value chain analysis of organic waste and e-waste value chains
 - Investigating job opportunities in organic waste and e-waste value chains
 - Exploring opportunities for growth in the organic waste and e-waste value chains

This research is funded by the Waste Research Development and Innovation (RDI) Roadmap, a Government initiative aimed at supporting South Africa's transition to a circular economy

- Investigating diaper usage in the Kruger to Canyon Biosphere
 - Performing a Life Cycle Assessment of diapers in a rural region

This research is funded by the Waste Research Development and Innovation (RDI) Roadmap, a Government initiative aimed at supporting South Africa's transition to a circular economy

- Investigating diaper disposal in Samora Machel Township

This research was funded by Kimberly-Clark.

General Duties

- Conduct administrative duties related to the projects
- Conduct and manage research including contributing to the design and execution of projects e.g. timetabling and meeting project milestones; participating in regular discussions with collaborative partners.
- Write and review research results for publication in peer-reviewed academic literature

2019 – 2020 | Massey University | Visiting PhD Fellow

- Investigated the distribution of litter along the coastline in relation to the Manawatu River estuary
- Conducted a material flow analysis of plastic waste flows from Palmerston North
- Analyzed the distribution of plastic debris along the New Zealand north island coastline

This research was funded by the Association of Commonwealth Universities Blue Charter Fellowship.

TEACHING EXPERIENCE

2023 – present University of Bordeaux | Instructor – EIT ALCASIM: Advanced LCA Simulation Program

- Preparation of course materials
- Delivering of course material

2019 University of Cape Town | Teaching Assistant – Industrial ecology

- Assisted students with tutorials

2018 – 2019 University of Cape Town | Supervisor – Third year undergraduate research projects

- Designed and structured research project
- Trained students on research methodology
- Provided constructive feedback on data analysis and reporting

2018 University of Cape Town | Supervisor – Final year undergraduate research project

- Introduced project background and advised on relevant literature
- Advised on research approach and methodology
- Provided constructive feedback on data analysis and reporting

2016 – 2018 University of Cape Town | Teaching Assistant – Life cycle assessment

- Assisted in course assignment development
- Assisted students with tutorials and assignments

2017 University of Cape Town | Lecturer – First year chemical engineering

- Planned overall course structure and schedule
- Prepared and delivered course material
- Set and marked appropriate assessments including tests and exams

2017 University of Cape Town | Senior Teaching Assistant – Final year undergraduate research project

- Planned and organised course activities
- Coordinated course activities with research groups and supervisors
- Coordinated marking with internal and external examiners

2015 – 2016, 2019 University of Cape Town | Assistant Lecturer – First year chemical engineering

- Planned course structure and schedule
- Prepared and delivered course material
- Set and marked appropriate assessments

2015 – 2016 University of Cape Town | Senior Teaching Assistant – First year chemical engineering

- Managed a team of teaching assistants and coordinated their activities
- Assisted students with tutorials and project assignments

SCHOLARSHIPS AND AWARDS

2019	Association of Commonwealth Universities Blue Charter Fellowship
2019	PETCO Excellence in Academia Award
2019	South Africa National Research Foundation Extension Support Doctoral Scholarship
2018 – 2019	UCT Engineering and the Built Environment Postgraduate Research Award
2017 – 2018	South Africa National Research Foundation Innovation Doctoral Scholarship
2017	UCT Conference Travel Grant
2016 – 2019	UCT International Students' Scholarship
2014 – 2015	Graça Machel Scholarship

SPECIALISATION

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| ➤ Circular Economy | ➤ Life cycle management |
| ➤ Material flow analysis | ➤ Sustainability assessment |
| ➤ Multi-criteria decision analysis | ➤ Waste management |
| ➤ Life cycle assessment | |

SKILLS

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| ➤ Data analysis | ➤ Organization and planning |
| ➤ Instructing and training | ➤ Problem solving |
| ➤ Interview protocol and analysis | ➤ Project management |
| ➤ Oral and written communication | ➤ Stakeholder management |

COMPUTING

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| ➤ NVivo | ➤ Simapro |
| ➤ ATLAS.ti | ➤ Statistica |

PUBLICATIONS

- Nell, C.M., Schenck, C.J., Joubert, J.W., **Chitaka, T.Y.** and de Wit, M.P. 2024. Disposable diaper usage, disposal practices and quantity estimation in rural areas. *Environmental Challenges*.
- **Chitaka, T.Y.**, Durant, A., Mignard, E., Etienne, G., Sonnemann, G. and Bobet, J-L. 2024. Utilizing life cycle assessment to support the environmentally friendly design of hydrogen generation from magnesium alloys: Offering a second life to waste. *International Journal of Hydrogen Energy*.
- Viere, T., Lehmann, J., Miao, Z., Harding, K., Strothmann, P., Weyand, S., Wright, L., **Chitaka, T.Y.** and Sonnemann, G. 2024. Global State of the Art of Teaching Life Cycle Assessment in Higher Education. *The International Journal of Life Cycle Assessment*.
- **Chitaka, T.Y.** and Goga, T. 2023. The evolution of life cycle assessment in the food and beverage industry: A review. *Cambridge Prisms: Plastics*.
- **Chitaka, T.Y.** and Schenck, C. 2023. Developing country imperatives in the circular bioeconomy: A review of the South African case. *Environmental Development*.
- Schenck, C.J., **Chitaka, T.Y.**, Tyrrell, H. and Couvert, A. 2023. Disposable Diaper Usage and Disposal Practices in Samora Machel Township, South Africa. *Sustainability*.
- Farrelly, T. and **Chitaka, T.Y.** 2023. Policy implications for gaps in traditional plastic waste material flow analysis: Palmerston North, New Zealand. *Frontiers in Sustainability*.
- Moyo, T., **Chitaka, T.Y.**, Lotter, A., Schenck, C.J. and Petersen, J. 2022. Urban mining versus Artisanal and Small-Scale Mining (ASM): An interrogation of their contribution to sustainable livelihoods in sub-Saharan Africa. *The Extractive Industries and Societies*.
- **Chitaka, T.Y.**, Moyo, T., Gihring, K. & Schenck, C.J. 2022. The myth of livelihoods through urban mining: the case of e-waste pickers in Cape Town. *South African Journal of Science*.
- **Chitaka, T.Y.** and Schenck, C. 2022. Transitioning towards a circular bioeconomy in South Africa : Who are the key players? *South African Journal of Science*.
- Ryan, P.G. and **Chitaka, T.Y.** 2022. Do we need more research on the environmental impacts of plastics? *Environmental Research Letters*. 17.

- **Chitaka, T.Y.**, de Kock, L. and von Blottnitz, H. 2022. Evolution of value chain and governance actor responses to the plastic leakage problem in South Africa. *Frontiers in Sustainability*.
- **Chitaka, T.Y.** 2021. Environmentalism or greenwashing? South African value chain actor responses to plastic straw marine pollution. *South African Journal of Science*.
- **Chitaka, T.Y.** and von Blottnitz, H. 2021. Development of a method for estimating product-specific leakage propensity and its inclusion into the life cycle management of plastic products. *The International Journal of Life Cycle Assessment*, 26, pp 1431 – 1438
- **Chitaka, T.Y.**, Russo, V., and von Blottnitz, H. 2020. In pursuit of environmentally friendly straws – a comparative life cycle assessment of five straw material options in South Africa. *The International Journal of Life Cycle Assessment*, 25, pp. 1818 – 1825.
- **Chitaka, T.Y.**, and von Blottnitz, H. 2019. Accumulation and characteristics of plastic debris along five beaches in Cape Town. *Marine Pollution Bulletin*, 138, pp 451 – 457.
- **Chitaka, T.Y.**, Cohen, B., and von Blottnitz, H. 2019. Circular economy local or global? The case of the South African iron and steel industry. In *Sustainable development in Africa: Case studies*. Nagao, Masafumi, Al-Hassan, Masinja and Alhassan, Amin, Eds. Denver: Spears Media Press. Pp 227 - 242
- **Chitaka, T.Y.**, von Blottnitz, H., and Cohen, B. 2018. The role of decision support frameworks in industrial policy development: a South African iron and steel scrap case study. *Sustainable Production and Consumption*, 13, pp. 11 – 125.

CONFERENCES

Oral Presentations

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| Sept 2023 | ‘Life Cycle Assessment of Ammonia as Chemical Vector for Storage of Green Hydrogen’
11th International Life Cycle Management Conference, Lille, France |
| Oct 2022 | ‘Circular Economy and the Sustainable Development Goals: The South African Informal E-Waste Sector’
WasteCon 2022, Johannesburg, South Africa |
| Sept 2019 | ‘Integration of leakage rates into life cycle management of products involving plastic as a material choice’
9th International Life Cycle Management Conference, Poznan, Poland |
| Jul 2017 | ‘Estimating plastic leakage into the environment: the South African case’
African Marine Waste Conference, Port Elizabeth, South Africa. |

Poster Presentations

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| Sept 2017 | ‘Plastic end-of-life: managing material choice without another impact category indicator?’
8th International Life Cycle Management Conference, Luxembourg, Luxembourg. |
| Mar 2016 | ‘Sustainability performance analysis and decision-making for minerals beneficiation: a South African iron and steel case study’
International Conference on Sustainability Science, Stellenbosch, South Africa. |
| Aug 2015 | ‘Sustainability performance analysis and decision-making for minerals beneficiation: a South African iron and steel case study’
33rd annual SAIMM Mineral Processing Conference, Cape Town, South Africa. |

WORKSHOPS

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| Aug 2022 | ‘Plastic pollution on Cape Town beaches’
Cape Town 2022 GIFT workshop, Cape Town, South Africa |
| Jul 2019 | ‘Sustainability is not black and white, but 50 shades of grey’
PETCO – What on earth is going on? Cape Town, South Africa |
| Apr 2019 | ‘An academic perspective on plastic pollution’
Institute of Packaging South Africa Seminar on Single-Use Plastics and the Environment: A South African Perspective, Stellenbosch, South Africa |
| Oct 2018 | ‘Looking at the big picture: the role of life cycle assessment in product design’
PETCO Designing for the Environment Workshop, Cape Town, South Africa. |
| May 2018 | ‘A survey of litter abundance and accumulation rates on 5 Cape Town beaches’
Workshop on Connecting Expert Communities to Address Marine Litter in Life Cycle Assessment, Brussels, Belgium. |

PEER REVIEW EXPERIENCE

Review of research papers submitted to *Marine Pollution Bulletin*, *Regional Marine Science*, *Science of the Total Environment*, *International Journal of Life Cycle Assessment* and the *South African Journal of Science*.

ACTIVITIES & INTERESTS

- 2021 – 2022** Member – *South African E-Waste Policy Working Group* to inform the development of a national e-waste policy
- 2020** Member – *Gauteng E-Waste Management Strategy Steering Committee*
- 2020** Founder and coordinator – *South African E-Waste Research Working Group*: a platform for promoting collaboration amongst universities and organizations conducting e-waste research
- 2020 – 2022** Co-founder and coordinator – *Ocean Plastic Webinars*: a webinar series dedicated to promoting scientific research on the origin and fate of ocean plastic
- 2020 – 2023** Co-organizer – *DSI/NRF/CSIR Chair in Waste and Society Webinar Series*: a platform that brings together academics, researchers, policy makers, municipal government officials and industry representatives to engage on various issues related to waste management
- 2022 – present** Member of the board of directors for Forum for Sustainability through Life Cycle Innovations