

# TAKUNDA YEUKAI CHITAKA

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## EDUCATION

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### 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

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### 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.*

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## **TEACHING EXPERIENCE**

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#### **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

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## SCHOLARSHIPS AND AWARDS

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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

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## SPECIALISATION

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

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## SKILLS

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

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## COMPUTING

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- NVivo
- ATLAS.ti
- Simapro
- Statistica

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## PUBLICATIONS

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- 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.

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## CONFERENCES

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### Oral Presentations

**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

**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’  
33nd annual SAIMM Mineral Processing Conference, Cape Town, South Africa.

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## 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.

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## PEER REVIEW EXPERIENCE

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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*.

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## ACTIVITIES & INTERESTS

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**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