**IDAN CHIYANZU, PhD**

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**PERSONAL PROFILE**

A versatile research engineer/scientist with extensive background experience in bioprocess engineering, fermentation, enzymology, anaerobic digestion involving principally Bioenergy energy systems and other Bio-based production systems.

A significant 7 years’ experience has been gained working at the forefront within universities and research agencies in the field of biomass, bio-products and biogas energy systems.

Comprehensive knowledge of current research and trends in Bioprocessing and Bio-manufacturing within South Africa and globally. Adept at strategic direction in R&D, conducting research literature studies, conducting research planning, develop and manage partnerships, monitoring and evaluation of projects, knowledge transfer and publication in peer reviewed journals. Proven track record in delivering professional projects on time to clients and within budget and significant expertise has also been gained proposal writing, external income generation and fostering collaboration with national and international institutions.

**EDUCATION**

**2018 University of Pretoria, Pretoria, South Africa**

Financial Management for Non-Financial Managers 5 days short course

**2006 – 2009 University of Cape Town, Cape Town, South Africa**

PhD in Chemical Engineering specialized in Bioprocess Engineering

Doctoral Thesis: “*An investigation into the biocatalytic application of the thermostable Nitrile hydratase from the thermophilic strain Geobacillus pallidus RAPc8”*

**2002 - 2004** **University of Cape Town, Cape Town, South Africa**

MSc in Organic Chemistry specialized in synthetic chemistry

Masters Thesis: “*Design, synthesis and biological evaluation of antiparasitic protease inhibitors based on the Isatin scaffold”*

**1995 – 2000 University of Zambia, Lusaka, Zambia**

BSc. Ed in Chemistry with majors in Analytical chemistry and Biochemistry.

**WORK EXPERIENCE**

**2019 – Present, Acting Research Team Manager-Renewable Energy, Agricultural Research Council, South Africa**

* Divisional manager responsible for a team of 15 researchers and delivering research, feasibility studies, technical advisory, due diligence and evaluation and monitoring of renewable energy project
* In-charge of the implementation of new and advanced technologies of energy efficiency in agricultural engineering.
* Establishing collaboration and interacts with research teams across the organization to ensure broad application of existing agricultural engineering technologies.
* Training and mentoring postgraduate students in the application of existing and next generation agricultural engineering technologies.
* Apply for external funding to ensure the optimal functioning of the renewable energy programmes at the cutting-edge of available technologies.
* Lead in project planning and identification of new projects within organization’s strategic programmes.
* Reports and managing project budgets.
* Conduct project management and leading renewable energy research team.
* Bioenergy and Waste-to-Energy specialist.

**2016 – 2019**, **Senior Researcher - Renewable Energy & Agro processing, Agricultural Research Council, Pretoria**

My responsibilities included conducting research in the following:

* Conduct research in Bioenergy and Agro processing related projects;
* Identifying new business opportunities on renewable energy in agricultural markets;
* Project management from acquisition to final delivery of Renewable Energy and energy efficiency implementation studies and sustainable energy action plan;
* Coordination and research of technical content of biogas, biochar and biomass plants feasibility studies;
* Supervision for postgraduate students and interns.

**2012 – 2015, Assistant Lecturer & Research Fellow North-West University, Potchefstroom, South Africa**

* Delivered lectures to undergraduate students in courses including Biotechnology and Fermentation Technologies.
* Delivered lectures to postgraduate students in courses including Biodiesel Process Technology, Bioethanol Process Technology, Bio refinery concept and Bioreactor and Bioprocessing.
* Researched microalgae based bio refinery for biofuel and bioenergy production:
* Developed energy strategies for diverse characterization methods for the biomass feedstock of their chemical composition to determine the suitability in biofuels production.
* Evaluated bio ethanol production from a range of feedstock including sweet sorghum, sugarcane bagasse, cassava, amaranths and pure starch.
* Researched out current beneficiation of waste for production of value-added products including hydrocarbons, organic acids, polymers and biogas.
* Design and conduct experiments that contributed knowledge to the production of ethanol gels, bio-char, hydrogen and biogas for use as energy in rural South African communities.
* Wrote manuscripts that report results and submit them to peer-reviewed journals. Establish collaborate with international institutions to promote exchange of scientific knowledge and ideas.

**2011 – 2012, Researcher University of the Western Cape, Cape Town, South Africa**

* Researched current South African energy policy to provide up to date advise to clients and students in biofuels related production activities.
* Developed pretreated methods for sugarcane bagasse, quantified monomeric sugars and lignin for enzymatic hydrolysis, and fermentation of glucose to bioethanol.
* Performed fermentation, enzyme isolation, enzyme purification, enzyme activities, protein quantifications, DNS and HPLC analysis.

**2010 – 2011, Post doctorate Fellowship, Stellenbosch University, Cape Town, South Africa**

* Low and zero carbon technologies assessment and applications.
* Steam explosion as pretreatment for biomass.
* Statistical modeling of bioenergy production with Design-expert and MatLab software.

**2009 – 2009, Post doctorate Research Fellowship, University of Cape Town, South Africa**

* Developing methodology for impact evaluation of proteins as vaccines in a TB prevention Project with the aim on advancing infant health in South Africa.

**SPECIAL SKILLS**

**Languages**

* English: Speak fluently and read/write with high proficiency.

**Computer Skills**

* MS Office: Proficient in MS Office including Word, Excel, and Power Point.
* Internet: Internet explorer, Firefox Mozilla and Chrome.
* Statistics: Design Expert.

**Communication**

* Verbal communication including speaking to senior stakeholders and managing upwards, presenting to audiences.

**Knowledge of analytical instruments**:

* Use of High Pressure Liquid Chromatography and Gas Chromatography

**Biochemical techniques**:

* Fermentations; protein functional characterization; protein isolation; protein purification; protein analysis; protein quantitation; spectrophotometric enzyme assays; enzyme immobilization; HPLC; ion exchange; and affinity chromatography; polyacrylamide gel electrophoresis and application of enzymes in bioreactors.

**Bioreactors**:

* Set-up, maintenance, trouble-shooting, optimization; biochemical analysis and microbiological tools
* Lab scale to pilot scale bioreactors.

**PERSONAL DETAILS**

**Driving license**

* Cars ( C ) or Code 10

**Other interests**

* Sport.
* Philosophy.
* Visual art.
* Reading.
* Travelling.
* Current affairs.

**PROFESSIONAL MEMBERSHIP**

* South African - Norway Research, Research Co-operation Programme (SANCOOP).
* Bio World Congress on Industrial Biotechnology.

**PUBLICATIONS**

* **Idan Chiyanzu** (2021). The reconstruction of metabolic pathways in selected bacterial and yeast strains for the production of bio-ethylene from crude glycerol: A mini review. African Journal of

Biotechnology. Article in Press

* Louis Christiaan Muller, Sanette Marx, Hermanus CM Vosloo, **Idan Chiyanzu** (2019). Functionalising lignin in crude glycerol to prepare polyols and polyurethane. *Polymers from Renewable Resources* 10: 3–18.
* LC Muller, S Marx, HCM Vosloo, E Fosso-Kankeu, **I Chiyanzu** (2018). Rigid polyurethane foams from unrefined crude glycerol and technical lignins. *Polymers from Renewable Resources* 9 (3-4), 111-132.
* B. Ndaba, **I. Chiyanzu**, S. Marx (2015). n-Butanol derived from biochemical and chemical routes: A review. *Biotechnology Reports*, 8: 1-9.
* B. Ndaba, **I. Chiyanzu**, S. Marx (2015). Direct fermentation of sweet sorghum juice by Clostridium acetobutylicum and Clostridium tetanomorphum to produce bio-butanol and organic acids. *Biofuel Research Journal* 2 (2), 248-252.
* Sanette Marx, Busiswa Ndaba, **Idan Chiyanzu**, Corneels Schabort (2014). Fuel ethanol production from sweet sorghum bagasse using microwave irradiation. *Biomass & Bioenergy*, 65, 145 – 150.
* Marx S, **Chiyanzu I**, Piyo N (2014). Influence of reaction atmosphere and solvent on biochar yield and characteristics. *Bioresource Technology* 164:177-83.
* Busiswa Ndaba, **Idan Chiyanzu**, Sanette Marx, George Obiero (2014). Effect of Saccharomyces cerevisiae and *Zymomonas mobilis* on the co-fermentation of sweet sorghum bagasse hydrolysates pretreated under varying conditions. *Biomass and Bioenergy* 71: 350 - 356.
* **Chiyanzu I**.; Brienzo M.; Garcia M.; Aguirre R.; Görgens J.F. (2013). Spent coffee ground mass solubilisation by steam explosion and enzymatic hydrolysis. *Journal of Chemical Technology & Biotechnology* (SN 1097-4660) and DOI:10.1002/Jctb.4313.
* **Chiyanzu I**.; Brienzo M.; Garcia M.; Aguirre R.; Görgens J.F. (2013). Application of endo-β-1,4, D-mannanae and cellulose for release of mannooligosaccharides from steam pretreated spent coffee ground. *Applied Biochemistry and Biotechnology* 172, (7), 3538 – 3557.
* **Idan Chiyanzu,** Don Cowan and Stephanie G. Burton (2010). Immobilization of a Nitrile hydratase (NHase) from *Geobacillus pallidus* RAPc8 reduces substrate inhibition and enhances stability. *Journal of Molecular Catalysis B*: Enzymatic, 63, 109–115.
* **Idan Chiyanzu**, Cailean Clarkson, Peter J. Smith, Julie Lehman, Jiri Gut, Philip J. Rosenthal and Kelly Chibale (2005). Design, synthesis and anti-plasmodial evaluation in vitro of new 4-aminoquinoline isatin derivatives. *Bioorganic & Medicinal Chemistry* 13 (9), 3249 - 3254.
* **Idan Chiyanzu**, Elizabeth Hansell, Jiri Gut, Philip J. Rosenthal, James H. McKerrow and Kelly Chibale (2003). Synthesis and evaluation of isatins and thiosmicarbazones derivatives against cruzain, falcipain-2 and rhodesain; *Bioorganic and Medicinal Chemistry Letters* 13 (20), 3527-3530.

**ACCOMPLISHMENTS**

Managed to be successful in attracting funding for research project, lead them from set-up to completion.

**On-going Research Support**

* Establishing an innovative and transnational feed production approach for reduced climate impact of the aquaculture sector and future food supply: National Research Foundation (NRF) Grant

The aim of the project is to address the following topics: 1) Promote innovative technology deployment to build sustainable and resilient food value chains influenced by changing food needs and patterns, and to

develop better efficiency of the inputs and outputs of food systems. 2) Reduce food losses under climate

change, including novel approaches to valorize side streams and reduce food waste.

***Role: Principal Investigator***

**Completed Research Support**

* Indigenous Knowledge System: National Research Foundation (NRF) Grant

The overall goal of our research is to identify the most efficacious approach to eradicate nutritional and dietary deficiencies in the rural areas of Limpopo province. The intervention is for promoting screening the various wild-growing African mushroom and to identify the edible types and the associated nutritional benefits of the mushroom. The impact will be on skills development especially much needed scarce skills; job creation– thus contributing to the women and youth jobs; poverty addressed – can positively contribute to the food scarcity currently faced by SA rural regions; and new and emerging market opportunity for SMME development.

***Role: Principal Investigator***

* United Nations Industrial Development Organization (UNIDO) Grant

Promoting organic waste-to-energy and other low-carbon technologies in small and medium and micro-scale enterprises (SMMEs): Accelerating biogas market development. The project is promoting market-based adoption of integrated biogas technology in small, medium, and micro-scale enterprises (SMMEs) in South Africa in support of government priorities, reducing greenhouse gas emissions and promote poverty alleviation. Develop energy technologies and household energy market development.

***Role: Co-investigator***

* Migration to renewable energy project

The main objective of the project is to establish co-operation with various government agencies to gauge the feasibility of a dedicated 30 MW solar and biogas hybrid power plant for the Agricultural Research Council. The outcomes of the study will provide the company with a solid foundation for a long-term power supply approach for its operations at various campuses as well as the central office located in Pretoria, in line with the SA government integrated development plans.

***Role: Principal Investigator***

* S&F - DST / NRF Innovation Fellowships. National Research Foundation (NRF) Grant

The purpose of this study was is to develop robust and sustainable process within the bio diesel industry for the biological conversion of crude glycerol into ethylene. The goal to promote re use of by-products of renewable energy processes and awareness disposal of industrial waste on the environment.

***Role: Principal Investigator***

**CONFERENCES**

* **Chiyanzu I**, Mditswa A, Marx S., 2015. Ultrasonic-assisted pretreatment of lignocellulose material for bioethanol production. Proceedings of 23rd European Biomass Conference and Exhibition (EUBCE), June 1 – 4, Vienna, Austria.
* **Chiyanzu I**, Ndaba B, Marx S., 2014. Bio-butanol production from bioethanol using a microwave In: Proceedings of 11th Bio World Congress on Industrial Biotechnology, May 12 - 15, Philadelphia, USA.
* **Chiyanzu I**, Ndaba B, Marx S., 2013. A single step pretreatment process in bioethanol production from Sweet Sorghum Bagasse. In: Proceedings of 10th Bio World Congress on Industrial Biotechnology, June 16 - 19, Montreal Canada.
* **Chiyanzu I**, Cowan D, Burton S.G., 2007. Immobilization and properties of a thermostable nitrile hydratase (NHase) from *Geobacillus pallidus* RAPc8. In: Proceedings of 13th European Congress on Biotechnology, September 17 – 19, Barcelona, Spain.
* **Chiyanzu I**, Cowan D, Burton S.G., Fifth national conference on biotechnology in Durban, June, 2006. Immobilization and functional characterization of nitrile hydratase (NHase).
* **Chiyanzu I**, Cowan D, Burton S.G, 2007. Continuous production of nicotinamide using a packed-bed reactor system with immobilized *Geobacillus pallidus* RAPc8 (NHase). In: Proceedings of South Africa Institute of Chemical Engineers June 2007, Cape Town.

**HONOURS AND AWARDS**

* 2018, National Research Foundation of South Africa (NRF), Indigenous Knowledge Systems Grant holder at ARC-Agricultural Engineering Institute.
* 2014, National Research Foundation of South Africa (NRF), Scarce-Skills Grant holder for Postdoctoral Fellowship at North-West University.

**REFERENCES**

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