

Lefu Maselepo

412-482-2392 | Rochester, NY, US | ljmaqe@gmail.com | ljmaqe.github.io

INTERESTS

Energy Systems, Energy Markets, Data Science / Machine Learning, Optimization, Climate Change.

EDUCATION

Rochester Institute of Technology

PhD, Sustainability

Rochester, NY, USA

Aug 2019 - July 2024

Dissertation: Rural Electrification Subsidies: Quantification, Structure and Policy Implications

Dissertation Committee: Nathan Williams, Jay Taneja (Umass Amherst), Eric Williams, Eric Hittinger

Carnegie Mellon University

PhD, Engineering and Public Policy (Transferred)

Pittsburgh, PA, USA

Jan 2019 - Aug 2019

Carnegie Mellon University

MS, Electrical and Computer Engineering

Kigali, Rwanda

Jul 2017 - Dec 2018

University of Botswana

BEng, Mechanical Engineering

Gaborone, Botswana

Aug 2011 - May 2016

EXPERIENCE

Graduate Research Assistant

Rochester Institute of Technology, INSYST Lab

Rochester, NY, USA

Aug 2019 - Aug 2024

- Lead and collaborated on research projects focused on energy-agriculture nexus in sub-Saharan Africa.
- Conducted cutting edge research and built quantitative decision support tools to aid energy system planning efforts in sub-Saharan Africa.
- Presented research findings to diverse audiences in conferences and online webinars.
- Provided consulting services as a quantitative analyst for Cross Boundary's mini grids implementing team.

Intern: Graduate III Computer Science

National Renewable Energy Lab (NREL)

Golden, CO, USA (Remote)

Mar 2022 - Feb 2023

- Enhanced accessibility and eased usability of dGen model by designing and implementing a wxPython framework based graphical user interface.
- Developed advanced statistical and stochastic modeling, and optimization techniques based methodology of fusing datasets for dGen agents generation.
- Collaborated with model engineering team to generate agents for LA100 Equity Strategies project.

Consultant: Software Engineer

Onepower

Maseru, Lesotho (Remote)

Nov 2020 - Feb 2022

- Improved mini grid project development management efficiency by more than 60% through development of a software tool (uGridPlan) that enables on the ground staff to make near real time progress updates on projects.
- Eased and cut down distribution network design effort by more than 70% through development of a software tool (uGridNet) that automates the design process.
- Build electricity demand prediction models using historical consumption and price data with accuracy levels of more than 85% on unseen data.
- Eased usability and extended audience that can use the demand prediction models through development of a GUI based software tool (uGrid)

Intern: Energy System Modeling

Green Design Institute at CMU

Pittsburgh, PA, US (Remote)

May 2018 - Aug 2018

- Expanded accessibility of the Stochastic Techno-Economic Microgrid Model (STEMM) by porting the code-base from Analytica to Python to make it open-source.
- Extended STEMM's capabilities to support smart metering and model predictive control (MPC) based dispatch strategy.

Mechanical Engineer I

Onepower

Maseru

Jul 2016 - Jul 2017

- Contributed to on-going PV tracker system control software development and fine tuning and hardware development.
- Conducted pre-electrification surveys to collect data later used in demand estimation for mini grid components design.
- Liaised with smart meter vendors to configure and field test meters to monitor performance.

Intern: Mechanical Engineer

Solar Turbine Group (Now Onepower)

Maseru

Feb 2015 - Jun 2015

- Components design and production of machining process program (G-Code) in Solidworks CAD software
- Building and testing parabolic trough collector (PTC) concentrating solar power (CSP) systems
- Installed electricity meters and weather stations at various schools and health clinics
- Collected and analyzed electricity usage and meteorological data to establish correlations

Research Fellow: Sustainable Engineering

University of Botswana

Maseru

Feb 2015 - Jun 2015

- Collaborated on research focused on investigating mechanical strength of acetalized *agave sisalana* fibers.

TEACHING EXPERIENCE

Graduate Teaching Assistant

Rochester Institute of Technology

Rochester, NY, USA

Spring 2021, 2023

Course(s): Multi-criteria Sustainable Systems, Sustainability in the Global South.

Graduate Teaching Assistant

Carnegie Mellon University

Kigali, Rwanda

Fall 2018

Course(s): Electric Power Systems.

JOURNAL PUBLICATIONS (peer-reviewed)

Wamalwa, F., **Maqelepo, L.**, Williams, N., Falchetta, G. (2024); Solar Irrigation Potential in Sub-Saharan Africa: A Crop-Specific Techno-Economic Analysis. *Environmental Research: Food Systems*

Maqelepo, L., Williams, N. and Taneja, J., 2022. Rural electrification subsidy estimation: a spatial model development and case study. *Environmental Research: Infrastructure and Sustainability*, 2(4), p.045009

Wamalwa, F., **Maqelepo, L.**, & Williams, N. (2023). Unlocking the nexus potential: A techno-economic analysis of joint deployment of minigrids with smallholder irrigation. *Energy for Sustainable Development*, 77, 101345.

CONFERENCE PROCEEDINGS (peer-reviewed)

Maqelepo, L., Wamalwa, F., Raji, T., & Williams, N. J. (2023, November). Thinking Beyond The Connection: Mapping Electricity Tariffs Affordability in Sub-Saharan Africa. In *2023 IEEE PES/IAS PowerAfrica (pp. 1-5)*, Marrakesh, Morocco. November 2023.

Raji, T., Wamalwa, F., **Maqelepo, L.**, & Williams, N. J. (2023, November). Assessing the Feasibility of Behind-the-Meter Battery Storage Systems for Tariff Arbitrage in Uganda. In *2023 IEEE PES/IAS PowerAfrica (pp. 1-5)*, Marrakesh, Morocco. November, 2023.

Raji, T., **Maqelepo, L.**, Williams, N.J. and Bett, A., 2022, August. Money and Power: The Impact of Tariff Structures on Electricity Consumption in Solar Microgrids in Africa. In *2022 IEEE PES/IAS PowerAfrica (pp. 1-5)*, Kigali, Rwanda. September, 2022.

ARTICLES IN PRESS

Maqelepo, L., Wamalwa, F., Williams, N., Taneja, J.; Two Sides of a Coin: Assessing Trade-offs Between Reliability and Profit in Mini Grids and the Policy Implications for Subsidies

Maqelepo, L., Raji, T., Williams, N. J.; Precious Photons: A Geospatial Benchmarking of the Value of Sun tracking in Solar PV Systems in Sub-Saharan Africa [Accepted, to be published in 2024 IEEE PES/IAS PowerAfrica]

TECHNICAL SKILLS

Programming: Python, Java, C/C++, R, Matlab, Bash, SQL, L^AT_EX.

Data / ML Stack: Numpy, Pandas, Geopandas, Scikit-Learn, Stats-models, Spark.

Optimization: Scipy, CVXPY, Pyomo, LINGO.

Energy Models: OnSSET, STEMM, dGen, Homer, pvlib.

CAD/CAM: Solidworks, AutoCAD, MasterCam, DesignBuilder

Applications: Vi/Vim, Eclipse, Visual Studio, Git.

Others: QGIS, Microsoft Suite, Google Earth.

CONFERENCE TALKS

Money and Power: The Impact of Tariff Structures on Electricity Consumption in Solar Microgrids in Africa, IEEE PES/IAS Power Africa, Kigali, Rwanda, August 2022.

INVITED TALKS

Implicit subsidies in grid-based electrification and what they mean for the DRE sector, Sustainable Energy for All, December, 2022.

Energy transitions and sustainable transformations in Africa, Physics World, environment and energy, November, 2022.

Rural Electrification Subsidies: Quantification, Policy Implications, RIT in Africa Research Colloquium, Rochester, NY, USA. April, 2021.

STUDENT MENTORING

Carnegie Mellon University

Tunmise Raji (Masters), now a PhD student at RIT.

Leandre Berwa (Masters), now Founder & CEO at Second Life Storage (SLS) Energy.

Chris Karera (Masters), now Lead Data Scientist at Odyssey Energy Solutions.

Janvier Muvunyi (Masters).

MEDIA COVERAGE

Stretching budgets by not stretching power lines: faster and cheaper electricity access through careful subsidy allocation in Africa. *SEforAll*, 2022.

CRWU senior lights family's night near African desert *The Daily, Case Western Reserve University*, 2024.

HONORS AND AWARDS

Mastercard Scholar, CMU

Recipient of a full scholarship to study Masters at Carnegie Mellon University in Kigali, Rwanda (2017).

Merit Award, University of Botswana

Recipient of academic excellence award in residence hall 405-415 for academic year 2011/12 (2012).

Excellence Award, Leribe district

Recipient of academic excellence award for being a top ten (rank 3rd nationwide) performer in the 2010 COSC examinations in Leribe district (2011).

Excellence Award, Sacred Heart High School

Recipient of excellence awards for being the top performer in Chemistry, Mathematics and Sesotho subjects at Sacred Heart High School (2010).

Certificate of Honour, Math Olympiad, Lesotho

Recipient of a certificate of honour for a high rank in the national Mathematics Olympiad taken at Cana High School (2008).