# CARMEN LEWIS curriculum vitae

**Electrical-Mechatronic Engineer** Renewable Energy

Doctoral Candidate | Stellenbosch University
Female | South African | Cape Town
English | Afrikaans

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research portfolio:
www.solarXY.org

## About

Carmen is a proactive and resilient researcher, coder and analyst. She is well-read, a proficient writer, and thoroughly enjoys asking questions and pursuing the answers thereof. Although she is an efficient independent worker, she appreciates collaborative projects. Her goal is to contribute to sustainability and the progress of society through her technical skills and creative approach to problem-solving. She is a proponent of sharing knowledge and believes that the electrification of Africa is imperative to global social progress and should therefore be a global effort.

## Academic Qualifications

**2021** | **PhD** (Electrical Engineering), Stellenbosch University

Modelling Atmospheric Transmittance for Clear-Sky Spectral Solar Radiation in Practical Applications

**2017** | **MEng** (Electrical Engineering), Stellenbosch University

A Spectral Guide: The Analysis of Solar Irradiance and Soiling Through Spectroradiometry

**2015** | **BEng** (Mechatronic Engineering), Stellenbosch University

PV Solar System Design and Analysis for a Domestic Swimming Pool Pump (Cum Laude)

## Experience

**2021 March - June** | **Research Assistant**, Stellenbosch University
UCDG REEP | University Capacity Development Grant Recommended Engineering Education Practices

Researching holistic approaches to engineering education and curriculums that encompass knowledge, skills and attributes, large class assessments, conceptual engagement and cumulative theory-practice connections.

**2020 – 2021** | **Programme Manager**, Centre for Renewable and Sustainable Energy Studies (CRSES)
RE-SC EPPEI | Renewable Energy - Specialisation Centre, Eskom Power Plant Engineering Institute

Financial and academic administration of ~70 postgraduate students from various academic institutions.

**2020 – 2021** | **Research Group Administrator**, Stellenbosch University
PSRG | Power Systems Research Group

Administration of ~50 postgraduate students and academic supervisors. Coordinating weekly research seminars. Management and maintenance of the research group website https://grid.sun.ac.za/ via WordPress.

**2016 – 2020** | **Graduate Tutor**, Electrical & Electronic Engineering, Stellenbosch University

Computer Programming | Electrical Drive Systems | Electrotechnique

**2015** | **Vacation Work**, Blue Cube Systems, Stellenbosch
**2014** | **Vacation Work**, Reutech Radar Systems, Stellenbosch
**2013** | **Part-time Work**, SmartGrid Technologies, Stellenbosch

## Featured Skills

**Technical |** Python | C | AutoCAD Inventor | Linux OS | SQL | HTML
**Typesetting |** LaTeX | Photoshop | Microsoft Office Professional

- Theoretical knowledge on spectroradiometry and practical experience with both laboratory and field spectroradiometric measurements.
- Experience in working with large geospatial radiometric and atmospheric datasets including BSRN, AERONET, GAW and NASA GES DISC (HDF5 files).
- Python proficient, especially scientific (scipy, statsmodels, statistics), plotting (matplotlib, plotly, seaborn), data analysis (Pandas) and radiometric (PVLib) packages.
- Experience with spectral solar radiation modelling, statistical analysis and forecasting methodologies.
- Familiarity with the latest measurement and modelling of atmospheric constituents, and the extinction of solar radiation by these constituents.
- Proficient in the research process, academic writing and presentation.

## Research outputs

**C. Lewis**, K.E. Wolff, B. Bekker, Supporting project-based education through a community of practice: a case of postgraduate renewable energy students, *World Transactions on Engineering and Technology Education*, 19(1), pp. 35-40, 2021.

**C. Lewis**, J.M. Strauss, M.B.Øgaard and J.H.K. Selj, Field experience: The use of spectrometry for soiling analysis on PV, in *25th Southern African Universities Power Engineering Conference (SAUPEC 2017)*, Stellenbosch, South Africa, 2017.

**C. Lewis**, A spectral guide: The analysis of solar irradiance and soiling through spectroradiometry, *Masters thesis*, Dept. Electrical Engineering, Stellenbosch University, 2017.

**C. Lewis**, PV Solar System Design and Analysis for a Domestic Swimming Pool Pump, *Final Year Project Report,* Dept. Mechanical and Mechatronic Engineering, Stellenbosch University, 2015.

## Continued Professional Development

**2021** | **Workshop** | Teachers Morning, Faculty of Engineering, Stellenbosch University, Virtual
**2021** | **Workshop** | Annual Recommended Engineering Education Practices (REEP) Research & Writing Workshop, Stellenbosch, South Africa
**2020** | **Conference** | 7th Annual Eskom Power Plant Engineering Institute Student Workshop, Virtual
**2020** | **Workshop** | Writing workshop for the Power Systems Research Group, Virtual
**2019** | **Workshop** | Writing workshop for the Renewable Energy Grid Integration Research Group, Stellenbosch, South Africa
**2017** | **Conference** | 25th Southern African Universities Power Engineering Conference (SAUPEC), Stellenbosch, South Africa

## References

**Dr Bernard Bekker** | Centre for Renewable and Sustainable Energy Studies, Stellenbosch University
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**Dr Karin Wolff** | Centre for Teaching & Learning, Engineering, Stellenbosch University
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**Dr Johann M Strauss** | Department of Electrical & Electronic Engineering, Stellenbosch University
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