CURRICULUM VITAE

Willem Gabriel Le Roux

1. BIOGRAPHICAL SKETCH

1.1 GENERAL INFORMATION

Surname	Le Roux												
First names	Willem Gabriel							**ID Number**		8607275009086			
Citizenship	RSA (South Africa)							**Title**	Dr	**Female**		**Male**	x
Place of birth	Pretoria, RSA (South Africa)							**Date of birth**		1986/07/27			
Population group	**African**		**Coloured**		**Indian**		**White**	**x**		**Other *(Please specify)***			
Department	Mechanical and Aeronautical Engineering							**Position**		Senior Lecturer			
Direct Telephone	012 420 2446 / 0845812619							**Direct Telefax**					
E-mail	willem.leroux@up.ac.za												
Date of appointment	2015/05/01							**Permanent full-time**	x	**Temporary full-time**			

1.2 ACADEMIC QUALIFICATIONS OBTAINED

Degree/ Diploma	Field of study	Higher education institution	Year	Distinctions
BEng	Mechanical Engineering	University of Pretoria, South Africa	2008	First Class
BEng (Hons)	Mechanical Engineering	University of Pretoria, South Africa	2009	Distinction
MEng	Mechanical Engineering *Thesis: Maximum net power output from an integrated design of a small-scale open and direct solar thermal Brayton cycle*	University of Pretoria, South Africa	2011	Distinction
PhD	Mechanical Engineering *Thesis: Thermodynamic optimisation and experimental collector of a dish-mounted small-scale solar thermal Brayton cycle*	University of Pretoria, South Africa	2015	Not Applicable

1.3 PROFESSIONAL REGISTRATION				
Pr Eng	Professional Registration as Professional Engineer	ECSA (Engineering Council of South Africa)	2016	Registration number: 20160368

1.4 WORK EXPERIENCE TO DATE		
Name of employer	**Capacity and/or type of work**	**Period**
Koeberg Nuclear Power Plant	Trainee Mechanical Engineer as a PBMR (Pebble Med Modular Reactor) bursary holder	2007/01
Saspine	Trainee Mechanical Engineer in Bio-Medical Engineering	2007/11 to 2007/12
University of Pretoria, Department of Mechanical and Aeronautical Engineering	Teaching Assistant and Research Engineer on Thermodynamic Optimisation and Heat Transfer	2009 - 2014
University of Pretoria, Department of Mechanical and Aeronautical Engineering	PhD Research Engineer	2012 - 2014
Helder Energie (Pty) Ltd. Solargolfer (Pty) Ltd.	Director - Renewable energy, - Research and development	2013 - 2017 2017 - current
University of Pretoria, Department of Mechanical and Aeronautical Engineering	Lecturer	2015/01/01 - 2015/04/30
University of Pretoria, Department of Mechanical and Aeronautical Engineering	Senior Lecturer	2015/05/01 - current
EPCM Consultants South Africa	Consultation	2017/07/01 - current

2. TEACHING ACTIVITIES

2.1 Courses presented

Course	Level *(e.g. second year, Masters)*	Self developed *(Yes or No)*
Thermoflow (Heat Transfer) (MTV410) - Senior Lecturer - 2015-2017 - 300+ students (2017)	4th year	Yes
Final year design (MOX410 & MOX420) - Supervisor - 2015-2017 - 20+ students (2017)	4th year	Yes
Final year project (MSC410 & MSC420) - Supervisor - 2015-2017 - 20+ students (2017)	4th year	Yes
Thermodynamics (MTX221) - Senior Lecturer - 2016-2017 - 700+ students (2017)	2nd year	No

2.2 Other education and pedagogic courses presented

Course	Level	Institution
Maths on Mxit - Volunteer - Math Teacher - 2007	High school	CSIR
Thermodynamics and Heat Transfer (MTX221, MTX311, MTV410) - Tutor and Teaching Assistant - 2009-2014	2nd, 3rd and 4th year	University of Pretoria
Thermodynamics (MTX311) - Stand-in Lecturer - 2011, 2017	3rd year	University of Pretoria
Thermodynamics (MTX221) - Stand-in Lecturer	2nd year	University of Pretoria

- Five lectures - 2014		
Vacation work (MPY310, MPY410) - Supervisor - 2012-2014, 2016-2017 - 50+ undergraduate students	3rd and 4th year	University of Pretoria
Thermal and Fluid Machines (MTV420) - Stand-in Lecturer - One lecture on power cycles - 2015	4th year	University of Pretoria
Advanced Thermodynamics and Energy Systems (MTX781) - Stand-in Lecturer - 2015-2017	Postgraduate level	University of Pretoria

3. RESEARCH ACTIVITIES

3.1 Current post-graduate students

Name of student	Degree enrolled for	Project title	Supervisor	Co-supervisor(s)	Year of registration
T Wolff	MEng	Solar thermal Brayton cycle dish and receiver	WG Le Roux	JP Meyer	2017

3.2 Obtaining research funds *(Optional)*

Origin of research funds (e.g. contract research, THRIP, international funding organisations, other(s)	Title of research project or programme	Duration	Money allocated (R) *(Optional - exact amounts not required)*
Technology and Innovation Agency (TIA)	Solar thermal Brayton cycle development	18 months	R 500 000
Research and Development Program (RDP), University of Pretoria	Testing of a small-scale dish-mounted solar thermal Brayton cycle	3 years	R 50 000 per year
NRF Incentive Funding for Y-Rated Researcher	Solar thermal Brayton cycle research and development	5 years	R 40 000 per year

4 RESEARCH OUTPUTS

4.1 Publications in peer-reviewed or refereed journals

1. LE ROUX WG, BELLO-OCHENDE T and MEYER JP; Operating conditions of an open and direct solar thermal Brayton cycle with optimised cavity receiver and recuperator, Energy 36: 6027-6036, 2011.

2. LE ROUX WG, BELLO-OCHENDE T and MEYER JP; Thermodynamic optimization of an integrated design of a small-scale solar thermal Brayton cycle, International Journal of Energy Research 36: 1088-1104, 2012.

3. LE ROUX WG, BELLO-OCHENDE T and MEYER JP; Optimum performance of the small-scale open and direct solar thermal Brayton cycle at various environmental conditions and constraints, Energy 46: 42-50, 2012.

4. LE ROUX WG, BELLO-OCHENDE T and MEYER JP; A review on the thermodynamic optimisation and modelling of the solar thermal Brayton cycle, Renewable & Sustainable Energy Reviews 28: 677-690, 2013.

5. LE ROUX WG, BELLO-OCHENDE T and MEYER JP; The efficiency of an open-cavity tubular solar receiver for a small-scale solar thermal Brayton cycle, Energy Conversion and Management 84: 457-470, 2014.

6. LE ROUX WG; Optimum tilt and azimuth angles for fixed solar collectors in South Africa using measured data, Renewable Energy 96: 603-612, 2016.

7. LONI R, KASAEIAN AB, ASKARI ASLI-ARDEH E, GHOBADIAN B, LE ROUX WG; Performance study of a solar-assisted organic Rankine cycle using a dish-mounted rectangular-cavity tubular solar receiver, Applied Thermal Engineering 108: 1298-1309, 2016.

8. PAVLOVIC S, BELLOS E, LE ROUX WG, STEFANOVIC V, TZIVANIDIS C; Experimental investigation and parametric analysis of a solar thermal dish collector with spiral absorber, Applied Thermal Engineering 121: 126-135, 2017.

Papers being prepared:

1. LE ROUX WG and SWANEPOEL PJ; Analysis of a novel turbomachine for power generation, Applied Energy.

2. LE ROUX WG, WOLFF TM, MEYER JP; Experimental testing of a dish-mounted open-cavity tubular solar receiver, Energy Conversion and Management.

3. LONI R, ASKARI ASLI-ARDEH E, GHOBADIAN B, BELLOS, E, LE ROUX WG; Numerical study on dish concentrator with different cavity receivers and different working fluids, Renewable Energy.

4. LONI R, ASKARI ASLI-ARDEH E, SHAHVERDI K, LE ROUX WG; Thermal and thermodynamic study on solar ORC using different types of cavity receiver and application of different nanofluids, Applied Thermal Engineering.

5. LONI R, ASKARI ASLI-ARDEH E, SHAHVERDI K, LE ROUX WG; Investigation of solar ORC using Al_2O_3/Oil nanofluid: effect of nanoparticle size, nanofluid concentration and type of solar receiver, Applied Thermal Engineering.

4.2 Books and/or chapters in books

1. LE ROUX WG, MEYER JP; Clean Energy for Sustainable Development, 1st Edition: Comparisons and Contrasts of New Approaches, Chapter 6, pp. 167–190 (Small-scale Dish-Mounted Solar Thermal Brayton Cycle), Elsevier: London, 2017 (Paperback ISBN: 9780128054239, eBook ISBN: 9780128054246).

4.3 Published full-length conference papers (peer-reviewed)

1. LE ROUX WG, BELLO-OCHENDE T and MEYER JP; Optimum performance of the small-scale open and direct solar thermal Brayton cycle at various environmental conditions and constraints, International Green Energy Conference-VI (IGEC-VI), Eskisehir, Turkey, 5-9 June, 2011.

2. LE ROUX WG, BELLO-OCHENDE T and MEYER JP; Optimum operating conditions of the small-scale open and direct solar thermal Brayton cycle at various steady state conditions, 8th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics (HEFAT2011), Mauritius, 11-13 July, 2011.

3. LE ROUX WG, BELLO-OCHENDE T and MEYER JP; Maximum net power output of the recuperative open and direct solar thermal Brayton cycle, ASME 2011 5th International Conference on Energy Sustainability (ES2011), Washington, 7-10 August, 2011.

4. LE ROUX WG, BELLO-OCHENDE T and MEYER JP; Optimum small-scale open and direct solar thermal Brayton cycle for Pretoria, South Africa. 1st Southern African Solar Energy Conference (SASEC2012), Stellenbosch, 21-23 May, 2012.

5. LE ROUX WG, BELLO-OCHENDE T and MEYER JP, Optimum small-scale open and direct solar thermal Brayton cycle for Pretoria, South Africa. ASME 2012, Paper No. ES2012-91135, pp. 1225-1234. 6th International Conference on Energy Sustainability (ES2012), San Diego, California, 23-26 July, 2012.

6. LE ROUX WG, MWESIGYE A, BELLO-OCHENDE T and MEYER JP; Tracker and collector for an experimental setup of a small-scale solar thermal Brayton cycle. 2nd Southern African Solar Energy Conference (SASEC2014), Port-Elizabeth, South Africa, 27-29 January, 2014.

7. LE ROUX WG, BELLO-OCHENDE T and MEYER JP; Optimisation of an open rectangular cavity receiver and recuperator used in a small-scale solar thermal Brayton cycle with thermal losses, 10th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics (HEFAT2014), Orlando, Florida, 14-16 July, 2014.

8. MWESIGYE A, LE ROUX WG, BELLO-OCHENDE T and MEYER JP; Thermal and thermodynamic analysis of a parabolic trough receiver at different concentration ratios and rim angles, 10th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics (HEFAT2014), Orlando, Florida, 14-16 July, 2014.

9. LE ROUX WG, MEYER JP and BELLO-OCHENDE T; Experimental testing of a tubular cavity receiver for a small-scale solar thermal Brayton cycle, 3rd Southern African Solar Energy Conference (SASEC2015), Kruger National Park, South Africa, 11-13 May, 2015.

10. CRAIG KJ, LE ROUX WG and MEYER JP; Computational fluid dynamics analysis of parabolic dish tubular cavity receiver, 3rd Southern African Solar Energy Conference (SASEC2015), Kruger National Park, South Africa, 11-13 May, 2015.

11. LE ROUX, WG and MEYER JP; Modeling the small-scale dish-mounted solar thermal Brayton cycle, AIP Conference Proceedings 1734, 060002-1–060002-8; doi: 10.1063/1.4949144

(SolarPACES2015), Cape Town, 13-16 October, 2015.

12. LE ROUX, WG; High-temperature testing of an open-cavity tubular solar receiver, 4th Southern African Solar Energy Conference (SASEC2016), Stellenbosch, 31 October - 2 November, 2016.

4.4 Keynote Conference papers

1. MEYER JP, LE ROUX WG and BELLO-OCHENDE T; The micro-turbine: a solar-to-electricity solution, International Conference on Clean Energy for Sustainable Growth in Developing Countries (CESGDC'15), Palapye, Botswana, 16-18 September, 2015.

4.5 Conference papers (non-refereed)

1. LE ROUX WG, BELLO-OCHENDE T and MEYER JP; Minimization and optimum distribution of entropy generation for maximum net power output of the small-scale open and direct solar thermal Brayton cycle, First Postgraduate Renewable Energy Symposium, Lynedoch, Cape Town, 11-12 November, 2010.

2. LE ROUX WG, BELLO-OCHENDE T and MEYER JP; Optimisation of the receiver and recuperator of the small-scale open and direct solar thermal Brayton cycle for Pretoria, Second Postgraduate Renewable Energy Symposium, Lynedoch, Cape Town, 17-18 November, 2011.

3. LE ROUX WG, BELLO-OCHENDE T and MEYER JP; Solar tracking for a parabolic dish used in a solar thermal Brayton cycle, Third Postgraduate Renewable Energy Symposium, Lynedoch, Cape Town, 22-23 November, 2012.

6.6 Technical reports

1. LE ROUX WG, LEXMOND AS; Development of a Stirling engine for liquefaction of natural gas rich in non-condensable gases. Client: EPCM Consultants South Africa, 2017.

2. LE ROUX WG, LEXMOND AS; Feasibility study on a CO_2 extraction process using a Stirling engine. Client: EPCM Consultants South Africa, 2017.

5 OTHER SCHOLARLY RESEARCH-BASED CONTRIBUTIONS

5.1 Participation in conferences, workshops and short courses - specify type of contribution

- Event speaker at DAAD (German Academic Exchange Service) - Engineering Research in the Renewable Energy Field, German South African Research Lecture Series:
  LE ROUX WG, MEYER JP, and BELLO-OCHENDE T; Solar thermal power generation using the Brayton cycle, German South African Research Lecture Series: 'Energy Sciences', German Academic Exchange Service (DAAD), Tshwane University of Technology, Pretoria, 10 April 2013.

- Delegate and University of Pretoria representative at the Annual National Renewable and Sustainable Energy Postgraduate Symposiums (REPS2016-2017) and Solar Thermal Energy Research Group Symposium (STERG Symposium 2017) and STERG Technical Tour of Solar Power Plants in the Northern Cape (2017).

5.2 Teamwork and collaboration with others:

- Communication with local external examiners for final year design and research projects
- Communication with international external examiners for the courses presented
- Lecturing of courses together with colleagues – Prof JP Meyer, Prof J Dirker, Dr M Mehrabi, Dr AS Lexmond, Ms B Huyssen, Dr Moghimi Ardekani.
- Consultation to industry with Dr AS Lexmond

6 MANAGEMENT AND ADMINISTRATIVE DUTIES

- Departmental marketing committee member (2016-2017)
- SAURAN (Southern African Universities Radiometric Network) committee volunteer (2016-2017)
- SAURAN solar measurement station manager for University of Pretoria - Roof of Engineering Building 1 (2013-current)
- Management of solar roof research facility - Roof of Engineering Building 2 (2013-current)
- Module coordinator for MTX311 (2017) and MTV410 (2015-2017).

7 COMMUNITY SERVICE OR PROFESSIONAL SKILLS

7.1 Referee duties

- Designated reviewer for HEFAT conference (International Conference on Heat Transfer, Fluid Flow and Thermodynamics), 2011-2014.
- Designated reviewer for SASEC conference (Southern African Solar Energy Conference), 2015.
- Designated reviewer for Applied Energy Journal 2015.
- Designated reviewer for Renewable Energy Journal 2016-2017.
- Designated reviewer for SolarPACES2015.

- External examiner for Master's Student of University of Cape Town (2017): MATTHEW MEAS: Thermodynamic design optimisation of an open recuperative twin-shaft solar thermal Brayton cycle with combined or exclusive reheating and intercooling

7.2 Workshop and installations

- Construction of solar thermal test facility at the University of Pretoria.
- Volunteer for installation of the SOLYS2 SAURAN measuring station at the University of Pretoria.

7.3 Licenses

- Motor vehicle license
- Motorcycle license

7.4 Software skills

- SolidWorks
- MSOffice
- Matlab
- Flownex
- SolTrace

8 AWARDS AND SCIENTIFIC/SCHOLARLY RECOGNITION

8.1 Evaluation status as scientist/scholar

Rated as Y2-researcher by the South African National Research Foundation, February 2017.

8.2 Research awards and prizes

- Outstanding paper award for the best paper in the session:
  LE ROUX WG, BELLO-OCHENDE T and MEYER JP; Optimum performance of the small-scale open and direct solar thermal Brayton cycle at various environmental conditions and constraints, International Green Energy Conference-VI (IGEC-VI), Eskisehir, Turkey, 5-9 June, 2011.

- Outstanding paper award for the best paper in the session on “Solar Energy 1”:
  LE ROUX WG, BELLO-OCHENDE T and MEYER JP; Optimisation of an open rectangular cavity receiver and recuperator used in a small-scale solar thermal Brayton cycle with thermal losses, 10th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics (HEFAT2014), Orlando, Florida, 14-16 July, 2014.

- Outstanding paper award for the best paper in the session on “Solar Thermal (Heat Transfer and Fluid Mechanics)”:
  LE ROUX WG, MEYER JP and BELLO-OCHENDE T; Experimental testing of a tubular cavity receiver for a small-scale solar thermal Brayton cycle, 3rd Southern African Solar Energy Conference (SASEC2015), Kruger National Park, South Africa, 11-13 May, 2015.

9. PERSONAL INTERESTS AND OTHER

9.1 Music

- Percussionist, Drummer, Backing vocalist, Bass guitarist, Music recording and production
- 2008 – current: Member of cover band (120+ live performances)
- 2009: Artist and producer in cover band album

9.2 Outdoors

Hiking, Mountain biking, Tennis, Traveling

9.3 Languages

- Afrikaans
- English
- Sepedi (limited proficiency)
- Dutch (limited proficiency)