

**UNIVERSITY OF PRETORIA**  
**CURRICULUM VITAE**

**Heinrich Badenhorst**

**EVALUATION DATE:** *(Office use only)*

## 1. BIOGRAPHICAL SKETCH

### 1.1 GENERAL INFORMATION

<b>Surname</b>	Badenhorst									
<b>First names</b>	Heinrich			<b>ID Number</b>	801020 5037 089					
<b>Citizenship</b>	South Africa			<b>Title</b>	Dr	<b>Female</b>	<input type="checkbox"/>	<b>Male</b>	<input checked="" type="checkbox"/>	
<b>Place of birth</b>	South Africa			<b>Date of birth</b>	1980/10/20					
<b>Population group</b>	<b>African</b>	<input type="checkbox"/>	<b>Coloured</b>	<input type="checkbox"/>	<b>Indian</b>	<input type="checkbox"/>	<b>White</b>	<input checked="" type="checkbox"/>	<b>Other (Please specify)</b>	
<b>Department</b>	Chemical Engineering			<b>Position</b>	Senior lecturer					
<b>Direct Telephone</b>	012 420 4989			<b>Direct Telefax</b>						
<b>E-mail</b>	Heinrich.badenhorst@up.ac.za									
<b>Date of appointment</b>	1 June 2012			<b>Permanent full-time</b>	<input type="checkbox"/>	<b>Temporary full-time</b>	<input checked="" type="checkbox"/>			

### 1.2 ACADEMIC QUALIFICATIONS OBTAINED

Degree/ Diploma	Field of study	Higher education institution	Year	Distinctions
B.Eng.	Chemical Engineering	University of Pretoria	2002	Yes
B.Eng. (Hons)	Control Engineering	University of Pretoria	2005	Yes
Ph.D.	Chemical Engineering	University of Pretoria	2012	N.A.

### 1.3 WORK EXPERIENCE TO DATE

Name of employer	Capacity and/or type of work	Period From mm/yy to mm/yy
Sasol	Control and Process Engineer	01/03 to 12/04
Applied Manufacturing Technologies	Control Engineer	01/05 to 12/07
Graftech	Senior Researcher	05/11 to 05/12
University of Pretoria	Senior Research Officer	06/12 to 12/13
University of Pretoria	Senior Lecturer	01/14 to present

## 2. TEACHING ACTIVITIES

2.1 Courses presented		
Course	Level (e.g. second year, Masters)	Self developed (Yes or No)
COP 311 (Transfer Processes)	Third year	Yes
CSC 411 (Research Project)	Fourth year	Yes
CSS 420 (Optimization)	Fourth year	Yes
CMS 732 (Carbon materials and technology)	Honors/Masters	Yes
CIP 732 (Process Integration)	Honors/Masters	Yes
CIR 702 (Literature Research)	Honors/Masters	No

2.2 Other education and pedagogic courses presented		
Course	Year	Institution
Nuclear graphite materials technology	2009	University of Pretoria

### 3 TEACHING OUTPUTS

#### 3.1 Educational publications and products

Provide full details including full titles, names of all the authors, publishers, dates, page numbers etc. Specify your exact contribution to the publications or products. Note that the publications here should be of a didactic nature e.g. articles in educational publications, papers presented at educational conferences, etc. A summary and description of educational products developed can be provided (e.g. study guides, learning materials, multimedia productions (CDs), educational videos, web materials, text books etc.) relevant to university education.

### 4. OTHER TEACHING CONTRIBUTIONS

#### 4.1 Membership of national and international bodies

List all the teaching associations or societies to which you belong. Name your involvement, e.g. honorary member, founder member, full member, chairman, president, secretary

#### 4.2 Visits to local and overseas universities as guest professor or lecturer in regard to teaching

Provide details

#### 4.3 Participation in national and international teaching associations, bodies, committees

List all memberships of associations and bodies, as well as teaching committees (e.g. curriculum and assessment committees, teaching review committees, etc) in which you participate. Name the type and extent of participation.

### 5 RESEARCH ACTIVITIES

#### 5.1 Former supervision or co-supervision (*completed*)

Name of student	Degree/Title of dissertation/ thesis and date	Supervisor	Co-supervisor(s)	Duration of studies (years)
G. Evans	B.Eng. (Hons)	H. Badenhorst	Prof. B. Rand	1
X. Nice	Masters Eng.	H. Badenhorst		2
M. Delport	Masters Eng.	H. Badenhorst		3
A. Roberson	Masters Eng.	H. Badenhorst		3

<b>5.2 Current post-graduate students</b>					
<b>Name of student</b>	<b>Degree enrolled for and date of first registration</b>	<b>Project title</b>	<b>Supervisor</b>	<b>Co-supervisor(s)</b>	<b>Year of registration</b>
W. Mhike	Post Doc 01/2016	Carbon materials for solar energy	H. Badenhorst		2015
X. van Heerden	PhD Eng. 01/2015	Biodegradation of carbon materials	H. Badenhorst		2015
S. Osman	PhD Eng. 01/2015	Carbon materials for heat transfer	M. Sharifpur	J. Meyer / H. Badenhorst	2015
C. Agutu	Masters Eng. 01/2016	Concentrated PV systems	H. Badenhorst		2016
N. Fox	Masters Eng. 01/2016	Solar water evaporator	H. Badenhorst		2016
C. Sechel	Masters Eng. 01/2016	Gasification modelling	H. Badenhorst		2016
A. Afolabi	Masters Eng. 01/2016	Synthetic graphite microstructure	H. Badenhorst		2016
J. Bester	Masters Eng. 01/2015	Concentrated solar power	H. Badenhorst		2015
O. Woodrow	Masters Eng. 01/2014	Low cost parabolic collector	H. Badenhorst		2014
H. Mey	Masters Eng. 01/2014	Carbon based solar energy storage	H. Badenhorst		2014
S. Mlisana	Masters Eng. 01/2013	Solar energy storage	H. Badenhorst		2013

<b>5.3 Obtaining research funds (Optional)</b>			
<b>Origin of research funds (e.g. contract research, THRIP, international funding organisations, other(s))</b>	<b>Title of research project or programme</b>	<b>Duration</b>	<b>Money allocated (R) (Optional - exact amounts not required)</b>
Skye Foundation	Fundamental modelling of graphite oxidation	4 yrs	R 100k
Graftech	Graphite controlled cooling and fluorination	1 yr	R 400k
DST/NRF	SARChI Chair for carbon materials and technology	5 yrs	R 800k/yr
SAWEF	Water-Energy-Food scholarship	1 yr	R 150k
Eskom	THRIP and TESP funding	1 yr	R 100k
University of Pretoria	Seed Funding – Institution Energy research theme	1 yr	R 280k
NWU	Coal combustion research	1 yr	R 100k
NRF	NRF Blue Skies Research Program	1 yr	R 200k
Water Research Commission	Solar distillation	2 yrs	R 500k
Innovation Hub	Gauteng Accelerator Program	1 yr	R 120k
University of Pretoria	Research Development Program	3 yrs	R 150k

## 6 RESEARCH OUTPUTS

### 6.1 Publications in peer-reviewed or refereed journals

Provide full details of each publication, including full titles, names of all the authors, journals, dates, page numbers etc.

H. Badenhorst. "Cheap concentrated solar test platform". Solar Energy (2016). Under review

H. Badenhorst. "A novel heat exchanger concept for latent heat thermal energy storage in solar power towers: modelling and performance comparison". Solar Energy (2015). Under review

M. Delpont, H. Badenhorst. "Production of a self-adhering mesophase powder from anthracene oil for low pressure forming of graphite artefacts". Carbon (2015) Under review

H. Badenhorst, C. Sandrock " Novel method for thermal conductivity measurement through flux signal deconvolution" Journal of Energy Storage (2015) Under review

H. Badenhorst, N. Fox, A. Mutalib. "The use of graphite foams for simultaneous collection and storage of concentrated solar energy". Carbon (2016) 99:17-25. DOI: 10.1016/j.carbon.2015.11.071

H. Badenhorst "Performance comparison of three models for thermal property determination from experimental phase change data" Thermochemica Acta (2015) 616:69-78. DOI: 10.1016/j.tca.2015.08.009.

X. van Heerden, H. Badenhorst "The influence of three different intercalation techniques on the microstructure of exfoliated graphite" Carbon (2015) 88:173-184. DOI: 10.1016/j.carbon.2015.03.006.

W.W. Focke, H. Badenhorst, S. Ramjee, H.J. Kruger, R. van Schalkwyk and B. Rand "Graphite foam from pitch and expandable graphite" Carbon (2014) 73:41-50. DOI: 10.1016/j.carbon.2014.02.035

W.W. Focke, W. Mhike, H.J. Kruger, D. Lombaard and H. Badenhorst "Characterization of commercial expandable graphite fire retardants" Thermochemica Acta (2014) 584:8-16. DOI: 10.1016/j.tca.2014.03.021

H. Badenhorst "Microstructure of natural graphite flakes revealed by oxidation: limitations of XRD and Raman techniques for crystallinity estimates" Carbon (2014) 66:674-690. DOI: 10.1016/j.carbon.2013.09.065

H. Badenhorst "Novel simulation technique for the prediction of complex oxidation behaviour in natural graphite flakes" Chemical Engineering Science (2013) 104:117-124. DOI: 10.1016/j.ces.2013.09.013

H. Badenhorst and W.W. Focke "Comparative analysis of graphite oxidation behaviour based on microstructure" Journal of Nuclear Materials (2013) 442:75-82. DOI: 10.1016/j.jnucmat.2013.08.053

H. Badenhorst, B. Rand and W.W. Focke "A generalized solid state kinetic expression for reaction interface controlled reactivity" Thermochemica Acta (2013) 562:1-10. DOI: 10.1016/j.tca.2013.03.022

H. Badenhorst and W.W. Focke "Geometric Effects Control Isothermal Oxidation of Graphite Flakes" Journal of Thermal Analysis and Calorimetry (2012) 108:1141-1150. DOI: 10.1007/s10973-012-2302-x

H. Badenhorst, B. Rand and W.W. Focke "Modelling of Natural Graphite oxidation using thermal analysis techniques" Journal of Thermal Analysis and Calorimetry (2010) 99:211-228. DOI: 10.1007/s10973-009-0095-3

### 6.2 Books and/or chapters in books

Provide full details, including full titles, names of all the authors, publishers, dates, page numbers etc. Specify your exact contribution to the book e.g. editorial role, co-author

H. Badenhorst, B. Rand and W.W. Focke "Microstructural Factors which Govern the Oxidative Properties of Graphite" in Q.C. Campbell (Ed.), Graphite: Properties, Occurrences and Uses (2013) Nova Science Publishers, New York. ISBN: 978-1-62618-577-7

H. Badenhorst " Structure of Graphitic Carbons: a Comprehensive Review" in A. K. Haghi, E.A. Castro, S. Thomas, P.M. Sivakumar, A.G. Mercader (Ed.), Materials Science of Polymers: Plastics, Rubber, Blends and Composites (2015) Apple Academic Press, New Jersey. ISBN: 9781771880664

H. Badenhorst " Research Methodologies on Physicochemical Properties and Structure of Graphitic Carbons" in Gennady E. Zaikov, A. K. Haghi, E. Klodzinska (Ed.), Materials Science and Engineering, Volume II: Physicochemical Concepts, Properties, and Treatments (2014) Apple Academic Press, New Jersey. ISBN: 9781771880091

H. Badenhorst " Microstructural Complexity of Natural and Synthetic Graphite Particles" in A. Hamrang (Ed.), Materials Science and Engineering. Volume I: Physical Process, Methods, and Models (2014) Apple Academic Press, New Jersey. ISBN: 9781771880008

H. Badenhorst "Microstructures of Natural and Synthetic Graphite Powders (Microstructures of Graphite)" in L. Liu and A. Ballada (Ed.), Engineering of Polymers and Chemical Complexity, Volume I Current State of the Art and Perspectives (2014) Apple Academic Press, New Jersey. ISBN: 9781926895864

### **6.3 Published full-length conference papers/keynote addresses**

Provide full details of each publication, including full titles, names of all the authors, journals, dates, page numbers etc.

Keynote address: International Carbon Conference, July 2013 "Linking graphite particle micro-structure and reactivity" H. Badenhorst, B. Rand and W.W. Focke

Closing address: Young Scientists Conference, Oct 2012 "Summary of young scientists contribution to sustainability" H. Badenhorst

Keynote address: International Carbon Conference, July 2010 "A Comparison of Graphite oxidation kinetics" H. Badenhorst, B. Rand and W.W. Focke

C.S. Melane, L. Holo, H. Badenhorst, B. Rand and W.W. Focke "Oxidative stability of carbon by thermal gravimetric analysis" ASME Pressure Vessel and Piping Conference, 2008, Illinois, USA. DOI: 10.1115/PVP2008-61423

### **6.4 Non-refereed publications or popular articles**

Provide full details of each publication, including full titles, names of all the authors, journals, dates, page numbers etc.

H Badenhorst "Revealing the nano-world to understand an age-old process" Innovate Magazine, Issue 7:2012, University of Pretoria.

H Badenhorst "From scrap tyres to clean renewable energy" Innovate Magazine, Issue 9:2014, University of Pretoria.

## 6.5 Patents

Provide full details of provisional or full patents

## 6.6 Technical reports

Provide full details.

2013 "Findings on controlled cooling research" delivered to Graftech International

# 7 OTHER SCHOLARLY RESEARCH-BASED CONTRIBUTIONS

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

Provide full details of participation in national and international . Conferences etc

### 7.2.1 National

Oral presentations:

J.J.G. Bester, H. Badenhorst. "Carbon materials as solar collectors". Oral presentation, 2015 Fossil Fuel Foundation conference, Potchestroom.

H. Badenhorst "Carbon Materials for solar thermal" SASEC Conference, Skukuza, May 2015

M.R. Delpont and H. Badenhorst. Production of graphitic precursors from anthracene oil. 18th Southern African Coal Science & Technology Indaba; Stonehenge Conference Centre, Vredefort Dome, Parys, South Africa, November 2013

H. Badenhorst, B. Rand and W.W. Focke "SEM study of catalyst and inhibitor effects during graphite oxidation" Microscopy Society of South Africa Conference, Oct 2010

H. Badenhorst, J. Labuschagne "Oxidation of Natural and Synthetic Graphite" SAICChE Student symposium, October 2010

H. Badenhorst, B. Rand and W.W. Focke "Oxidation of Natural and Synthetic Graphite" SACEC Conference, Stellenbosch, March 2009

Organization:

Organisation committee of Research in Coal Science and Technology Conference hosted by Fossil Fuel Foundation. 2015.

Session Chair: South African Solar Energy Conference, Skukuza, May 2015.

Organisation committee of 11th International Conference on Frontiers of Polymers and Advanced Materials (2011) Pretoria, South Africa.

Workshops/Short courses:

<u>Description</u>	<u>Institution</u>	<u>Year</u>
openSim Symposium	CSIR, South Africa	2015
Structured Training for African Researchers	Association of Commonwealth Universities, U.K.	2015
Innovative Energy Workshop	University of Pretoria, South Africa.	2015

PhD Supervision Course	EP-NUFFIC, Netherlands	2014
Hybrid solar and fossil energy Workshop	FFF, South Africa	2014
South African Water Energy Food Forum	SAWEF, South Africa	2013
Symposium on technological innovation for low carbon society	ASSAf and Leopoldina, South Africa	2013
Chemical Engineering simulations with COMSOL	Innovation Hub, South Africa	2013
Coal sampling and quality assessment	WITS University, South Africa	2013
Coal: A sustainable fuel for the future	WITS University, South Africa	2013
4th CSIR Biennial Conference	CSIR, South Africa	2012
X-Ray Tomography workshop	Xradia, South Africa	2012
Electron Microscopy Course	NMMU, South Africa	2010
High Performance Computing Course	Centre for High Performance Computing, South Africa	2009
Pavilion Training Course	Pavilion, Belgium	2006
DMC+ Training Course	AspenTech, South Africa	2004
SASOL Business Development and Implementation Course	Sasol, South Africa	2003
RMPCT Training Course	Honeywell, South Africa	2003
Micheal Brown Control Course	Micheal Brown, South Africa	2003
Inferential Modeling Course	Honeywell, South Africa	2003

Attended STARS (Structured Training for African Researchers) course which aims to introduce some of the wider skills that can help early career academics (ECAs) to embark on and pursue fruitful research careers: run by the Association of Commonwealth Universities, with financial support from the Robert Bosch Foundation.

Online seminars

2012 – Truly 3D Raman Imaging: Confocal Volume Scans & Topography Tracing

2012 – Unleashing the Power of COMPASS (EDX analysis)

2012 – FTIR microscopy and imaging techniques for materials analysis

#### 7.2.2 International

Participated in 63rd Annual Nobel Laureates Meeting, June 2013, Lindau - Germany.

Participated in Falling Walls International Conference on Future Breakthroughs in Science and Society, Nov 2013, Berlin - Germany.

Oral presentations:



H. Badenhorst and W.W. Focke "Carbon foams as solar collectors" International Carbon Conference, July 2015, Germany

H. Badenhorst "Carbon and graphite materials for solar energy storage" International Conference on Applied Energy, July 2013, South Africa

H. Badenhorst, B. Rand and W.W. Focke "Modelling the microstructural development of graphite during oxidation" International Carbon Conference, June 2012

H. Badenhorst, B. Rand and W.W. Focke "Microstructural development in different graphite materials and influence on oxidation kinetics" Workshop on Order/Disorder in Bulk Carbons, Poland, June 2012

H. Badenhorst, B. Rand and W.W. Focke "Modeling the action of channeling catalysts during the oxidation of natural graphite" International Carbon Conference, July 2011

Poster presentations:

H. Badenhorst "Carbon foams and carbon black as solar collectors" International SolarPACES Conference, July 2015, South Africa

H. Badenhorst, B. Rand and W.W. Focke "Understanding graphite oxidation using low voltage, high resolution SEM" International Microscopy Conference, Sept 2010, Rio de Janeiro

H. Badenhorst, B. Rand and W.W. Focke "Oxidation of nuclear graphite" 4<sup>th</sup> International Topical Meeting on High Temperature Reactor Technology, Sept 2008, Washington

## **7.2 Teamwork and collaboration with others:**

Other researchers (national and international)

Participating member of Responsible Research & Innovation (RRI) project, in collaboration with more than 30 researchers from 26 different countries world-wide. The aim of the project is to create a first network of research institutions (research centres, universities and industry research departments) to implement a RRI Plan on thermal energy storage (TES) research. The project is led by Prof. Luisa Cabeza, Spain. It is a European Union funded Horizon 2020 application for R 6 mill in total funding.

Working with Dr Fredrik Wallin and Prof. E. Dahlquist (Mälardalen University, Sweden) on renewable energy research and student exchange under Linnaeus-Palme program. Project is part of a larger collaboration with Prof. F. Waanders (North-West University), Prof. H. Potgieter (WITS) and Mitsubishi-Hitachi Power Systems South Africa based on the implementation of coal gasification combined cycle technology in South Africa.

Collaborating with Dr. M. MacDevette at the University of Cape Town to complete mathematical modeling of phase change processes.

Completed application for Newton Advanced Fellowship with Dr. T O'Donovan, U.K. (Heriot-Watt University). This funding (R2.1m) will enable collaborative research and student exchange between institutions.

Collaborating with Prof. Luisa Cabeza from Universitat de Lleida, to compile a proposal for the EU funded Horizon 2020 call. This is being done in collaboration with several EU partners (Dr T O'Donovan, U.K.

(Heriot-Watt University), Dr C. Zauner, Austria (Austrian Institute of Technology) Dr M. Roeb, Germany (Deutsches Zentrum für Luft- und Raumfahrt, DLR)).

Collaborating with Dr.-Ing. H. Drück at the University of Stuttgart, Germany for the development of Zeolite based low temperature thermal energy storage applications.

Collaborating with Prof. A.O. de Toledo Patrocínio at the Universidade Federal de Uberlândia, Brazil on the production of carbon functionalized counter electrodes for dye sensitized solar cells.

Joint application with Prof. D. Hotza from Brazil and Prof. L.M. Manocha from India on the IBSA call for trilateral proposals to undertake development work on dye sensitized solar cells.

Collaborating with Prof. K. de Lancastre Jedenov at the Universidade Lusíada de Lisboa, Portugal on using carbon and graphite structures as basis for architectural designs.

Collaborated with Oak Ridge National Laboratory in U.S.A. including 3 month visit and use of facilities for research in the kinetics of graphite oxidation during Aug-Oct 2008. Working closely with Dr T. Burchell and Dr C. Contescu.

Other research institutions (national and international)

Collaborating with Prof. Iakovos Sigalas at the University of the Witwatersrand on developing high temperature carbon ceramic composites, co-supervising Masters student Phylis Makurunje.

Working together with Prof. Hein Neomagus from the North West University on the thermal analysis of coal samples with varying heat treatments for property improvement.

Worked with Prof. Nana Agyei from the University of Limpopo on the thermal activation of maize tuft for use as heavy metal adsorbent.

Collaborating with Prof. Ken Craig from University of Pretoria, Mechanical Engineering Dept, to develop multidisciplinary solar engineering group.

Industry

Currently collaborating with Dr Kobus Wagener and Mr Benni Vilakazi from NECSA on a project to selectively fluorinate natural and synthetic graphite.

Research work underway with Prof. Jannie van Deventer from Zeobond Group, Australia on the development of a novel graphite electrode for recovery of trace precious metals.

Extensive graphite characterization and analysis work done for Dr Flip Hayes from HMC corp. on graphite by-product upgrading for value addition.

Advanced Process Control Project work:

Successfully planned and executed numerous APC Projects on refinery unit operations, chemical plants and gas loops, with exceptional financial returns. With world leading team in APC. Including:

- Lyondell Botlek POSM Plant, Netherlands
- Total Feyzin Refinery, France
- OMV Burghausen Refinery, Germany
- Fina Antwerp Olefins, Belgium

- Inneos Lavera Refinery, France
- SK Corporation Refinery, South Korea
- Total Antwerp Refinery, Belgium
- Lyondell Maasvlakte POSM Plant, Netherlands
- Innovene Lavera EO/EG Plant, France
- Total Vlissingen Refinery, Netherlands
- Chevron Texaco, UK
- Scanraff FCC, Sweden

Modeling and Development work:

Designed, coded and implemented various monitoring and support applications, ensuring optimal plant performance and easy maintenance. Platforms: Matlab, Visual Basic and OPC for plant interfacing. With Zak Friedman of Petrocontrol. Applications included:

- Fundamental model for cut-point determination during crude oil fractionation to infer product specifications of naphtha, kerosene and gas oil streams.
- Detailed modeling of multi-component distillation to determine separation efficiency.
- Development of multiple inferential models on reactors to predict a variety of product quality controls, ranging from viscosity to diesel nitrogen content.
- APC health monitors, including performance analysis of auto-correlation attenuation and problem identification for multi-input, multi-output systems.
- Plant optimization tools, utilizing detailed plant models and key economic drivers to assess day to day plant performance and identify opportunities.

### **7.3 Membership in national and international bodies**

List all the scientific associations or societies to which you belong. Name your involvement, e.g. honorary member, founder member, full member, chairman, president, secretary

Inaugural fellow of TUKS Young Leadership Program  
 International Institute of Chemical Engineers – Chartered member  
 ECSA, MSSA, SAChE, ICTAC – Full member  
 ThermSA – Committee member (International collaboration)

### **7.4 Visits to local and overseas universities or research institutes as guest professor or researcher**

Details are required

2015 – Visited Mälardalen University in Sweden together with Head of Department to build on relationship between two Universities and find areas for mutual collaboration.

2014 – Visited University of Lleida in Spain to develop relationship with several international university partners and work on research proposals for Horizon 2020 program.

## 8 ARTISTIC OUTPUTS (if applicable)

8.1 Provide full details of artistic outputs, including public reviews of work, coordinating reports by experts in the field, publisher, production company etc

Participated in documentary film by *Nature* journal, based on 2013 Lindau Nobel laureates meeting: Science in the developing world with Dan Schechtman and José Ramos-Horta.

<http://www.nature.com/lindau/2013/index.html>

## 9 MANAGEMENT AND ADMINISTRATIVE DUTIES

9.1 List your involvement in departmental activities (e.g. administrative functions), faculty (e.g. faculty committees) or other university activities.

Head of departmental marketing committee: responsible for organization of university open day and EBIT faculty engineering week.

Volunteer: Grade 11 Top achievers function

## 10 COMMUNITY SERVICE OR PROFESSIONAL SKILLS

### 10.1 Outreach projects

(e.g. project titles, institutions and communities involved, etc.)

### 10.2 Professional service performed

(e.g. courses presented, lectures at professional associations/clubs, radio or TV appearances, outside expert or appointment committee, etc.)

### 10.3 Clinical service

(e.g full detail of rank/level of joint appointment, level of clinical service rendering responsibilities, university administration and academic responsibilities, CPD involvement, clinical trials involvement, etc.)

### 10.4 Involvement with other universities/scientific institutions

(e.g. external examiner, editor of journal, advisory council, CSIR, SA Council for Scientific Professions)

Academy of Science of South Africa: participated in signing of Memorandum of understanding between German National Academy of Sciences Leopoldina and ASSAf

### 10.5 Referee duties

(e.g. journals, dissertations/theses)

External examiner PhD Thesis : Odeh A

External examiner Masters Thesis : Rambuda M, Kuhn MJ

Internal examiner PhD Thesis : Reshid E, Ramjee S, Beangstrom SG, Price T

Internal examiner Masters Thesis : Möller V, Skolo KP, Transell M

Regular reviewer for several journals including Renewable Energy, IF 3.8, Thermochemica Acta, Energy & Fuels, Carbon IF 5.8.

Yearly external examiner for courses at WITS (CHMT3000) and North-West (CEMI479) Universities since 2013.

## 11 AWARDS AND SCIENTIFIC/SCHOLARLY RECOGNITION

### 11.1 Evaluation status as scientist/scholar

(e.g. NRF; first evaluation and date, subsequent evaluations and dates)

### 11.2 Research awards and prizes

Full details are required

Nominated for TW Kambule-NSTF Awards in partnership with South32 in the category: Emerging Researcher of 2015/2016.

Inaugural fellow of Tuks Young Research Leader Programme 2015. The programme aims to grow early career academics at UP in the areas of thought leadership, team development, engagement and collaboration, with the intention of enabling them to solve the complex issues that face society.

Third place winner in 2015 GAP Green innovation competition hosted by The Innovation Hub Management Company. The competition aims to support innovations that more effectively manage the use of water and energy by citizens and enterprises in Gauteng.

Presented with "Renewable Energy Best Reviewer Award 2014" for exceptional contribution to the peer review of papers in the journal (IF 3.8) with special recognition for the number of reviews undertaken.

Winner for best paper in Solar Thermal at 2015 South African Solar Energy Conference.

Winner 2013 International Green Talents Competition. The award entailed a two week tour of German institutions involved in sustainability and renewable energy research. This includes a three month stay at a German institution during 2014 to complete a joint research project. <http://www.greentalents.de/>

Received Fossil Fuel Foundation of South Africa Award for completion of postgraduate degree studies with outstanding contributions to carbon science and technology, Nov 2013.

Winner of the first German-South African Science Slam held at the Sci-Bono Discovery Centre, Johannesburg, Oct 2013:

[http://www.southafrica.diplo.de/Vertretung/suedafrika/en/\\_\\_\\_pr/2\\_\\_Embassy/2013/4thQ/10-Science-Slam-wrap.html](http://www.southafrica.diplo.de/Vertretung/suedafrika/en/___pr/2__Embassy/2013/4thQ/10-Science-Slam-wrap.html)

Winner Nedbank SAWEF Scholarship 2013 for Food-Water-Energy Nexus research - R 150 000

National Research Foundation Science Lens Competition 2011

Winner International Year of Chemistry category, SEM Image "The cave of wonders"

Winner Nanotechnology category, SEM Image "Tiny fjords"

Runner-up Science Close-ups category, SEM Image "The spaceship has landed"

Winner SEM category, Nano-image competition 2010 Carl Zeiss, Inc

Best student presentation, MSSA Conference 2010 Microscopy Society of South Africa

Second best student presentation, SAChE Student Symposium 2010 South African Institute of Chemical Engineering

### **11.3 Teaching awards and prizes**

Full details are required

### **11.4 Artistic awards and prizes**

Full details required

Prototype developed: Transient thermal conductivity measurement using heat flux