

UNIVERSITY OF PRETORIA
CURRICULUM VITAE - FULL
Dr Bradley D. Bock

1. BIOGRAPHICAL SKETCH

1.1 GENERAL INFORMATION

Surname	Bock	First names	Bradley Denis				
Citizenship	South African	Title	Dr	Female		Male	X
Place of birth	East London, South Africa						
Position	Lecturer	Department	Mechanical Engineering				
Direct Telephone	012 420 2195	E-mail	bradley.bock@up.ac.za				
Date of appointment	1 July 2014	Permanent full-time	X	Temporary full-time			

1.1 ACADEMIC QUALIFICATIONS OBTAINED

Degree/ Diploma	Field of study	Higher education institution	Year	Distinctions
Matric	English 1 st Lang, Afrikaans 1 st Lang, Mathematics, Physical Science, Biology, Accounting	Fairbairn College	2004	14 th in Western Cape 2004 Matric Exams
B.Sc.(Eng)	Mechanical Engineering	University of Cape Town	2009	First Class Honours
M.Sc.(Eng)	Mechanical Engineering	University of Cape Town	2013	Not applicable
Ph.D.	Mechanical Engineering	University of Pretoria	2020	Not applicable

1.2 WORK EXPERIENCE TO DATE		
Name of employer	Capacity and/or type of work	Period
Spur Steak Ranches	Full-time Waiter	01/2005 to 12/2005
Sasol Synfuels	Candidate Engineer	01/2012 – 04/2013
Sasol Synfuels	Mechanical Engineer, Power Station Plant Support	05/2013 – 06/2014
University of Pretoria	Lecturer	07/2014 – 12/2021
University of Pretoria	Senior Lecturer	01/2022 - Current
1.3 PROFESSIONAL REGISTRATION		
Candidate Engineer	ECSA (Engineering Council of South Africa)	2013 - Current

2. TEACHING ACTIVITIES

2.1 Courses presented			
Course	Level (e.g. second year, Masters)	Self developed (Yes or No)	Class Size
MJJ 210 – Professional and Technical Communication	2 nd Year (2015 to Present)	Yes (Course coordinator)	~350
MTX 221 – Thermodynamics	2 nd Year (2020 to Present)	No	~550
MOX 410 – Design Project	4 th Year (2014 to Present)	No	~15
MRN 412/422 – Research Project	4 th Year (2014 to Present)	No	~15
MIA 320 – Engineering Impact and Groupwork	3 rd Year (2016 to 2019)	Yes (Course coordinator)	850-750
MPY 315 and 415 – Practical Training	2 nd year (2015)	No	360
MGC 110 – Graphical Communication	1 st Year (2016)	No	1400
MUU 781 – Fossil Fuel Power Stations	4 th Year/PostGrad (2016)	No	8

3. TEACHING OUTPUTS

3.1 Educational publications and products

MJJ 210 – Professional and Technical Communication – Course Notes

MIA 320 – Impact of Engineering and Groupwork – Course Notes

4 RESEARCH ACTIVITIES

4.1 Co-supervision of Interns			
Name of student	Duration of studies	Topic	Position
Mahlatshe Mothoa	12 months; 2015 - 2016	Calibration of transducers; Design of Heat Exchanger Equipment using enhanced tubes	NRF Intern
Jan Segmuller	3 Months; 2019	Contact Angle of water droplets on various modified tube surfaces	Exchange student, Eastern Switzerland University of Applied Sciences, Switzerland

4.2 Current post-graduate students					
Name of student	Degree enrolled for and date of first registration	Project title	Supervisor	Co-supervisor(s)	Year of registration
Martin Rencken	M.Eng, 2020	Investigation of Online Hydroblasting Cleaning of Sugar Evaporators	WJ le Roux	BD Bock	3rd
Dian Dickson	M.Eng, 2022	Falling film boiling and pool boiling of refrigerants on nanocoated enhanced tubes	BD Bock	JP Meyer	1st

4.3 Obtaining research funds			
Origin of research funds (e.g. contract research, THRIP, international funding organizations, other(s))	Title of research project or program	Duration	Money allocated (R) (Optional - exact amounts not required)
University of Pretoria	UCDP – University Capacity Development Program: Awarded for a period of 1 year to fund replacement lecturers while PhD research was completed.	2019-2020	~R250 000
University of Pretoria	VP Congress funding : Funding to attend ICBCHT conference in Nagasaki, Japan	2018	~R40 000

5 RESEARCH OUTPUTS

5.1 Publications in peer-reviewed or refereed journals

(Pending) **B. D. Bock**, M. Bucci, C. N. Markides, J. R. Thome, and J. P. Meyer, "**Modelling of surface influences on falling film boiling**," TBC, ~2021

B. D. Bock, M. Bucci, C. N. Markides, J. R. Thome, and J. P. Meyer, "**Falling film boiling of refrigerants over nanostructured and roughened tubes: Heat transfer, dryout and critical heat flux**," International Journal of Heat and Mass Transfer, vol. 163, 120452, 2020.

B. D. Bock, M. Bucci, C. N. Markides, J. R. Thome, and J. P. Meyer, "**Pool boiling of refrigerants over nanostructured and roughened tubes**," International Journal of Heat and Mass Transfer, vol. 162, 120387, 2020.

B. D. Bock, J. P. Meyer, and J. R. Thome, "**Falling film boiling and pool boiling on plain circular tubes: Influence of surface roughness, surface material and saturation temperature on heat transfer and dryout**," Experimental Thermal and Fluid Science, vol. 109, 109870, 2019.

B.D. Bock, A. Bell, G. Floweday, "**Investigation into the influence of charge cooling and autoignition chemistry on the greater knock resistance of ethanol over iso-octane**," SAE Technical Paper 2013-01-2615, 2013

5.2 Published conference papers

B. D. Bock, C. N. Markides, M. Bucci, J. R. Thome, and J. P. Meyer, "**Surface influences on falling film boiling**," Proceedings of the 15th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics (HEFAT), p 2085-2090, Online, 26 – 28 July 2021.

B.D. Bock, J.P. Meyer, and J.R. Thome. "**Surface roughness effect of plain tubes during falling film boiling**", Proceedings of the 10th International Conference of Boiling and Condensation Heat Transfer (ICBCHT), Nagasaki Japan, 12 – 15 Mar 2018.

5.3 Popular articles

B. D. Bock, "**Reducing global warming impact of refrigeration systems through nanostructures**," Innovate Magazine, University of Pretoria, June 2021

B. D. Bock, "**UP using nanostructures to reduce the global warming impact of refrigeration equipment**," Mechanical and Aeronautical Engineering Website, University of

Pretoria, Available at https://www.up.ac.za/mechanical-and-aeronautical-engineering/news/post_2969129-up-using-nanostructures-to-reduce-the-global-warming-impact-of-refrigeration-equipment, 30 April 2021

5.4 Technical reports

Sasol:

Numerous technical reports delivered, focused on maintenance of boilers and project renewals, 2012 - 2014

University of Pretoria:

1. PhD thesis, Surface Influences on Falling Film Boiling and Pool Boiling of Saturated Refrigerants, 2020
2. (Pending) Design of falling film convective heat transfer rig, ~2021

6 OTHER SCHOLARLY RESEARCH-BASED CONTRIBUTIONS

6.1 Participation in conferences, workshops and short course

6.1.1 National

B. D. Bock, "Nanostructures for heat transfer enhancement in refrigerant evaporators", SAIMechE Central Branch Student Conference, 11th November 2021

6.1.2 International

- 15th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics (HEFAT) from 26 – 28 Jul 2021, Online
 - Presentation
- 10th International Conference on Boiling and Condensation Heat Transfer (ICBCHT) from 12 – 15 Mar 2018 in Nagasaki, Japan
 - Poster

6.2 Teamwork and collaboration with others

- MIT (USA) and Imperial College London (UK) on "Augmented Boiling with nano-Engineered surfaces and eco-friendly Refrigerant" project funded by "MIT international science and technology initiative" (MISTI) to nanocoat tubes and test under pool boiling and falling film boiling conditions (~1 year)
- Oxford nanoSystems (Oxford, UK) to nanocoat tubes with the propriety nanoFLUX© coating to test under pool boiling and falling film boiling conditions (~1 year).
- Imperial College London (UK), University of Mauritius and University of Lagos (Nigeria) as part of 'Royal Society-DFID Africa Capacity Building Initiative' to investigate the potential of harnessing unsteady phase change in concentrating solar power applications (Ongoing, ~5 years).
- Wielend-Werke AG (Ulm, Germany) provide commercially produced 3D enhanced tubes for testing in our facilities under falling film and pool boiling conditions (Ongoing, ~3 years).

6.3 Membership in national and international bodies

- Engineering Council of South Africa (ECSA), Candidate Engineer
- South Africa Institute of Mechanical Engineers (SAIMechE), Member
- South African Institute of Refrigeration and Air-Conditioning (SAIRAC), Member

6.4 Visits to local and overseas universities or research institutes as guest professor or researcher

- MIT
 - June – July 2019 (4 weeks)
 - Investigation into nanocoating of tubes and influence on falling film boiling heat transfer
- Oxford nanoSystems
 - July 2019 (1 week)
 - Nanocoating of plain tubes with Oxford nanocoatings's proprietary commercial coating, nanoFLUX©.
- Imperial College
 - July 2017, July 2018, July 2019 (1 week each)
 - Royal Society research collaboration on harnessing unsteady phase change for concentrating solar power
- University of Mauritius,
 - November 2017, January 2019 (1 week each)
 - Royal Society research collaboration on harnessing unsteady phase change for concentrating solar power

7 MANAGEMENT AND ADMINISTRATIVE DUTIES

7.1 Website –

- Management and Updating of up.ac.za/mechanical-and-aeronautical-engineering Website

7.2 Falling Film Rig – Management of Falling Film Rig in the Heat Transfer laboratories

- Installation and commissioning of falling film rig and related equipment
- Calibration of falling film rig and related equipment

7.3 Project Coordinator: Harnessing unsteady phase-change heat exchange in high-performance concentrated solar power systems

- Project sponsored by Royal Society-DFID
- Coordinate between universities involved in the project, namely University of Lagos, Imperial College in London and University of Mauritius.
- Project budget of ~R20 million.

8 COMMUNITY SERVICE OR PROFESSIONAL SKILLS

8.1 Involvement with other universities/scientific institutions

Acting as external examiner for UCT course “MEC2045S – Applied Engineering Mechanics”

8.2 Referee duties

Reviewer for following journals

- Applied Thermal Engineering
- Chemical Engineering Research and Design
- Physics of Fluids