Curriculum Vitae- Michael Owen

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Citizenship: dual South African / British

Personal profile

I am a *senior lecturer* and *NRF Y1 rated researcher* in mechanical engineering, specializing in heat transfer and fluid dynamics. I have been involved in research relating to the performance and operation of large scale mechanical draft air-cooled steam condensers (ACCs) for power plant applications since 2007.

After completing my studies in 2013 I spent time travelling abroad and am now working in academia at Stellenbosch University's Department of Mechanical and Mechatronic Engineering where I teach at undergraduate and postgraduate level and conduct research in power plant cooling systems (wet, dry and hybrid), solar thermal energy, fundamental heat transfer and fluid dynamics.

Education

PhD (engineering), December 2013
Stellenbosch University
Dissertation: Air-cooled condenser steam flow distribution and related design considerations

MScEng (mechanical engineering) cum laude, March 2010
Stellenbosch University
Dissertation: A numerical investigation of air-cooled steam condenser performance under windy conditions

BEng (mechanical engineering) cum laude, December 2007
Stellenbosch University

International journal publications

i. Marincowitz, F., Owen, M., Muiyser, J., Experimental investigation of the effect of perimeter windscreens on air-cooled condenser fan performance, Applied Thermal Engineering, 163, 2019.
ii. Du Plessis, J., Owen, M., An experimental investigation of the air-side pressure drop through a bare tube bundle, Journal of Thermal Science and Engineering Applications 12, 2020.
iii. Reuter, H., Owen, M., Goodenough, J., The Antifouling Effects of Copper-Oxide Filler Incorporated Into Paint-Based Protective Films Applied to Steam Surface Condenser Tubes, Journal of Thermal Science and Engineering Applications, 10(4), 2018.
iv. Owen, M., Kröger, D.G., A numerical investigation of vapor flow in large air-cooled condensers, Applied Thermal Engineering, 127, pp. 157-164, 2017.
v. Reuter, H., Owen, M., Goodenough, J., Experimental evaluation of the temporal effects of paint-based protective films on composite fouling inside admiralty brass and titanium steam surface condenser tubes, Applied Thermal Engineering, 126, pp. 848-857, 2017.
vi. Owen, M., Kröger, D.G., Reuter, H.C.R., Enhancing dry-cooled power plants using a hybrid (dry/wet) dephlegmator, Heat Transfer Engineering, 38, pp. 1089-1100, 2017.
vii. Owen, M., Kröger, D.G., Contributors to increased fan inlet temperature at an air-cooled steam condenser, Applied Thermal Engineering, 50, 2013.
viii. Owen, M., Kröger, D.G., An investigation of air-cooled steam condenser performance under windy conditions using computational fluid dynamics, Journal of Engineering for Gas Turbines and Power, 133 (6), 2011.

ix. Owen, M., Kröger, D.G., The effect of screens on air-cooled condenser performance under windy conditions, Applied Thermal Engineering, 30 (16), pp. 2610-2615, 2010.

International conference papers

i. Marincowitz, F., Owen, M., Muiyser, J., Development of a test facility to investigate the effect of wind on air-cooled condenser fans, 19th IAHR International Conference on Cooling Towers and Heat Exchangers, Washington, DC, October 2019.
ii. Venter, A., Owen, M., Muiyser, J., Validation of a numerical air-cooled condenser windscreen effect model, 19th IAHR International Conference on Cooling Towers and Heat Exchangers, Washington, DC, October 2019.
iii. Du Plessis, J., Owen, M., An experimental investigation of steam pressure drop in a partial condenser for the design of practical condensers, 14th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics, Wicklow, Ireland, 2019.
iv. Owen, M., Kröger, D.G., A numerical investigation of vapor flow in large air-cooled condensers, IAHR Industrial Cooling Towers Conference, Lyon, 2017.
v. Reuter, H., Owen, M., Goodenough, J., Experimental evaluation of the temporal effects of paint-based protective films on composite fouling inside admiralty brass and titanium steam surface condenser tubes, IAHR Industrial Cooling Towers Conference, Lyon, 2017.
vi. Graaf, A.H., Owen, M., Reuter, H.C.R., Experimental investigation of critical air flow and bundle wetting in a delugable plain tube bundle, IAHR Industrial Cooling Towers Conference, Lyon, 2017.
vii. Graaf, A.H., Owen, M., Reuter, H.C.R., A hybrid (dry/wet) cooling system for the HVAC industry: concept description and performance evaluation, IAHR Industrial Cooling Towers Conference, Lyon, 2017.
viii. Owen, M., Kröger, D.G., Reuter, H.C.R., Enhancing dry-cooled power plants using a hybrid (dry/wet) dephlegmator, Proceedings of the 17TH IAHR Cooling Tower and Heat Exchanger Conference, Queensland, Australia, 2015.
ix. Owen, M., Kröger, D.G., A hybrid dephlegmator for incorporation into an air-cooled steam condenser, Proceedings of the International Conference on Applied Energy, Pretoria, 2013.
x. Maulbetsch, J.S., Di Fillipo, M.N., Owen, M., Kröger, D.G., Wind effects on air-cooled condensers for power plant cooling, 14th International Conference on Heat Transfer, pp. 809-816, Washington DC, USA, 2010.
xi. Owen, M., Kröger, D.G., A Numerical Investigation Of Air-Cooled Steam Condenser Performance Under Windy Conditions, Proceedings of the 14TH IAHR Cooling Tower and Heat Exchanger Conference, Paper OPO2, University of Stellenbosch, Stellenbosch, South Africa, 2009.

National conference papers

i. Raphael, D., Owen, M., The Influence of Mounting Structure Configurations on Rooftop Solar Module Cell Temperature, 65th South African Solar Energy Conference, East London, 2019.
ii. Piessou, C., Lubkoll, M., Owen, M., Pre-feasibility analysis of incorporating non-concentrating solar thermal energy systems in the Kenyan tea industry, 5th South African Solar Energy Conference, Durban, 2018.
iii. Owen, M., Kröger, D.G., Fan inlet temperature considerations at an ACC, 1st South African Solar Energy Conference, Stellenbosch, 2012.

Post-graduate supervision record

PhD graduates

2016 J. Goodenough (co-supervisor with H Reuter in final year only)

The effects of paint-based protective films on the actual temporal water-side performance characteristics of steam surface condenser tubes

MEng (Research) graduates

2019 F. Marincowitz (co-supervisor with J. Muiyser)

An experimental investigation on the effect of wind screens on air-cooled condenser fan performance and dynamic blade loading

2017 A. Graaf (co-supervisor with H. Reuter in final year only)

Performance evaluation of a hybrid (dry/wet) cooling system

2017 M. Budler (co-supervisor with H. Reuter in final year only)

Theoretical modelling, design, and testing of a novel low pressure spray sprinkler for travelling agricultural irrigation systems

MEng (Structured) graduates

2019 C. Piessou (co-supervisor with M. Lubkoll)

A prefeasibility analysis of incorporating non-concentrating solar technologies in the Kenyan tea industry

PhD ongoing supervision

2019 – present F. Marincowitz (co-supervisor with J. Muiyser)

Optimal configuration of wind mitigation mechanisms for a robust air-cooled steam condenser

2018 – present J. du Plessis

An experimental and modelling approach for the design considerations of a hybrid dephlegmator

MEng (Research) ongoing supervision

2018 – present A. Venter (co-supervisor with J. Muiyser)

A numerical investigation on the effect of wind screens on air-cooled condenser fan performance

2018 – present Alex Ham (co-supervisor with M. Venter)

A shape morphing foil for hydrodynamic applications

2018 – present C. Kohrs

An investigation of cooling tower fill performance for Eskom's tower fill refurbishment program

MEng (Structured) ongoing supervision

2019 – present M. Dundas-Starr

Integrating CSP with thermal storage into coal-fired power plant feedwater heating

2018 – present D. Raphael

The influence of sheeting profile and mounting clearance on the thermal behavior and electrical performance of roof mounted solar panels

2018 – present S. Sullivan

Evaluation of passive measures for improving thermal comfort in South African low-cost housing

Employment history and experience

Department of Mechanical and Mechatronic Engineering, Stellenbosch University – Thermofluids division

SENIOR LECTURER, January 2018 – present

LECTURER, January 2017 – December 2017

JUNIOR LECTURER, January 2016 – December 2016

PART-TIME LECTURER, July 2015 – December 2015

Lecturing post-graduate heat transfer (Advanced Heat Transfer 813) in 2019, under-graduate engineering heat transfer (Heat Transfer A414) and Strength of Materials W244 (2016 and 2018). Presented the Materials Science section of Strength of Materials 143 in 2016.

Supervision of post-graduate students (PhD and MEng) and Mechanical Project 478 (under-graduate 'thesis'). Researcher: industrial cooling systems (wet, dry and hybrid), solar thermal energy, fluid dynamics and heat transfer.

After obtaining my PhD in December 2013 I took some time off to travel in Asia, northern Africa and Europe. During that time I worked for short periods in a variety of positions.

ASSISTANT CHALET HOST, December 2014 – April 2015 (Peak Pursuits, St Martin de Belleville, France)

GENERAL CONSTRUCTION, September 2014 – November 2014 (Chalet 3 Valleys, St Laurent de le Cote, France)

CARETAKER, July 2015 – August 2015 (Animales des Orientes, Ceceda, Spain)

FREELANCE WRITER, December 2013 – March 2014, Demand Media Studios

Author of several articles relating to renewable energy and sustainability published on websites such as ehow.com and opposingviewsscience.com.

CONSULTANT, December 2013 – March 2014, Self-employed, Cape Town, South Africa

Design report review and advice for *Nuclear Structural Engineering*.

Leadership, community involvement and awards

- National Research Foundation Y1 Researcher Rating, 2019.
- Technical committee, 11th South African conference on Computational and Applied Mechanics, 2018.
- Member, South African Society for Engineering Education, 2016 – 2019.
- Reviewer, 2015 – present
    - Applied Energy
    - Applied Thermal Engineering
    - International Journal for Heat and Mass Transfer
    - International Journal of Thermal Sciences
    - Journal of Mechanical Engineering Research
    - Journal of Thermal Engineering
    - R&D Journal of the South African Institute of Mechanical Engineering
    - 16th International Heat Transfer Conference, Beijing, 2018.
- Chairman, Stellenbosch River Festival organizing committee, 2011/2012.
- Vice-Chair, Maties Canoe Club, 2011.
- Development and racing officer, Maties Canoe Club, 2011.
- Element Six and DST/NRF Medal for Academic Excellence, 2007.
- Sasol Prize for best fourth year mechanical engineering student, 2007.
- Kröger Book Prize for best final year project in thermodynamics, 2007.
- SAIMechE Prize for best final year project presentation, 2007
- Student representative, South African Institute of Mechanical Engineers, 2006.
- Head student leader, St Patrick's College Kimberley, 2003.

Interests

RESEARCH

My research to date has focused on the performance of large air-cooled condensers for thermal power plants. These dry cooling systems result in significant reductions in energy related water consumption and are therefore a key component in the drive for more sustainable energy production. I have investigated both the air-side and steam-side performance of these systems using computational fluid dynamics (CFD) and therefore have expertise in the fields of fluid dynamics, CFD, heat transfer and thermodynamics.

I am currently also pursuing research in the fields of wet and hybrid cooling and solar thermal energy, as well as fluid dynamics relating to high performance racing yachts and paragliders. In addition, I am extremely interested in the fields of renewable energy, innovative energy systems and energy efficiency.

TEACHING

I have a passion for teaching and love the challenge of bringing a group of students to a higher level of understanding. I have come to value the teaching aspect of my current job more than the research element which has come as a surprise to me.

I have been involved in teaching undergraduate Heat Transfer (4th year ~ 180 students) for 3 years and Strength of Materials (1st and 2nd year ~ 600 and 250 students respectively) for 2 years. I have been the module coordinator for Heat Transfer A414 since 2016 and am responsible for all aspects of presenting the module: lectures, formative and summative assessments, incorporation of blended learning tools and administration.

I have a firm belief in the necessity for undergraduate lecturers to inspire creative and critical problem solving skills as well as create opportunities for students to gain the confidence necessary to apply those skills to any problem.

I enjoy and value traditional methods of teaching (lectures, tutorials, practicals) but would also like to explore different methods and tools (in a formal, scholarly manner) in an attempt to improve the learning experience of students in the present age. The use of technology and greater student-to-student learning are topics of particular interest to me.

PERSONAL

I am a keen and active outdoor enthusiast and enjoy climbing / mountaineering, mountain running, skiing, cycling, surfing, and adventure racing. Since returning to South Africa and a full time job in mid-2015 I have managed to cycle across Bolivia (December 2015); compete in Adventure Racing World Series races (2017 in China and 2018 in South Africa); climb in the French Alps (2017 and 2018) Italian Dolomites (2017), Mt Kenya (2018) and Yosemite, USA (2019); amongst several adventures closer to home.

References

Prof. Thomas Harms – Mechanical and Mechatronic Engineering, Stellenbosch University
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Line manager

Prof. Kristiaan Schreve – Mechanical and Mechatronic Engineering, Stellenbosch University
kschreve@sun.ac.za
Head of department

Ass. Prof. Thorsten Becker– Mechanical and Mechatronic Engineering, Stellenbosch University
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Colleague

Dr Francois Louw - Owner: Therm Development
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Dr Johan Kotze – Engineer: TF Design
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