

Albert Zapke

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Research and Development / Technical Project Management

Research and Development / Engineering / Software Design / Product Management

Innovative leader adept at driving project business and personnel development toward organizational goals. Serve as a contributing member of senior management teams, leveraging comprehensive expertise in the energy market, problem solving, and research and development to create strategic, practical, and innovative solutions. Collaborative professional skilled at using excellent communication and moderation skills, gaining buy-in from internal and external stakeholders.

- Full-Cycle Technical Project Management
 - Research & Development Projects
 - Energy Industry Clients
 - Complex Problem Solving
 - Team Leadership/Guidance
 - Thermal Process Design and Heat Transfer
 - Software Development Initiatives
 - Thermal Performance Digital Twins
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Education and Credentials

Post Graduate Program in Artificial Intelligence and Machine Learning: Business Applications

The University of Texas at Austin

PhD, Mechanical Engineering

Master of Engineering, Mechanical Engineering, Cum Laude

Bachelor of Engineering, Mechanical Engineering, Cum Laude

Stellenbosch University – South Africa

Master of Business Administration

University of Witwatersrand, South Africa – South Africa

Native speaker: German and English

Professional Experience

THERM Development GmbH, Essen, Germany

Founding Member and Managing Director, 10/2021 - present

Lead a team of professionals developing thermal performance digital twins for large-scale and industrial heat exchangers and cooling towers. Provide cooling system related thermo-flow consulting services to industry. Execute related R&D projects at academic institutions.

ENEXIO Management GmbH/ENEXIO Germany GmbH (Part of the Kelvion Group of Companies), Herne, Germany

Global Head of Research and Development, 9/2016 – 9/2020

Defined large-scale cooling system product market needs in collaboration with Sales and Marketing for the power industry. Conducted in-depth analyses of competitor technologies and product offerings on the market. Defined the scope, timeline, and budget for R&D projects; executed R&D projects and implemented outcomes while managing the R&D department and a team of 10 professionals. Attended conferences and trade fairs to stay abreast of new technologies and research. Oversaw operation of wind tunnel and laboratory test equipment as well as field testing.

- Teamed with internal and external developers to develop in-house thermal sizing and rating software tools; created CFD tools to optimize power plant cooling system product development and efficiency improvement.
- Cooperated with institutions like RWTH Aachen, TU Berlin, and Stellenbosch University as well as suppliers in product and know-how development projects.

- **Project Lead – Development of Advanced Thermal Performance Simulation Software:**
 - Defined project scope to replace existing cooling system thermal rating legacy software programs with a new fully integrated thermal rating platform for indirect and direct dry-cooling, as well as wet-cooling and combined dry/wet cooling systems.
 - Established and managed a new Thermal Performance Rating Software Development team.
 - Defined projects related to wind effects and other adverse airflow conditions; evaluated 3D flow phenomena via CFD.
 - Drove the implementation of new matrix based thermos-flow solver for cooling systems.
- **Technical Coordinator – European Commission H2020 Funded Project, MinWaterCSP:**
 - Drove project conception, consortium building, proposal writing, and funding agreement conclusion with EU.
 - Defined ENEXIO technical scope and objectives including the development of a combined dry-wet direct condensing system for the condensation of turbine exhaust stem, using deluge cooling to reduce water consumption of a CSP plant.
 - Inventor and applied for the patent of the Deluge ACC (deluge air-cooled condenser) concept developed within the project.

GEA Aircooled Systems (Pty) Ltd (Currently Kelvion Thermal Solutions (Pty) Ltd), Johannesburg, South Africa

Director, Contracts and Engineering, 10/2011 – 8/2016

Served as a contributing member of the Management team while concurrently guiding a 30-member team of direct and indirect reports. Led the team through engineering processes and project execution pertaining to heat exchangers and large-scale cooling systems for power industries.

- **Lead Engineer for the Medupi Power Station air-cooled condenser manufacturing, supply, installation, commissioning and performance testing (one of the largest power stations worldwide):**
 - Managed project engineering scope of the Medupi air-cooled condenser main cooling system.
 - Interfaced between internal engineering team based in Germany, turbine supplier based in France, and project location and end user based in South Africa.
 - Executed technical contract negotiations and contract management with suppliers and client.
 - Delivered high-level support to the site team during construction and commissioning project phases.
 - Provided technical support to the project director for claims management and arbitration processes.

General Manager, Contracts and Engineering, 7/2000 – 9/2011

Delivered senior-level leadership and management within the Contracts, Engineering, and Drawing Office Departments, while serving on the Management Team. Provided oversight of construction and equipment supply projects. Served as a contributing member of the Management team.

Senior Thermal Design Engineer, 1/1998 – 6/2000

Executed the thermal design of heat transfer equipment, including air-cooled condensers for power and petrochemical industries. Designed air-cooled process coolers, shell and tube heat exchangers, and plate heat exchangers.

Awards / Academic and Industrial Involvement

- Proposal reviewer for US Electric Power Research Institute (EPRI) and National Research Foundation's (NSF) joint research program on Advanced Dry-cooling for Power Plants, 2013.
- Consultant for US Electric Power Research Institute (EPRI) on large-scale cooling systems used in the power industry, 2014 – 2017.
- ASME International Gas Turbine Institute, Fans & Blowers 2015 Best Paper Award, Jacques Muiyser, Daniel N.J. Els, Sybrand J. Van der Spuy & Albert Zapke, 'The Determination of Fan Blade Aerodynamic Loading from a Measured Response', ASME Paper GT2015-43010.
- Appointment as Associate Professor Extraordinary in the Department of Mechanical and Mechatronic Engineering at Stellenbosch University, January 2015 to December 2017.
- Appointment as Professor Extraordinary in the Department of Mechanical and Mechatronic Engineering at Stellenbosch University, January 2018 to December 2020.
- Appointment as Professor Extraordinary in the Department of Mechanical and Mechatronic Engineering at Stellenbosch University, January 2021 to December 2023.

Technical Appendix to CV

Authored and Co-authored Technical Publications

- S.J. van der Spuy, D.N.J. Els, L. Tieghi, G. Delibra, A. Corsini, F.G. Louw, A. Zapke and C.J. Meyer, Preliminary evaluation of the 24 ft. diameter fan performance in the MinWaterCSP large cooling systems test facility, Proceedings of ASME Turbo Expo 2021, Turbomachinery Technical Conference and Exposition GT2021, June 7-11, 2021.
- Daniel Els, Jacques Muiyser, Johan van der Spuy, Chris Meyer, Francois Louw and Albert Zapke, Performance testing of a retrofitted ACC fan, Fan 2018 International Conference, Darmstadt (Germany), 18 – 20 April 2018.
- Ruan A. Engelbrecht, Johan van der Spuy, Chris J. Meyer, Albert Zapke, Numerical investigation of the performance of a forced draft air-cooled heat exchanger, Proceedings of ASME Turbo Expo 2017: Turbomachinery Technical Conference and Exposition GT2017 June 26-30, 2017, Charlotte, NC, USA.
- Charles H. O. Lombard, Daniel N. J. Els, Jacques Muiyser and Albert Zapke, Analysis of a Large-Scale Cooling System Fan Gearbox Loads, ASME Turbo Expo 2017: Turbomachinery Technical Conference and Exposition, June 2016.
- Wilhelm Beyers, Albert Zapke and Gerhard Venter, Modelling the structural behaviour of a round nozzle to flat plate interface in pressure vessels, 10th South African Conference on Computational and Applied Mechanics at Potchefstroom South Africa, October 2016.
- Jacques Muiyser, Danie N. J. Els, Sybrand J. van der Spuy and Albert Zapke, The determination of fan blade aerodynamic loading from a measured response, Proceedings of the ASME 2015 Turbine Technical Conference and Exposition, TE2015, June 15-29, Montreal, Canada.
- Wilhelm Beyers, Albert Zapke and Gerhard Venter, Improved Cover Type Header Box Design Procedure, R & D Journal of the South African Institution of Mechanical Engineering 2015, 31, 76-85.
- Chris Meyer, Albert Zapke, A modeling strategy for large-scale mechanical draught air-cooled systems, 10th International Conference on CFD in Oil & Gas, Metallurgical and Process Industries, SINTEF, Trondheim, Norway, 17-19th June 2014.
- Jacques Muiyser, Danie N. J. Els, Sybrand J. van der Spuy, Albert Zapke, Investigation of large-scale cooling system fan blade vibration, Proceedings of the ASME 2014 Turbine Technical Conference and Exposition, TE2014, June 16-20, 2014, Düsseldorf, Germany.
- Jacques Muiyser, Danie N. J. Els, Sybrand J. van der Spuy, Albert Zapke, Measurement of air flow and blade loading conditions at a large-scale cooling system fan, R & D Journal of the South African Institution of Mechanical Engineering 2014, 30, 30-38.
- Zapke, A., Goldschagg, H. and Kröger, D. G., Flow limitations in a dephlegmator and modifications for the performance improvement of the Matimba Power Station air-cooled steam condensing system, Presented at the 13th IAHR Cooling Tower Conference in Poitiers, France, June 2005.
- Zapke, A. and Kröger, D. G., Countercurrent gas-liquid flow in inclined and vertical ducts – I: Flow patterns, pressure drop characteristics and flooding, International Journal of Multiphase Flow, Vol. 26, pp. 1429 - 1455, 2000.
- Zapke, A. and Kröger, D. G., Countercurrent gas-liquid flow in inclined and vertical ducts – II: The validity of the Froude-Ohnesorge number correlation for flooding, International Journal of Multiphase Flow, Vol. 26, pp. 1457 - 1468, 2000.
- Zapke, A. and Kröger, D. G., Vapor-condensate interactions during counterflow in inclined reflux condensers, ASME National Heat Transfer Conference, HTD-Vol. 342, Vol. 4, pp. 157-162, Baltimore, August 1997.
- Zapke, A. and Kröger, D. G., The influence of fluid properties and inlet geometry on flooding in vertical and inclined tubes, International Journal of Multiphase Flow, Vol. 22, No. 3, pp. 461-472, 1996.

Zapke, A. and Kröger, D. G., The effect of fluid properties on flooding in vertical and inclined rectangular duct and tubes, ASME Fluids Engineering Division Conference, FED-Vol. 239, Vol. 4, pp. 527-532, 1996.

Zapke, A. and Kröger, D. G., Pressure drop during gas-liquid countercurrent flow in inclined rectangular ducts, 5th International Heat Pipe Symposium, Melbourne, 1996.

Selected research and development projects initiated by me or with my involvement

TOPIC	STUDY LEADERS / SUPERVISORS	DATE
Master Thesis (Mechanical Engineering): Pressure gradient and flooding during two-phase countercurrent flow in inclined tubes.	Prof. D. G. Kröger, Stellenbosch University	1993 - 1994
Ph. D Thesis (Mechanical Engineering): Characteristics of gas-liquid counterflow in inclined ducts with reference to reflux condensers.	Prof. D. G. Kröger, Stellenbosch University	1995 - 1997
Large air-cooled condenser CFD, carried out by PhD student Francois Louw.	Prof. D. G. Kröger, Stellenbosch University	2011
Performance and thermo-mechanical cost evaluation of API 661 air-cooled heat exchanger, S. Ackers.	Prof. H. C. R. Reuter, Stellenbosch University	2012
Large scale air-cooled condenser mechanical equipment loading, M. Sc. Thesis Jacques Muiyser.	Dr. Danie Els and Dr. Johan van der Spuy, Stellenbosch University	2009 - 2011
Large scale air-cooled condenser mechanical equipment loading, PhD Thesis Jacques Muiyser.	Dr. Danie Els and Dr. Johan van der Spuy, Stellenbosch	2012 - 2015
Bridge effect on fan performance and blade vibration in air-cooled heat exchangers, N. R. Basson.	Dr. Danie Els and Dr. Johan van der Spuy, Stellenbosch University	2013 - 2015
OpenFoam CFD modelling of large-scale air-cooled condensers.	Prof. C. Meyer, Stellenbosch University	2012 - 2016
API air-cooled heat exchanger cover-type header FEA and design methodology project, M. Sc. Thesis W. Beyers.	Prof. G. Venter, Stellenbosch University	2013 - 2014
API air-cooled heat exchanger plug-type header FEA and design methodology project at PhD level, W. Beyers.	Prof. G. Venter, Stellenbosch University	2015 - 2017
Gearbox loading project with reference to air-cooled condenser applications at M.Sc. level, Osche Lombard.	Dr. Danie Els and Jacques Muiyser, Stellenbosch University	2015 - 2016
Reduction of water consumption in large-scale cooling systems. A 3-year research and development project called MinWaterCSP, funded by the European Union under its H2020 programme.	Technical coordination by A. Zapke, participating organisations from South Africa, Morocco, Germany, Spain, Italy and Belgium.	2016 - 2018
Cooling system related noise calculation methodology development.	Prof. Dr.-Ing. E. Sarradj, Technical University Berlin	2018 - 2019
Axial flow fan scale model performance testing.	Prof. Johan van der Spuy, Stellenbosch University	2019 - 2020

TOPIC	STUDY LEADERS / SUPERVISORS	DATE
Large-scale air-cooled condenser CFD study to quantify the effect of wind on turbine output and concept design for wind mitigation.	Dr. Ruan Engelbrecht, Therm Development (Pty) Ltd.	2019 - 2020
Air-cooled condenser air-side resistance calculation methodology development.	Prof. Johan van der Spuy, Stellenbosch University	2019 - 2020
Plenum loss coefficients and heat exchanger air outlet kinetic energy distribution for forced-draft air-cooled condensers.	Prof. Johan van der Spuy, Stellenbosch University	2021