

Dr. Jaap Hoffmann



Dr. Jaap Hoffmann is currently senior lecturer in the Thermofluids Division. He did his Ph. D. on performance prediction on natural draft cooling towers under influence of atmospheric temperature inversions. During the 90's his attention turned to numerical simulation of dispersed two-phase flows. Recently his research focus shifted to solar-thermal energy. He was registered as Professional Engineer with ECSA (reg. no. 990334) in 1998.

Academic Qualifications

B. Eng. (Mechanical), Stellenbosch, 1985
M. Eng. (Mechanical), Stellenbosch, 1987
Ph. D. (Mech. Eng.), Stellenbosch, 1997

Professional Experience

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| 2012 - Present | Stellenbosch University Senior Lecturer |
| 2002 - 2010 | PBMR Chief Engineering Specialist: CFD (validation & verification) |
| 2000 - 2002 | Thermophysics Owner/Consultant (power plant simulation) |
| 2000 - 2010 | Pretoria University Part-time Lecturer |
| 1996 - 1999 | TSI Senior Engineer (Dispersed two-phase flow modelling) |
| 1993 - 1996 | ESKOM Engineer (Boiler engineering) |

Professional societies

Executive committee member of South African Association of Applied Mechanics
Chair: Local organizing committee, SACAM 2014

Fields of research

Solar thermal energy
Dispersed two-phase flow
Natural draft cooling towers

Fields of interest

Thermodynamics, Heat Transfer & Fluid Mechanics, Stochastic Optimization

Journal Papers

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| 1 | J.E. Hoffmann, <u>Particle Laden Flow through an Open Bifurcation in a Vertical Duct with Rectangular Cross-section</u> , R&D Journal, Vol. 17, pp. 62 - 68, November 2001. |
| 2 | J.E. Hoffmann and K. Madaly, <u>On Thermal Energy Storage Capacity for CSP Plant in South Africa</u> , R & D Journal of the South African Institution of Mechanical Engineering, Vol. 31, pp. 46 – 51, 2015. |
| 3 | J.E. Hoffmann and P.C. van der Merwe, <u>Testing and analysis of low pressure, transparent tube solar receiver for the SUNSPOT cycle</u> , Journal of Thermal Engineering, Vol. 3, No. 3, pp. 1294 – 1307, 2017. |
| 4 | L. Heller, K. Allen, M. Lubkoll, J. Pitot de la Beaujardiere, P. Gauché and J. Hoffmann, <u>The SUNDISC cycle: A direct storage-charging dual-pressure air receiver cycle</u> , Solar energy, Vol. 153, pp. 435 – 444, 2017. |
| 5 | J.E. Hoffmann and E.P. Dall, <u>Integrating desalination with concentrating solar thermal power: A Namibian case study</u> , Renewable Energy, Vol. 115, pp. 423 – 432, 2018. |
| 6 | R. Laubscher and J.E. Hoffmann, <u>Utilization of basic multi-layer perceptron artificial neural networks to resolve turbulent fine structure chemical kinetics applied to a CFD model of a methane/air piloted jet flame</u> , Journal of Thermal Engineering, Vol. 4, No. 2, pp. 1828 – 1846 , 2018. |

Conference Proceedings

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| 1 | J.E. Hoffmann and D.G. Kröger, <u>Heat, Mass and Momentum Transfer in the Rain Zone of a Large Natural Draft Cooling Tower</u> , Proceedings of the 9 th International Heat Transfer Conference, Jerusalem, 1990. |
| 2 | J.E. Hoffmann, J.P.S. du Preez and F.P. Farrell, <u>Managing Excessive Wear Rates on Economiser Tubes in a Pulverised Coal Fired Boiler</u> , Proceedings of Tribology '94, Pretoria, 1994. |
| 3 | G.W. Hasse and J.E. Hoffmann, <u>Investigation into the Mechanism Causing Cracking of the Reheater Attenuator Sleeves at Matimba Power Station</u> , Proceedings of the 1 st South African Conference on Applied Mechanics, Midrand, 1996. |
| 4 | J.E. Hoffmann and D.G. Kröger, <u>The Response of a Large Natural Draft Dry-Cooling Tower to Ambient Temperature Stratification</u> , Proceedings of the EPRI Conference, St. Petersburg, USA, 1997. |
| 5 | J.E. Hoffmann and G.W. Hasse, <u>Review: Particle/Wall Collision Models and Particle/Fluid Turbulence Interaction for Two-phase Flow Modelling</u> , SACAM 1998, Cape Town, 1998. |
| 6 | W. Schmitz, D. Gibson, J. Hoffmann, M. van Staden and C. van Rensburg, <u>Application of CFD in the Power Industry</u> , Vorträge zum Kongress Kraftwerke 1999, Essen, 1999. |
| 7 | J.E. Hoffmann and K.J. Craig, <u>Particle Laden Flow through a Mini-Classifer</u> , SACAM 2000, Durban, January 2000. |
| 8 | J.E. Hoffmann, <u>Porosity Model for Oblique Flow through In-Line Tube Banks</u> , Submitted for publication in R&D Journal, February 2002. |
| 9 | J.E. Hoffmann, <u>Validation and Verification of CFD Simulations at PBMR</u> , SACAM 2004, Muldersdrift, January 2004. |
| 10 | J.E. Hoffmann, <u>Oblique Flow Through Expanded Metal Screens</u> , SACAM 2004, Muldersdrift, January 2004. |
| 11 | J. Janse van Rensburg, J. E Hoffmann and M.P. van Staden, <u>CFD Modeling of the PBMR Reactor Unit</u> , HTR-2006, Johannesburg, October 2006. |
| 12 | J.E. Hoffmann, <u>Thermal Radiation in a Packed Bed with Internal Heat Generation</u> , ASME Summer Heat Transfer Conference, Jacksonville, August 2008. |
| 13 | J.E. Hoffmann, <u>Dual Mesh Approach for Transient Modeling of Plate Heat Exchangers</u> , ICONE 17, Brussels, July 2009. (Paper was accepted but had to be withdrawn). |

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| 14 | K.J. Craig, A.W. Harkness, H.P. Kritzinger and J.E. Hoffmann, <u>Analysis of AP1000 Reactor Vessel Cavity and Support Cooling</u> , European Nuclear Conference, Barcelona, June 2010. |
| 15 | Van der Westhuizen, J. and Hoffmann, J.E., <u>Liquid Extraction on Air Cooled Condenser Steam Ducts</u> , SACAM 2014, Somerset West, January 2014. |
| 16 | Hoffman, J.E. <u>Optimization of Internally Finned Tubes for Solar Receivers</u> , SASEC 2014, Port Elizabeth, January 2014. |
| 17 | Madaly, K. and Hoffmann, J.E., <u>Identifying the Optimum Storage Capacity for a 100 MW CSP Plant in South Africa</u> , SASEC 2014, Port Elizabeth, January 2014. |
| 18 | Heller, L. and Hoffmann, J.E., <u>Comparison of Different Layouts for a Combined Cycle CSP Plant</u> , SASEC 2014, Port Elizabeth, January 2014. |
| 19 | Van der Merwe, P.C. and Hoffmann, J.E., <u>Annular Solar Receiver Tube</u> , SASEC 2014, Port Elizabeth, January 2014. |
| 20 | Heller L., Mesnil B. and Hoffmann J. (2015). <u>“Initial Investigation of Liquid Glass as a Thermal Medium in CSP Plants”</u> . SASEC2015, Skukuza, May 2015. |
| 21 | Heller, L., Hoffmann, J. and Gauché, P. (2016). <u>The Hybrid Pressurized Air Receiver (HPAR) in the SUNDISC Cycle</u> , SolarPACES 2015, Cape Town, October 2015. |
| 22 | Pidaparathi, A.S., Dall, E.P., Hoffmann, J.E. and Dinter, F. (2016). <u>CSP Parabolic Trough and Power Tower Performance Analysis through the Southern African Universities Radiometric Network (SAURAN) Data</u> , SolarPACES 2015, Cape Town. |
| 23 | Heller, L.J. and Hoffmann, J.E., <u>Enhancements to the Hybrid Pressurized Air Receiver (HPAR) Concept in the SUNDISC Cycle</u> , SolarPaces 2016, Abu Dabi. |
| 24 | Pidaparathi, A.S. and Hoffmann, J.E., (2016), <u>Effect of Heliostat Size on the Levelized Cost of Electricity for Power Towers</u> , SolarPACES 2016, Abu Dabi. |
| 25 | Dall, E.P. and Hoffmann, J.E., <u>The Techno-economic Optimization of a 100 MW_e CSP-desalination Plant in Arandis, Namibia</u> , SolarPACES 2016, Abu Dabi. |
| 26 | Hoffmann, J.E., (2016), <u>Lumped Method for Calculating the Optical Efficiency of Radially Staggered Heliostat Fields</u> , SASEC 2016, Stellenbosch. |
| 27 | Hoffmann, J.E., <u>On the Optimization of a Central Receiver System</u> , SASEC 2016, Stellenbosch. |
| 28 | Pidaparathi, A.S., Duvenhage, A.F. and Hoffmann, J.E., <u>A Parametric Study of Heliostat Size for Reductions in Levelized Cost of Electricity</u> , SASEC 2016, Stellenbosch. |
| 29 | Dall, E.P. and J.E. Hoffmann, <u>Integrating Desalination with CSP: Large Scale Cogeneration of Water and Electricity</u> , SASEC 2016, Stellenbosch. |
| 30 | W. Krog, S. Hess, J.E. Hoffmann and F. Dinter, <u>Solar live steam generation and solar bagasse drying for South African Sugar Mills</u> , SASTA Congress 2017, Durban. |
| 31 | W. Krog, S. Hess, J.E. Hoffmann, and F. Dinter, <u>Solar Live Steam Generation for South African Sugar Mills</u> , SolarPACES 2017, Santiago. |
| 32 | L.J. Heller and J.E. Hoffmann, <u>Performance of a SUNDISC Cycle CSP Plant for Off-Grid Baseload Applications in Chile</u> , SolarPACES 2017, Santiago. |
| 33 | J.J. Swart and J.E. Hoffmann, <u>One-dimensional transient filling simulation of a molten salt receiver panel</u> , ISES Solar World Congress, Abu Dhabi, 2017. |

Post Graduate Supervision:

PhD students:

Lukas Heller, Investigation of a Hybrid-Pressure Air Receiver for the SUNDISC cycle, March 2017.

Ryno Laubscher, Utilization of Artificial Neural Networks to Resolve Chemical Kinetics in Turbulent Fine Structures of an Advanced CFD Combustion Model, March 2017.

Masters students:

Kam Madaly, (M. Eng. Research), Identifying the Optimum Storage Capacity for a 100-MW_e Concentrating Solar Power Plant in South Africa, March 2014.

Japie van der Westhuizen, (M. Eng. Research), Liquid Extraction from Air-cooled Condenser Steam Ducts, March 2015.

Carel van der Merwe, (M. Eng. Structured), Solar Air Receiver using a Non-uniform Porous Medium, December 2015.

Arvind Pidaparathi, (M. Eng. Research), Heliostat Cost Reduction for Power Tower Plants, March 2017.

Ernest Dall, (M. Eng. Research), Integrating Desalination with CSP: Large Scale Cogeneration of Water and Electricity, March 2017.

Jean Swart, (M. Eng. Research), One-Dimensional Cold Filling Simulation of a Molten Salt Central Receiver Pipe, December 2017.

Willem Krog, (M.Eng. Research), Solar Live Steam Generation and Solar Bagasse Drying for South African Sugar Mills, March 2018.