UNIVERSITY OF PRETORIA
FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY
1 April 2022

1. BIOGRAPHICAL SKETCH

1.1 GENERAL INFORMATION													
Surname	Kok												
First names	Schalk												
Citizenship	South Africa					Title	Prof.	Female		Male	X		
Place of birth	Johannesburg					Date of birth		5 June 1973					
Population group	African		Coloured		Indian		White	X	Other				
Department	Mechanical and Aeronautical Engineering					Position		Professor					
Direct Telephone	+27 12 420-5809					Direct Telefax		+27 12 362-5124					
E-mail	schalk.kok@up.ac.za												
Date of appointment	1 March 2013					Permanent full-time		X	Temporary full-time				

1.2 ACADEMIC QUALIFICATIONS OBTAINED				
Degree	Field of study	Higher education institution	Year	Distinctions
B. Eng.	Mech. Eng.	University of Pretoria	1991-1994	All
M. Eng.	Mech. Eng.	University of Pretoria	1995-1996	8 of 8
Ph. D.	Mech. Eng.	University of Illinois at Urbana-Champaign	1997-2002	10 of 10 GPA 4.0/4.0

1.3 WORK EXPERIENCE TO DATE		
Name of employer	Capacity and/or type of work	Period
Sasol Technology	Engineer	3/2002 – 2/2003
University of Pretoria	Senior lecturer	3/2003 – 12/2006
	Associate Professor	1/2007 – 5/2009
CSIR	Principal Researcher	6/2009 – 2/2013
University of Pretoria	Associate Professor	3/2013 – 12/2019
	Professor	1/2020 – present

2. TEACHING ACTIVITIES

2.1 COURSES PRESENTED		
Course	Level	Self developed
Introductory mechanics (MEG123)	First year (2003-2005)	No
Programming (MPR210)	Second Year (2003)	No
Programming (MPR211)	Second year (2004-2009)	Yes
Computer aided structural mechanics (MSY410)	Fourth year (2003)	No
Computer aided structural mechanics (MSY411)	Fourth year (2004-2009)	Yes
Finite element methods (MEE732)	Postgraduate (2003-2010)	Yes
Structural Design (MOW227)	Second year (2015)	No
Solid Mechanics (MKM321)	Third year (2016)	Yes
Design (MOX410)	Fourth year (2003-2009, 2013-2021)	No
Structural Design (MOW227)	Second year (2017-present)	Yes
Research Project (MRN412, MRN422)	Fourth year (2003-2009, 2013-present)	N/A
Advanced finite element methods (MEE781)	Postgraduate (2011-present)	Yes
Numerical Methods (MWN780)	Postgraduate (2013-present)	Yes

2.2 OTHER EDUCATION AND PEDAGOGIC COURSES PRESENTED		
Course	Year	Institution
Introduction to material behaviour and modelling short course	2004, 2008	Continuing Education, University of Pretoria

3. TEACHING OUTPUTS

3.1 Educational publications and products

1. MPR211 Course notes. Detailed course notes (134 pages) for a first programming course in Matlab. The notes cover the complete curriculum. The majority of students find these notes sufficient to master the course material, 2005.

2. MSY411 Course notes. Two sets of notes are provided. The first set provides the neces-

sary continuum mechanics background required for studying the finite element method. The second set of notes provided an introduction to formal optimization techniques, necessary to perform structural optimization using the finite element method, 2006.

3. MEE732 Course notes. A complete set of notes was developed to teach the non-linear effects section of this course. One set of notes covers geometric non-linearities, while the second covers small strain plasticity (material non-linearity), 2006.

4. Conference presentation: S. Kok, Photoelasticity as a teaching aid for the finite element method, XXII International Congress of Theoretical and Applied Mechanics (ICTAM 2008), Adelaide, Australia, August 25-29, 2008.

5. Conference presentation: S. Kok, D.N. Wilke, Challenges to present a postgraduate finite element course in structural mechanics at the University of Pretoria, 23rd International Congress of Theoretical and Applied Mechanics (ICTAM 2012), Beijing, China, 19–24 August, 2012.

6. Conference paper: S. Kok, Tutorial on geometrically non-linear finite element analysis including an assumed stress formulation, Proceedings of the Eighth South African Conference on Computational and Applied Mechanics (SACAM 2012), 3–5 September, Johannesburg, 2012. ISBN: 978-086970-728-9.

7. Conference paper: G.J. Jansen van Rensburg, S. Kok, Tutorial on state variable based plasticity: An Abaqus UHARD subroutine, Proceedings of the Eighth South African Conference on Computational and Applied Mechanics (SACAM 2012), 3–5 September, Johannesburg, 2012. ISBN: 978-086970-728-9.

8. Conference paper: S. Kok, D.N. Wilke, Understanding linear and non-linear multi-point constraints in finite element analysis, Ninth South African Conference on Computational and Applied Mechanics (SACAM 2014), 14–16 January, Somerset West, 2014. ISBN: 978-0-620-58994-9.

4. OTHER TEACHING CONTRIBUTIONS

4.1 Participation in national and international teaching associations, bodies, committees

1. Completed the Orientation for International Teaching Assistants at the University of Illinois at Urbana-Champaign, August 21–22, 1997.

2. Attended the Education Induction Programme, 7–11 July, 2003, University of Pretoria.

3. Attended CDIO workshop, 14–15 February 2005, University of Pretoria.

5. RESEARCH OUTPUTS

5.1 Publications in peer-reviewed or refereed journals

A total of 65 journal papers have been published. To date, these papers have attracted numerous citations (Google Scholar: 1762 citations, h-index 20; Scopus: 1171 citations, h-index 18; Web of Science: 939 citations, h-index 17). The average impact factor of the journals that these papers are published in, is 2.86. The most recent Journal Impact Factor (JIF) is listed in parentheses for each entry in the list that follows, as well as the number of Google Scholar citations.

1. S. Kok, N. Stander, W.J. Roux, Thermal optimization in transient thermoelasticity using response surface approximations, International journal for numerical methods in engineering, Vol. 43, pp. 1-21, 1998. (JIF 2.59, cited 15 times)

2. S. Kok, N. Stander, Optimization of a sheet metal forming process using successive multipoint approximations, Structural optimization, Vol. 18, No. 4, pp. 277-295, 1999. (JIF 2.88, cited 56 times)

3. S. Kok, A.J. Beaudoin, D.A. Tortorelli, Numerical Integration of Lattice Rotation in Polycrystal Plasticity, International Journal for Numerical Methods in Engineering, Vol. 52, 1487-1500, 2001. (JIF 2.59, cited 8 times)

4. S. Kok, A.J. Beaudoin, D.A. Tortorelli, A Polycrystal Plasticity Model based on the Mechanical Threshold, International Journal of Plasticity, Vol. 18, No. 5-6, pp. 715-741, 2002. (JIF 5.50, cited 159 times)

5. S. Kok, A.J. Beaudoin, D.A. Tortorelli, The Development of Stage IV hardening based on the Mechanical Threshold, Acta Materialia, Vol. 50, No. 7, pp. 1653-1667, 2002. (JIF 6.04, cited 76 times)

6. S. Kok, A.J. Beaudoin, D.A. Tortorelli, M. Lebyodkin, Simulation of the Portevin-Le Chatelier Effect using Polycrystal Plasticity, Modelling and Simulation in Materials Science and Engineering, Vol. 10, pp. 745-763, 2002. (JIF 1.79, cited 56 times)

7. S. Kok, M.S. Bharathi, A.J. Beaudoin, G. Ananthakrishna, C. Fressengeas, L.P. Kubin, M. Lebyodkin, Spatial Coupling in Jerky Flow using Polycrystal Plasticity, Acta Materialia, Vol. 51, No. 13, pp. 3651-3662, 2003. (JIF 6.04, cited 139 times)

8. S. Kok, A.J. Beaudoin, D.A. Tortorelli, M. Lebyodkin, L. Kubin, C. Fressengeas, Simulation of the Portevin-Le Chatelier effect using polycrystal plasticity, Journal de Physique IV, Vol. 105, pp. 191-197, 2003. Cited 6 times.

9. D.N. Wilke, S. Kok, A.A. Groenwold, A quadratically convergent unstructured remeshing strategy for shape optimisation, International Journal for Numerical Methods in Engineering, Vol. 65, No. 1, pp. 1-17, 2006. (JIF 2.59, cited 27 times)

10. S. Kok, D.W. Wood, A.A. Groenwold, A particle swarm minimization algorithm with enhanced hill climbing capability, South African Journal of Science, Vol. 102, pp. 543-547, 2006. (JIF 1.19, cited 3 times)

11. D.N. Wilke, S. Kok, A.A. Groenwold, Comparison of linear and classical velocity update rules in particle swarm optimization: notes on diversity, International Journal for Numerical Methods in Engineering, Vol. 70, pp. 962-984, 2007. (JIF 2.59, cited 92 times)

12. D.N. Wilke, S. Kok, A.A. Groenwold, Comparison of linear and classical velocity update rules in particle swarm optimization: notes on scale and frame invariance, International Journal for Numerical Methods in Engineering, Vol. 70, pp. 985–1008, 2007. (JIF 2.59, cited 56 times)

13. D.W. Wood, Z.C. Lai, C.S. Long, S. Kok, A.A. Groenwold, Semi-analytical elements for radially symmetric problems, Computers and Structures, Vol. 85, pp. 1445-1452, 2007. (JIF 2.89, cited 0 times)

14. W.W. Focke, C. Sandrock, S. Kok, Weighted-Power-Mean Mixture Model: Application to Multicomponent Liquid Viscosity, Industrial & Engineering Chemistry Research, Vol. 46, pp. 4660–4666, 2007. (JIF 3.14, cited 10 times)

15. S. Kok, J.A. Snyman, A Strongly Interacting Dynamic Particle Swarm Optimization Method, Journal of Artificial Evolution and Applications, Vol. 2008, Article ID 126970, 9 pages, 2008. DOI 10.1155/2008/126970. Cited 8 times.

16. J.A. Snyman, S. Kok, A reassessment of the Snyman-Fatti dynamic search trajectory method for unconstrained global optimization, Journal of Global Optimization, Vol. 43, pp. 67–82, 2009. (JIF 1.41, cited 11 times)

17. A.A. Groenwold, L.F.P. Etman, S. Kok, D.W. Wood, S. Tosserams, An augmented Lagrangian approach to non-convex SAO using diagonal quadratic approximations, Structural and Multidisciplinary Optimization, Vol. 38, Number 4, pp. 415–421, 2009. (JIF 2.88, cited 11 times)

18. S. Kok, C. Sandrock, Locating and Characterizing the Stationary Points of the Extended Rosenbrock Function, Evolutionary Computation, Vol. 17, No. 3, pp. 437–453, 2009. (JIF 3.83, cited 45 times)

19. J. Grobler, A.P. Engelbrecht, S. Kok, S. Yadavalli, Metaheuristics for the multi-objective FJSP with sequence-dependent set-up times, auxiliary resources and machine down time, Annals of Operations Research, DOI 10.1007/s10479-008-0501-4, Vol. 180, pp. 165–196, 2010. (JIF 1.86, cited 37 times)

20. D.N. Wilke, S. Kok, A.A. Groenwold, The application of gradient-only optimization methods for problems discretized using non-constant methods, Structural and Multidisciplinary Optimization, DOI 10.1007/s00158-009-0389-x, Vol. 40, No. 1–6, pp. 433-451, 2010. (JIF 2.88, cited 20 times)

21. A. van Houwelingen, S. Kok, W. Nicol, Effectiveness factors for partially wetted catalysts, Industrial & Engineering Chemistry Research, DOI 10.1021/ie9017176, Vol. 49, pp. 8114–8124, 2010. (JIF 3.14, cited 10 times)

22. A.E.J. Bogaers, S. Kok, A.G. Malan, Highly Efficient Optimization Mesh Movement Method Based on Proper Orthogonal Decomposition, International Journal for Numerical Methods in Engineering, DOI: 10.1002/nme.3080, Vol. 86, Issue 8, pp. 935-952, 2011. (JIF 2.59, cited 10 times)

23. G.J. Jansen van Rensburg, D.N. Wilke, S. Kok, Human skull shape and masticatory induced stress: Objective comparison through the use of non-rigid registration, International Journal for Numerical Methods in Biomedical Engineering, DOI: 10.1002/cnm.1493, Vol. 28, Issue 1, pp. 170–185, 2012. (JIF 2.34, cited 9 times)

24. L. J. Haarhoff, S. Kok, D.N. Wilke, Numerical Strategies to Reduce the Effect of Ill-Conditioned Correlation Matrices and Underflow Errors in Kriging, Journal of Mechanical Design, DOI: 10.1115/1.4023631, 135, 044502, 2013. (JIF 2.78, cited 6 times)

25. D.N. Wilke, S. Kok, A.A. Groenwold, Relaxed error control in shape optimization that utilizes remeshing, International Journal for Numerical Methods in Engineering, DOI: 10.1002/nme.4445, Vol. 94, pp. 273–289, 2013. (JIF 2.59, cited 8 times)

26. C. Erasmus, S. Kok, M.P. Hindley, Significance of primary irradiation creep in graphite, Journal of Nuclear Materials, Vol. 436, pp. 167–174, DOI: 10.1016/j.jnucmat.2012.11.007, 2013. (JIF 2.45, cited 11 times)

27. D.N. Wilke, S. Kok, J.A. Snyman, A.A. Groenwold, Gradient-only approaches to avoid spurious local minima in unconstrained optimization, Optimization and Engineering, Vol. 14(2), pp. 275–304, DOI: 10.1007/s11081-011-9178-7, 2013. (JIF 1.35, cited 15 times)

28. N. Govender, D.N. Wilke, S. Kok, R. Els, Development of a convex polyhedral discrete element simulation framework for NVIDIA Kepler based GPUs, Journal of Computational and Applied Mathematics, Vol. 270, pp. 386–400, DOI: 10.1016/j.cam.2013.12.032, 2014. (JIF 1.63, cited 109 times)

29. R. Suliman, O.F. Oxtoby, A.G. Malan, S. Kok, An enhanced finite volume method to model 2D linear elastic structures, Applied Mathematical Modelling, DOI: 10.1016/j.apm.2013.10.028, Vol. 38, pp. 2265–2279, 2014. (JIF 2.62, cited 16 times)

30. A. Bekker, S. Kok, T.J. Cloete, G.N. Nurick, Introducing objective power law rate dependence into a visco-elastic material model of bovine cortical bone, International Journal of Impact Engineering, DOI: 10.1016/j.ijimpeng.2013.12.003, Vol. 66, pp. 28–36, 2014. (JIF 3.34, cited 13 times)

31. A.E.J. Bogaers, S. Kok, B.D. Reddy, T. Franz, Quasi-Newton methods for implicit black-box FSI coupling, Computer Methods in Applied Mechanics and Engineering, Vol. 279, pp. 113–132, DOI: 10.1016/j.cma.2014.06.033, 2014. (JIF 2.88, cited 68 times)

32. M.N. Ras, D.N. Wilke, A.A. Groenwold, S. Kok, On rotationally invariant continuous-parameter genetic algorithms, Advances in Engineering Software, Vol. 78, pp. 52–59, DOI:10.1016/j.advengsoft.2014.08.006, 2014. (JIF 3.20, cited 8 times)

33. S. Kok, N. Botha, H.M. Inglis, Calibrating corneal material model parameters using only inflation data: An ill-posed problem, International Journal for Numerical Methods in Biomedical Engineering, Vol. 30, pp. 1460–1475, DOI: 10.1002/cnm.2667, 2014. (JIF 2.34, cited 13 times)

34. R. Suliman, A.G. Malan, S. Kok, O.F. Oxtoby, A matrix free, partitioned solution of fluid-structure interaction problems using finite volume and finite element methods, European Journal of Mechanics - B/Fluids. DOI: 10.1016/j.euromechflu.2014.10.002. Vol. 49, pp. 272–286, 2015. (JIF 1.98, cited 6 times)

35. A. Bekker, T.J. Cloete, A. Chinsamy-Turan, G.N. Nurick, S. Kok, Constant strain rate compression of bovine cortical bone on the Split-Hopkinson Pressure Bar, Materials Science & Engineering C. Vol. 46, pp. 443–449, DOI:10.1016/j.msec.2014.10.071, 2015. (JIF 5.08, cited 25 times)

36. A.E.J. Bogaers, S. Kok, B.D. Reddy, T. Franz, Extending the robustness and efficiency of artificial compressibility for partitioned fluid-structure interactions, Computer Methods in Applied Mechanics and Engineering, Vol. 283, pp. 1278–1295, DOI: 10.1016/j.cma.2014.08.021, 2015. (JIF 2.88, cited 16 times)

37. A.S.D. Dymond, A.P. Engelbrecht, P.S. Heyns, S. Kok, Tuning Optimization Algorithms under Multiple Objective Function Evaluation Budgets, IEEE Transactions on Evolutionary Computation, Vol. 19, No. 3, pp. 341–358, DOI: 10.1109/TEVC.2014.2322883, 2015. (JIF 8.12, cited 19 times)

38. N. Govender, R.K. Rajamani, S. Kok, D.N. Wilke, Discrete Element Simulation of Mill Charge using the BLAZE-DEM GPU framework, Minerals Engineering, Vol. 79, pp. 152–168, DOI: 10.1016/j.mineng.2015.05.010, 2015. (JIF 2.71, cited 86 times)

39. N. Govender, D.N. Wilke, S. Kok, Collision detection of convex polyhedra on the NVIDIA GPU architecture for the discrete element method, Applied Mathematics and Computation, Vol. 267, pp. 810–829, DOI:10.1016/j.amc.2014.10.013, 2015. (JIF 2.71, cited 78 times)

40. A.E.J. Bogaers, S. Kok, B.D. Reddy, T. Franz, An evaluation of quasi-Newton methods for application to FSI problems involving free surface flow and solid body contact, Computers and Structures, Vol. 173, pp. 71–83, DOI:10.1016/j.compstruc.2016.05.018, 2016. (JIF 2.89, cited 20 times)

41. N. Govender, D.N. Wilke, S. Kok, Blaze-DEMGPU: Modular high performance DEM framework for the GPU architecture, SoftwareX, Vol. 5, pp. 62-66, 2016. (JIF 2.14, cited 70 times)

42. A.S. Dymond, S. Kok, P.S. Heyns, MOTA: A Many-Objective Tuning Algorithm Specialized for Tuning under Multiple Objective Function Evaluation Budgets, Evolutionary Computation, Vol. 25, No. 1, pp. 113–141, DOI: 10.1162/EVCO_a_00163, 2017. (JIF 3.83, cited 1 times)

43. E. Asaadi, D.N. Wilke, P.S. Heyns, S. Kok, The use of direct inverse maps to solve material identification problems: pitfalls and solutions, Structural and Multidisciplinary Optimization, Vol. 55, pp. 613–632, DOI: 10.1007/s00158-016-1515-1, 2017. (JIF 2.88, cited 7 times)

44. G.J. Jansen van Rensburg, S. Kok, D.N. Wilke, Steel alloy hot roll simulations and through-thickness variation using dislocation density based modeling, Metallurgical and Materials Transactions B, Vol. 48(5), pp. 2631–2648, DOI: 10.1007/s11663-017-1024-7, 2017. (JIF 3.44, cited 6 times)

45. L. Gregor, S. Kok, P.M.S. Monteiro, Empirical methods for the estimation of Southern Ocean CO_2: support vector and random forest regression, Biogeosciences, Vol. 14, pp. 5551–5569, https://doi.org/10.5194/bg-14-5551-2017, 2017. (JIF 3.44, cited 30 times)

46. L. Gregor, S. Kok, P.M.S. Monteiro, Interannual drivers of the seasonal cycle of CO_2 in the Southern Ocean, Biogeosciences, Vol. 15, pp. 2361–2378, https://doi.org/10.5194/bg-15-2361-2018, 2018. (JIF 3.44, cited 36 times)

47. G.J. Jansen van Rensburg, S. Kok, D.N. Wilke, Simultaneous estimation of boundary conditions and material model parameters, Structural and Multidisciplinary Optimization, Vol. 58, pp. 701–717, https://doi.org/10.1007/s00158-018-1924-4, 2018. (JIF 2.88, cited 0 times)

48. G.J. Jansen van Rensburg, S. Kok, D.N. Wilke, Modelling multiple cycles of static and dynamic recrystallisation using a fully implicit isotropic material model based on dislocation density, Computational Mechanics, Vol. 62, pp. 1343–1367, https://doi.org/10.1007/s00466-018-1568-7, 2018. (JIF 2.72, cited 1 time)

49. M.S. Jordaan, S. Kok, Material model calibration for superplastic forming, Inverse Problems in Science and Engineering, Vol. 25, No. 5, pp. 589–607, https://doi.org/10.1080/17415977.2018.1489802, 2019. (Q2, JIF 1.13, cited 0 times)

50. M.N. Ras, D.N. Wilke, A.A. Groenwold, S. Kok, On the rotational variance of the differential evolution algorithm, Advances in Engineering Software, Vol. 136, 102691, https://doi.org/10.1016/j.advengsoft.2019.102691, 2019. (Q1, JIF 4.19, cited 1 time)

51. J. Calitz, S. Kok, D.J. Delport, The effect of geometry on the fatigue life of overhead line hardware, Journal of Failure Analysis and Prevention, Vol. 9, Issue 5, pp. 1401–1406, https://doi.org/10.1007/s11668-019-00736-5, 2019. (Q3, JIF 0.8, cited 2 times)

52. A.B. Edward, P.S. Heyns, S. Kok, A Numerical Investigation of a Single-Shot in a DEM-FEM Approach to Shot Peening Simulation, Metals, Vol. 9, No. 11, Article number 1183, https://www.mdpi.com/2075-4701/9/11/1183, 2019. (Q1, JIF 2.26, cited 3 times)

53. L. Gregor, A. Lebehot, S. Kok, P. Monteiro, A comparative assessment of the uncertainties of global surface-ocean CO_2 estimates using a machine learning ensemble (CSIR-ML6 version 2019a) – have we hit the wall?, Geoscientific Model Development, Vol. 12, pp. 5113–5136, https://doi.org/10.5194/gmd-12-5113-2019, 2019. (Q1, JIF 5.15, cited 36 times)

54. I.E. Kalu, H.M. Inglis, S. Kok, Failure assessment methodology for boiler tubes with localized external erosion defects, International Journal of Pressure Vessels and Piping, Vol. 188, 104190, https://doi.org/10.1016/j.ijpvp.2020.104190, 2020. (Q1, JIF 2.23, cited 2 times)

55. S. Salifu, D. Desai, S. Kok, Comparative evaluation of creep response of X20 and P91 steam piping networks in operation, International Journal of Advanced Manufacturing Technology, Vol. 109, pp. 1987–1996, https://doi.org/10.1007/s00170-020-05727-7, 2020. (Q1, JIF 2.63, cited 6 times)

56. S. Salifu, D. Desai, S. Kok, Creep-Fatigue Interaction of P91 Steam Piping Subjected to Typical Start-up and Shutdown Cycles, Journal of Failure Analysis and Prevention, Vol. 20, pp. 1055–1064, https://doi.org/10.1007/s11668-020-00908-8, 2020. (Q3, JIF 0.8, cited 8 times)

57. F. Fameso, D. Desai, S. Kok, M. Newby, D. Glaser, Simulation of laser shock peening on X12Cr steel using an alternate computational mechanical threshold stress plasticity model, International Journal of Advanced Manufacturing Technology, Vol. 111, pp. 1–11, https://doi.org/10.1007/s00170-020-06079-y, 2020. (Q1, JIF 2.63, cited 2 times)

58. S. Salifu, D. Desai, S. Kok, Prediction and Comparison of Creep Behavior of X20 Steam Plant Piping Network with Different Phenomenological Creep Models, Journal of Materials Engineering and Performance, Vol. 29, pp. 7382–7395, https://doi.org/10.1007/s11665-020-05235-5, 2020. (Q2, JIF 1.65, cited 6 times)

59. I.E. Kalu, H.M. Inglis, S. Kok, The sensitivity of failure analysis of boiler tubes to the shape of elliptical external erosion flaws, Engineering Failure Analysis, Vol. 119, 104952, https://doi.org/10.1016/j.engfailanal.2020.104952, 2021. (Q1, JIF 2.90, cited 0 times)

60. B.D. Collins, P.S. Heyns, S. Kok, D.N. Wilke, Application of Anti-Diagonal Averaging in Response Reconstruction, Symmetry, 13, 1165, https://doi.org/10.3390/sym13071165, 2021. (Q1, JIF 2.65, cited 0 times)

61. S. Salifu, D. Desai, S. Kok, Influence of Diverse Operating Cycles on the Useful Creep Life of P92 Steam Piping, Journal of Failure Analysis and Prevention, Vol. 21, pp. 983–992, https://doi.org/10.1007/s11668-021-01144-4, 2021. (Q3, JIF 0.80, cited 3 times)

62. C. Bam, D.N. Wilke, S. Kok, A generic strategy to obtain semi-analytical mesh sensitivities/velocities for tetrahedral mesh generators, International Journal for Numerical Methods in Engineering, Vol. 122, pp. 4944–4965, 2021, https://doi.org/10.1002/nme.6752. (Q1, JIF 2.87, cited 0 times)

63. S. Salifu, D. Desai, S. Kok, Numerical Simulation of Stress Relaxation and Creep Response of X20 Steam Piping under Diverse Operating Conditions, International Journal of Engineering Research in Africa, Vol. 57, No. 12, pp. 19–32, https://doi.org/10.4028/www.scientific.net/JERA.57.19, 2021. (Q3, JIF 0.87, cited 0 times)

64. J. Calitz, S. Kok, D. Delport, The effect of decarburization on the fatigue life of overhead line hardware, Journal of the Southern African Institute of Mining and Metallurgy, Vol. 121, No. 10, pp. 537–542, http://dx.doi.org/10.17159/2411-9717/1109/2021, 2021. (Q2, JIF 0.94, cited 0 times)

65. S. Salifu, D. Desai, S. Kok, Determination of the dominant failure mechanism of P92 steam piping subjected to daily operational cycle using finite element (FE) technique, South African Journal of Science and Technology, Vol. 40, No. 1, pp. 37–43, https://doi.org/10.36303/SATNT.2021cosaami.08, 2021.

5.2 Publications accepted for publication in peer-reviewed or refereed journals

1. J. Bouwer, S. Kok, D.N. Wilke, Challenges and Solutions to Arc-Length Controlled Structural Shape Design Problems, Accepted by Mechanics Based Design of Structures and Machines, Published online July 2021. DOI: 10.1080/15397734.2021.1950549 (Q1, cited 0 times)

5.3 Publications submitted for publication in refereed journals

5.4 Books and/or chapters in books

1. J. Crous, D.N. Wilke, S. Kok, D.G. Chen, P.S. Heyns, On system identification for accelerated destructive degradation testing of nonlinear dynamic systems, ICSA Springer Book Series in Statistics: Statistical Modeling for Degradation Data, pp. 335-364, ISBN 978-981-10-5193-7, DOI: 10.1007/978-981-10-5194-4, 2017.

2. J. Crous, S. Kok, D.N. Wilke, P. S. Heyns, Generalized Prototype Bootstrapping for Nonlinear System Identification in an Accelerated Fatigue Testing Context, Springer Book Series Applied Condition Monitoring, Modelling and Simulation of Complex Systems for Sustainable Energy Efficiency, pp. 131–143, ISBN 978-3-030-85584-0, https://doi.org/10.1007/978-3-030-85584-0, 2021.

5.5 Published full-length conference papers/keynote addresses

Keynote addresses:

1. S. Kok, Using virtual inverse problems to determine identifiability of material parameters, 12th South African Conference on Computational and Applied Mechanics (SACAM2020), Cape Town, 30 November – 2 December, 2021.

Conference papers:

1. S. Kok, N. Stander, Optimal Process Design for Maximum Heating and Cooling Rates of Pressure Vessels, DETC97/DAC-3735, ASME Design Engineering Technical Conferences, Sacramento, September 14–17, 1997.

2. S. Kok, N. Stander, Optimization of a sheet forming process using successive multipoint approximations, 39th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, Long Beach, California, April 20–23, 1998.

3. S. Kok, A.J. Beaudoin, D.A. Tortorelli, Parameter estimation of a polycrystal model through identification studies, International Workshop on Multidisciplinary Design Optimization, University of Pretoria, South Africa, August 7–10, 2000.

4. S. Kok, A.J. Beaudoin, D.A. Tortorelli, M. Lebyodkin, L. Kubin, C. Fressengaes, Simulation of the Portevin - Le Chatelier effect using polycrystal plasticity, 6th European Mechanics of Materials Conference, Liège, Belgium, September 9–12, 2002.

5. D.W. Wood, Z.C. Lai, C.S. Long, S. Kok, A.A. Groenwold, Line elements for the multi-physics modeling of axispherical bodies, The Fourth International Conference on Engineering Computational Technology, Eds. B.H.V. Topping, C.A. Mota Soares, Lisbon, Portugal, September, 2004.

6. D.N. Wilke, S. Kok, A.A. Groenwold, Particle swarm searches and adaptive unstructured meshing in shape optimization, The Fourth International Conference on Engineering Computational Technology, Eds. B.H.V. Topping, C.A. Mota Soares, Lisbon, Portugal, September, 2004.

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5.6 Non-refereed publications or popular articles

1. A.E.J. Bogaers, S. Kok, A.G. Malan, ROM-it! Mesh movement made cheap, Innovate 5, pp. 96-98, 2010.

5.7 Patents

5.8 Technical reports

1. N. Stander, S. Kok, Shape optimization of pre-forming die for sheet-metal forming, Department of Mechanical and Aeronautical Engineering, University of Pretoria, June 1997.

2. S. Kok, Development of a material subroutine for Autodyn 5.0 based on the Mechanical Threshold Stress model, Department of Mechanical and Aeronautical Engineering, University of Pretoria, March 2005.

3. S. Kok, Review of PBMR graphite modelling, Advanced Mathemetical Modelling, CSIR Modelling and Digital Science, CSIR GWDMS No. 180649, August 2009.

4. S. Kok, Theory manual for PBMR graphite model, Advanced Mathemetical Modelling, CSIR Modelling and Digital Science, CSIR GWDMS No. 180651, August 2009.

5. S. Kok, User manual PBMR graphite model, Advanced Mathemetical Modelling, CSIR Modelling and Digital Science, CSIR GWDMS No. 180652, August 2009.

6. S. Kok, PBMR graphite modelling benchmarks, Advanced Mathemetical Modelling, CSIR Modelling and Digital Science, CSIR GWDMS No. 180653, August 2009.

7. S. Kok, N. Siyakatshana, Review: Water Resources Modelling Gaps and Needs Analysis, Advanced Mathemetical Modelling, CSIR Modelling and Digital Science, CSIR GWDMS No. 190383, May 2010.

8. A. Bogaers, A. Odendaal, S. Kok, Progress report: Blood flow modelling, Advanced Mathemetical Modelling, CSIR Modelling and Digital Science, CSIR GWDMS No. 202986, May 2011.

9. J. Jansen van Rensburg, D. Golding, S. Kok, Progress report: Image processing and Registration, Advanced Mathemetical Modelling, CSIR Modelling and Digital Science, CSIR GWDMS No. 202990, May 2011.

10. S. Kok, Working Model for the Integrated Energy Plan, Revision 1, Advanced Mathemetical Modelling, CSIR Modelling and Digital Science, CSIR GWDMS No. 209558, September 2011.

11. J. Jansen van Rensburg, S. Kok, Progress report on modelling of WC-Co compression tests, Revision 3, Advanced Mathemetical Modelling, CSIR Modelling and Digital Science, CSIR GWDMS No. 214528, February 2012.

12. S. Kok, The proposed modelling approach to accommodate plausible futures, Revision 2, Advanced Mathemetical Modelling, CSIR Modelling and Digital Science, CSIR GWDMS No. 216745, June 2012.

13. S. Kok, Osemosys model development, Revision 2, Advanced Mathemetical Modelling, CSIR Modelling and Digital Science, CSIR GWDMS No. 217586, October 2012.

5.9 Edited volumes

1. S. Kok, D.N. Wilke, H.M. Inglis, Proceedings of the 7th South African Conference on Computational and Applied Mechanics (SACAM10), Published by South African Association for Theoretical and Applied Mechanics (SAAM), ISBN: 978-0-620-49192-1, 2011.

5.10 Theses

1. S. Kok, Rapid heating and cooling of pressure vessels through optimal temperature control: a general methodology, Master's Thesis, Department of Mechanical and Aeronautical Engineering, University of Pretoria, October 1996.

2. S. Kok, Kinetics of plastic flow in polycrystal plasticity, Department of Mechanical Engineering, University of Illinois at Urbana-Champaign, January 2002.

6. POSTGRADUATE SUPERVISION

6.1 Supervision or co-supervision of students who have completed degrees

Name of student	Degree/Title of dissertation/thesis and date completed	Supervisor	Co-supervisor(s)	Duration of studies (years)
D.N. Wilke	M.Eng. research: Analysis of the particle swarm optimization algorithm (2005, Cum Laude).	Prof. A.A. Groenwold	Prof. S. Kok	2
Z.-C. Lai	M.Eng. research: Finite element analysis of geometrically non-linear electrostatic coupled systems (2007, Cum Laude).	Prof. A.A. Groenwold	Prof. S. Kok	3
A.E.J. Bogaers	M.Eng. research: Reduced order modeling techniques for mesh movement strategies as applied to fluid structure interactions (2010, Cum Laude).	Prof. S. Kok	Dr. A.G. Malan	2
D.N. Wilke	Ph.D. Approaches to accommodate remeshing in shape optimization (2010)	Prof. S. Kok	Prof. A.A. Groenwold	5
A.D.S. Dymond	M.Eng. research: Multiple objective optimization of an airfoil shape (2011, Cum Laude)	Prof. S. Kok	Dr. B. Broughton	3
GJ Jansen van Rensburg	M.Eng. research: Selective feature preserved elastic surface registration in complex geometric morphology (2011, Cum Laude)	Dr. S. Kok	Dr. D.N. Wilke	2
L Prinsloo	M.Eng. research: A critical evaluation of the design of removable cover-plate header boxes for air-cooled heat exchangers (2011, Cum Laude)	Ms. H. Inglis	Dr. S. Kok	2

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M van der Walt	M.Sc research: Investigating the empirical relationship between oceanic properties observable by satellite and the oceanic pCO_2 (2011, Cum Laude)	Prof. G Drevin	Dr. S. Kok Prof. J Spoelstra	1
R Suliman	M.Eng. research: Development of parallel strongly coupled hybrid fluid-structure interaction technology involving thin geometrically non-linear structures (2012, Cum Laude)	Dr. S. Kok	Prof. A.G. Malan	4
ML Patriquin	Ph.D. The relationship between masticatory stress and prognathism: a finite element and morphometric study (2014)	Prof. M. Steyn	Prof. S. Kok	6
N Botha	M.Eng. research: Effect of numerical modelling assumptions on the simulated corneal response during Goldmann applanation tonometry (2014, Cum Laude)	Prof. S. Kok	Ms. H. Inglis	3
C Mpanga-A-Kangaj	M.Sc. (Applied Science) research: Pull-out of hooked end steel fibres: Experimental and numerical study (2014, Cum Laude)	Ms. M. Inglis	Prof. S. Kok	2
ADS Dymond	Ph.D. Tuning optimization algorithms under multiple objective function evaluation budgets (2014)	Prof. P.S. Heyns	Prof. S. Kok	4
M Beckley	M.Sc. (Applied Science) research: Comparison of Sampling Methods for Kriging Models (2014, Cum Laude)	Prof. S. Kok		2
N Govender	Ph.D. (Applied Science) Blaze-DEM: A GPU based large scale 3D discrete element particle transport framework (2015)	Dr. DN Wilke	Prof. S. Kok	3
AEJ Bogaers	Ph.D. Efficient and robust partitioned solution schemes for fluid-structure interactions (2015)	Prof. DB Reddy (UCT)	Prof. S. Kok	5

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DJ McDougall	M.Eng. research: The Suitability of SAOi for Topology Optimisation of Geometrically Non-linear Structures using a SAND Formulation (2015)	Prof. A.A. Groenwold (US)	Prof. S. Kok	3
GJ Jansen van Rensburg	Ph.D. Development and Implementation of State Variable Based User Materials in Computational Plasticity (2016)	Prof. S. Kok	Dr. D.N. Wilke	5
C Grobler	M.Eng. research: Multi-Objective Parallelization of Efficient Global Optimization (2016, Cum Laude)	Prof. S. Kok	Dr. D.N. Wilke	2
S Robberts	M.Eng. research: Characterising the Behaviour of an Electromagnetic Levitation Cell using Numerical Modelling (2017, Cum Laude)	Prof. S. Kok	Dr. J. Zietsman Dr. H.M. Inglis	2
MJR Schoeman	M.Eng. research: Development and Comparison of Strategies for the Reconstruction of Full and Partial Skull Geometries (2017, Cum Laude)	Prof. S. Kok	Dr. D.N. Wlke	2
M Cowley	M.Eng. research: Optimising Pressure Profiles in Superplastic Forming (2017, Cum Laude)	Prof. S. Kok		2
L Gregor	Ph.D. Improved estimates and understanding of interannual trends of CO_2 fluxes in the Southern Ocean (2017)	Dr. P.M.S. Monteiro (CSIR)	Prof. M. Vichi (UCT) Prof. S. Kok	4
J Crous	Ph.D. A statistical learning approach to response reconstruction for accelerated fatigue testing (2019)	Prof. S. Kok	Prof. P.S. Heyns	4
D Armfield	M.Eng research: Optimised Implementation of Physics-based Strain-rate Dependent Material Models for the Improved Simulation of the Laser Shock Peening Process (2019, Cum Laude)	Prof. S. Kok	Prof. P.S. Heyns	2
I Kalu	Ph.D. Failure Assessment of Boiler Tubes under Localized External Erosion to Support Maintenance Decisions (2020)	Dr. H.M. Inglis	Prof. S. Kok	5

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TJ Bam	M.Eng research: A computer-based justification for using the simple bend test as the basis for predicting the performance of steel hooked-end fibres in reinforced concrete (2020, Cum Laude)	Prof. S. Kok	Prof. D.N. Wilke	4
CA Bam	M.Eng research: Development of a three-dimensional mesh generator with semi-analytical mesh sensitivities for the use in gradient based shape optimisation (2020, Cum Laude)	Prof. D.N. Wilke	Prof. S. Kok	4
AH Kotze	M.Eng research: Modelling deformation in a DC smelting furnace lining (2020)	Dr. J. Zietsman	Prof. S. Kok	6
B Collins	M.Eng research: Insights into the use of Linear Regression Techniques in Response Reconstruction (2021, Cum Laude)	Prof. PS Heyns	Prof. S. Kok	4
J Calitz	D.Eng (Tech): Material characteristics of alternative material grades for overhead line hardware (2021)	Prof. S. Kok	Dr. D. Delport (TUT)	7
S Salifu	D.Eng (Tech): Creep-Fatigue Failure and Life-Cycle Prediction of X20, P91 and P92 Steel Pipes (2021)	Dr. D. Desai (TUT)	Prof. S. Kok	4
J Swart	M.Eng research: Comparison of Optimisation Methods to Operate Water Supply Networks (2021, Cum Laude)	Prof. S. Kok	Prof. D.N. Wilke	3

6.2 Current post-graduate students					
Name of student	Degree enrolled for and date of first registration	Project title	Supervisor	Co-supervisor(s)	Year of registration
OF Fameso	D.Eng (Tech) 2018	Optimization of Laser Peening Parameters for Residual Stress Enhancement in Low Pressure Steam Turbine Blades	Prof. S. Kok	Dr. D. Desai (TUT)	Fourth
J. Dreyer	M.Eng (Tech) 2019	Alternate Computationally Efficient Technique to Model Laser Shock Peening by Modification of the Pressure Load	Prof. S. Kok	Dr. D. Desai (TUT)	Third
PJ Joubert	M.Eng 2020	Development of a Lagrange multiplier focussed optimization workbench for FreeCAD	Prof D.N. Wilke	Prof S. Kok Dr AEJ Bogaers	Third
J. Bouwer	M.Eng 2020	Design of snap through structures using gradient enhanced surrogates	Prof. S. Kok	Prof. D.N. Wilke	Third
P. Shah	M.Eng 2021	Predicting mandible geometries from a cranial database	Prof S. Kok	Prof D.N. Wilke	Second
R. Gast	M.Eng 2021	Tyre Force Prediction from Deformation Measurements	Prof D.N. Wilke	Prof S. Kok Prof PS Els Dr TR Botha	Second
S. Krüger	M.Eng 2022	Gradient enhanced surrogates for structural analysis	Prof S. Kok		First

7. OTHER SCHOLARLY RESEARCH-BASED CONTRIBUTIONS

7.1 Participation in conferences, workshops and short-courses

7.1.1 National

1. Workshop presentation: S. Kok, Numerical challenges to model the Portevin Le Chatelier effect using polycrystal plasticity, US-Africa Workshop on Materials & Mechanics, Cape Town, 24-28 January, 2005.

2. Conference presentation: A.J. Vogel, S. Kok, D.N. Wilke, Parallel implementations of SAO algorithms for structural optimization, South African Conference on Computational and Applied Mechanics (SACAM 2010), 10-13 January, Pretoria, 2010.

3. Conference presentation: D.N. Wilke, J.A. Snyman, S. Kok, A.A. Groenwold, Overcoming discontinuities in computational engineering optimization using gradient-only optimization, Seventh South African Conference on Computational and Applied Mechanics (SACAM 2010), 10-13 January, Pretoria, 2010.

4. Conference poster: S. Kok, G.J. Jansen van Rensburg, A finite element study to quantify the relationship between masticatory stress and prognathism, CSIR 3rd Biennial Conference, Pretoria, South Africa, 31 August – 1 September, 2010.

5. Conference poster: M.L. Patriquin, M. Steyn, G.J. Jansen van Rensburg, S. Kok, The Relationship Between Masticatory Stress and Prognathism: A Finite Element and Morphometric Study, 39th Annual Conference of the Anatomical Society of Southern Africa (ASSA), University of Witwatersrand, Johannesburg, South Africa, 22–25 May 2011.

6. Conference poster: R. Suliman, O. Oxtoby, A.G. Malan, S. Kok, Development of strongly-coupled hybrid fluid-structure interaction technology involving thin geometrically non-linear structures, CSIR Emerging Researcher Symposium, Pretoria, South Africa, 13 October, 2011.

7. Symposium presentation: N. Botha, S. Kok, H. Inglis, Ondersoek na die gebruik van ortogonale ontbinding om interne okulêre druk te bepaal, Studentesimposium in die Natuurwetenskappe 2011, University of South Africa, 27–28 October 2011.

8. Colloquium presentation (Invited): S. Kok, Osemosys: motivation for using it as part of the tools for the IEP, Colloquium on Energy Planning in South Africa (IEP Indaba), Gallagher Estate, 20–30 March, 2012.

9. Workshop presentation (Invited): S. Kok, Energy Planning: modelling perspectives on energy efficiency, Workshop I: South Africa/Japan Energy Efficiency Improvement Project, Pretoria, 15–16 May, 2012.

10. Colloquium presentation (Invited): S. Kok, A modelling approach that is consistent with scenario planning, Modelling Colloquium 2012, Energy Research Centre, University of Cape Town, 31 July, 2012.

11. Conference poster: D.J. McDougall, H.M. Inglis, S. Kok, Computational model for a novel compression testing method, Eighth South African Conference on Computational and Applied Mechanics (SACAM 2012), 3–5 September, Johannesburg, 2012.

12. Conference poster: D. Diamond, N. Godfrey, H.M. Inglis, S. Kok, E. van Zyl, Development of an optimization technique to characterize pressurized membranes, Eighth South African Conference on Computational and Applied Mechanics (SACAM 2012), 3–5 September, Johannesburg, 2012.

13. Symposium presentation: R. Suliman, O. Oxtoby, A.G. Malan, S. Kok, J.P. Meyer, Partitioned Finite Volume-Finite Element Fluid-Structure Interaction Scheme with Applications to Flutter Analysis, International Aerospace Symposium of South Africa 2012 (IASSA 2012), Centurion, 17–18 September 2012.

14. Conference presentation: N. Govender, S. Kok, D.N. Wilke, A GPU Based Polyhedral Particle DEM Transport Code, South African Institute of Physics 59th Conference (SAIP2014), University of Johannesburg, 7–11 July, 2014.

15. Poster presentation: M. Beckley, S. Kok, Comparison of sampling methods for use with Kriging, 56th Annual Conference of the South African Statistical Association, Rhodes University, Grahamstown, 27–30 October, 2014.

16. Conference presentation: N. Govender, D.N. Wilke, S. Kok, Fast Collision Detection on the GPU for particle simulations, CHPC National Meeting and Conference (CHPC 2014), Kruger National Park, 1–5 December, 2014.

17. Conference presentation: N. Govender, S. Kok, D.N. Wilke, BLAZE-DEM: A GPU based large scale 3D discrete element particle transport framework, South African Institute of Physics 60th Conference (SAIP2015), Boardwalk Convention Centre, Port Elizabeth, 28 June–3 July, 2015.

18. Conference presentation: I.E. Kalu, H.M. Inglis, S. Kok, M. Hindley, Finite element analysis of boiler tube defects, Tenth South African Conference on Computational and Applied Mechanics (SACAM 2016), 3–5 October, Potchefstroom, 2016.

19. Conference presentation: I.E. Kalu, S. Kok, H.M. Inglis, Sensitivity study on failure assessment of localized eroded boiler tubes, 12th South African Conference on Computational and Applied Mechanics (SACAM 2020), 29 November – 1 December, Cape Town, 2021.

7.1.2 International

1. Conference presentation: S. Kok, A.J. Beaudoin, D.A. Tortorelli, Parameter estimation of a rate dependent polycrystal plasticity model through inverse analysis, 5th US National

Congress on Computational Mechanics, University of Colorado at Boulder, USA, August 4 - 6, 1999.

2. Conference poster: S. Kok, A.J. Beaudoin, D.A. Tortorelli, P.J. Maudlin, Parameter estimation and texture augmentation of a polycrystal model through identification studies, 20th International Congress of Theoretical and Applied Mechanics, Chicago, USA, August 27 - September 2, 2000.

3. Conference presentation: S. Kok, A.J. Beaudoin, D.A. Tortorelli , Numerical integration of lattice rotation in polycrystal plasticity, 6th US National Congress on Computational Mechanics, Dearborn, Michigan, USA, August 1 - 3, 2001.

4. Conference presentation: S. Kok, A.J. Beaudoin, D.A. Tortorelli, M. Lebyodkin, Simulation of the Portevin - Le Chatelier Effect using Polycrystal Plasticity, ASME International Mechanical Engineering Congress and Exposition, New York, USA, November 11 - 16, 2001.

5. Conference poster: D.N. Wilke, S. Kok, A.A. Groenwold, Reference frame and scale invariant real-parameter genetic and differential evolution algorithms, Genetic and Evolutionary Computation Conference (GECCO), London, UK, July 7-11, 2007.

6. Conference poster: J.A. Snyman, S. Kok, A Strongly Interacting Dynamic Particle Swarm Optimization Method, Genetic and Evolutionary Computation Conference (GECCO), London, UK, July 7-11, 2007.

7. Conference presentation: A. Dymond, S. Kok, A multi-objective optimisation framework for optimisation algorithm parameter derivation, 18th Triennial Conference of the International Federation of Operational Research Societies (IFORS), Sandton, South Africa, 13-18 July, 2008.

8. Conference presentation: J. Grobler, A.P. Engelbrecht, S. Yadavalli, S. Kok, Multi-objective particle swarm optimization for complex job shop scheduling, 18th Triennial Conference of the International Federation of Operational Research Societies (IFORS), Sandton, South Africa, 13-18 July, 2008.

9. Conference presentation: D.N. Wilke, S. Kok, Gradient only optimization for discontinuous functions, 18th Triennial Conference of the International Federation of Operational Research Societies (IFORS), Sandton, South Africa, 13-18 July, 2008.

10. Conference presentation: S. Kok, Photoelasticity as a teaching aid for the finite element method, XXII International Congress of Theoretical and Applied Mechanics (ICTAM 2008), Adelaide, Australia, August 25-29, 2008.

11. Conference presentation: D.N. Wilke, S. Kok, A.A. Groenwold, Error estimate based remeshing strategy for shape optimization using radial basis functions, XXII International Congress of Theoretical and Applied Mechanics (ICTAM 2008), Adelaide, Australia, August 25-29, 2008.

12. Conference presentation: D.N. Wilke, S. Kok, A.A. Groenwold, Towards a simple generic anisotropic remeshing strategy for shape optimization, 1st African Conference on Computational Mechanics (Africomp'09), Sun City, South Africa, 7-11 January, 2009.

13. Conference presentation: S. Kok, J. de Vaal, Particle Swarm Optimization: A Special Case of Population Based Trajectory Methods, 8th World Congress on Structural and Multidisciplinary Optimization (WCSMO-8), Lisbon, Portugal, 1-5 June, 2009.

14. Conference presentation: C. Erasmus, S. Kok, M. Hindley, The implementation of Primary irradiation creep in GRMAT software, 10th International Nuclear Graphite Specialists Meeting, Holiday Inn Sun Spree Resort, West Yellowstone, Montana, September 27-30, 2009.

15. Conference presentation: L.J. Haarhoff, D.N. Wilke, S. Kok, The effect of more appropriate correlation function choices when creating Kriging surfaces for mathematical optimization, 2nd International Conference on Engineering Optimization (EngOpt 2010), Lisbon, Portugal, 6–9 September, 2010.

16. Conference poster: S. Kok, Path dependent models to predict property changes in graphite irradiated at changing irradiation temperatures, The Nuclear Materials Conference (NuMat 2010), Karlsruhe, Germany, 4–7 October, 2010.

17. Conference presentation: G.J. Jansen van Rensburg, D.N. Wilke, S. Kok, Comparison of Numerical Results between Related Shapes using a Non-rigid Mapping with Statistical Quantification of Uncertainty, 2nd International Conference on Computational Engineering (ICCE 2011), Darmstadt, Germany, 4-6 October, 2011.

18. Conference presentation: L.J. Haarhoff, S. Kok, D.N. Wilke, Practical guidelines to avoid ill-conditioning of the correlation matrix in Kriging response surfaces, Third International Conference on Engineering Optimization (EngOpt 2012), Rio de Janeiro, Brazil, 1–5 July 2012.

19. Conference presentation: S. Kok, D.N. Wilke, Challenges to present a postgraduate finite element course in structural mechanics at the University of Pretoria, 23rd International Congress of Theoretical and Applied Mechanics (ICTAM 2012), Beijing, China, 19–24 August, 2012.

20. Conference presentation: N. Govender, D.N. Wilke, S. Kok, BLAZE-DEM: A GPU Based Polyhedral DEM Particle Transport Code, 4th International Congress on Computational Engineering and Sciences (FEMTEC 2013), Las Vegas, USA, 19–24 May, 2013.

21. Conference presentation: A.E.J. Bogaers, S. Kok, B.D. Reddy, T. Franz, Treatment of fully enclosed FSI using artificial compressibility, 3rd African Conference on Computational Mechanics (Africomp'13), Livingstone, Zambia, 30 July - 2 August, 2013.

22. Conference presentation: N. Govender, I. Gledhill, S. Kok, D.N. Wilke, GPU-Based Discrete Element Rigid Body Transport, 6th International Conference on Discrete Element Methods (DEM6), Golden, Colorado, USA, 5–6 August, 2013.

23. Conference poster: N. Govender, D.N. Wilke, S. Kok, A GPU based polyhedral particle DEM transport code, GPU Technology Conference, San Jose, CA, USA, 24–27 March, 2014.

24. Seminar poster: N. Govender, S. Kok, D.N. Wilke, BLAZE-DEM A GPU Based Polyhedral Particle Transport code, 4th European Seminar on Computing, Pilsen, Czech Republic, June 15 – 20, 2014.

25. Seminar presentation: N. Govender, S. Kok, D.N. Wilke, Particle Simulations on NVIDIA GPUs, 4th European Seminar on Computing, Pilsen, Czech Republic, June 15 – 20, 2014.

26. Conference presentation: N. Govender, S. Kok, D.N. Wilke, Blaze-DEM a convex polyhedral particle discrete element framework for NVIDIA GPUs, 4th African Conference on Computational Mechanics (AfriCOMP'15), Marrakech, Morocco, 7–9 January, 2015.

27. Conference presentation: N. Govender, S. Kok, D.N. Wilke, BLAZE-DEM: A Polyhedral Discrete Element Simulation Framework for NVIDIA Kepler GPUs, GPU Technology Conference, San Jose, CA, USA, 17–20 March, 2015.

28. Conference presentation: G.J. Jansen van Rensburg, D.N. Wilke, S. Kok, The effect of different roughing schedules on the mean-field static recrystallisation of microalloyed plate steels, XIV International Conference on Computational Plasticity, Fundamentals and Applications, Barcelona, Spain, September 5–7, 2017.

29. Conference presentation: D.N. Wilke, S. Kok, M. Hindley, Graphite irradiated calibration analysis framework, The Sixteenth International Conference on Civil, Structural & Environmental Engineering Computing, 16–19 September, Riva del Garda, Italy, 2019.

30. Conference presentation: S. Kok, D.N. Wilke, Multi point constraints produce symmetric or non-symmetric stiffness matrices: the complete story, The Sixteenth International Conference on Civil, Structural & Environmental Engineering Computing, 16–19 September, Riva del Garda, Italy, 2019.

31. Conference presentation: D.N. Wilke, S. Kok, Incorporating experimentally measured full field strains into a finite element model using assumed stress elements, The Sixteenth International Conference on Civil, Structural & Environmental Engineering Computing, 16–19 September, Riva del Garda, Italy, 2019.

7.2 Teamwork and collaboration with others

Other researchers (national and international)

1. Dr. Helen Inglis and Prof. Nico Wilke at the University of Pretoria: Collaboration on solid mechanics research, material modelling and optimization.

2. Mr Trevor Cloete at the University of Cape town: material model development

Other research institutions (national and international)

1. CSIR
2. University of Cape Town

7.3 Membership in national and international bodies

1. President of the South African Association of Theoretical and Applied Mechanics (SAAM), March 2010 – October 2016.
2. President of SA National Committee for IUTAM (International Union of Theoretical and Applied Mechanics), March 2010 – October 2016.
3. Member of the General Assembly of IUTAM, March 2010 – October 2016.
4. Vice-President of the South African Association of Theoretical and Applied Mechanics (SAAM), October 2016 – September 2018.

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

1. 2008: Guest researcher at CSIR Materials Science and Manufacturing for 7 weeks, hosted by Dr. Craig Long.
2. 2008: Guest researcher at CSIR Defence Peace Safety and Secuity (DPSS) for 6 weeks, hosted by Dr. Arnaud Malan.

8. PROFESSIONAL SKILLS

8.1 Professional service performed

1. Registered as professional engineer with ECSA, Registration No.: 20130375.
2. Member of the South African Institution of Mechanical Engineering (SAIMechE), Membership number 702148.
3. Member of NRF Scarce skills panel for five years (2003–2007).
4. Member of NRF Postdoctoral fellow panel for seven years (2008–2014).
5. Member of NRF panel for SA-Germany and SA-Poland collaborative research (2006).
6. Member of NRF Research Career Advancement Fellowship review panel (2014).
7. Developed and presented an Engineering Materials short-course, CSIR Defencetek & Armscor, January 2004.

8. Member of the international scientific committee, 1st African Conference on Computational Mechanics, Sun City, January 7-11, 2009.

9. Proposer and chair of minisymposium “Algorithms and Applications in Shape and Topology Optimization”, 1st African Conference on Computational Mechanics, Sun City, January 7-11, 2009.

10. Member of local organizing committee, Seventh South African Conference on Computational and Applied Mechanics, 10-13 January, Pretoria, 2010.

11. Chair of scientific committee, Seventh South African Conference on Computational and Applied Mechanics, 10-13 January, Pretoria, 2010.

12. Review research proposals for the Water Research Commission (WRC), 2010.

13. Invited as lecturer for postgraduate course MEE732, Finite element methods, Department of Mechanical and Aeronautical Engineering, University of Pretoria, 2010.

14. Member of the international scientific committee, 2nd African Conference on Computational Mechanics, Cape Town, South Africa, 5–8 January, 2011.

15. Invited as lecturer for postgraduate course MEE781, Advanced Finite Element Methods, Department of Mechanical and Aeronautical Engineering, University of Pretoria, 2011.

16. Member of the International Scientific Committee, 11th US National Congress on Computational Mechanics (11th USNCCM), Minneapolis and St. Paul, Minnesota, 25–28 July 2011.

17. Member of the International Scientific Committee, 10th World Congress on Computational Mechanics (WCCM 2012), Sao Paulo, Brazil, 8-13 July 2012.

18. Member of the local organizing committee, Eighth South African Conference on Computational and Applied Mechanics, 3–5 September, Johannesburg, 2012.

19. Member of the scientific committee, Eighth South African Conference on Computational and Applied Mechanics, 3–5 September, Johannesburg, 2012.

20. Member of the International Scientific Committee, 3rd African Conference on Computational Mechanics, Livingstone, Zambia, 30 July – 2 August, 2013.

21. Member of the scientific committee, Ninth South African Conference on Computational and Applied Mechanics, 14–16 January, Somerset West, 2014.

22. Proposer and chair of minisymposium “Inverse Problems in Engineering”, 4th International Conference on Engineering Optimization, Lisbon, Portugal, 8–11 September, 2014.

23. Member of the International Advisory Committee for the fourth African Conference on Computational Mechanics (AfriComp), Marrakech, Morocco, 7–9 January, 2015.

24. Member of the Technical Program Committee, International Conference on Computing in Mechanical Engineering (ICCME-2015), Kochi, India, 2015.

25. Member of the scientific committee, Eleventh South African Conference on Computational and Applied Mechanics, 17–19 September, Vanderbijlpark, 2018.

8.2 Referee duties

Refereed papers for the following journals:

1. International
   (a) Advances in Water Research
   (b) Algorithms
   (c) Computational Materials Science
   (d) Computer Methods in Applied Mechanics and Engineering
   (e) IEEE Transactions on Evolutionary Computation
   (f) IEEE Transactions on Industrial Informatics
   (g) International Journal of Materials and Product Technology
   (h) International Journal of Mechanical Sciences
   (i) International Journal of Reliability and Safety (IJRS)
   (j) International Journal of Robotics and Automation
   (k) International Journal of Vehicle Design
   (l) Journal of Artificial Evolution and Applications
   (m) Journal Of Combinatorial Optimization
   (n) Journal Of The Brazilian Society Of Mechanical Sciences And Engineering
   (o) Journal of the Mechanical Behavior of Biomedical Materials
   (p) Mechanics Of Time-Dependent Materials
   (q) Medical & Biological Engineering & Computing
   (r) Modelling and Simulation in Materials Science and Engineering
   (s) Physics Letters A
   (t) Swarm Intelligence
2. National
   (a) SA Tydskrif vir Natuurwetenskap en Tegnologie
   (b) R & D Journal
   (c) Journal of the South African Institution of Civil Engineering

Submitted peer review of the following journal:

1. R & D Journal (Peer review provided input to “Report on Grouped Peer Review of Scholarly Journals in Architecture, Built Environment and Engineering”, published by the Academy of Science of South Africa (ASSAf), March 2018.)

Refereed papers for the following conferences:

1. International
   (a) 1st African Conference on Computational Mechanics (AfriComp), Sun City, South Africa, 2009.
   (b) 4th International Conference on Engineering Optimization (EngOpt 2014), Lisbon, Portugal, 8–11 September, 2014.
   (c) 4th African Conference on Computational Mechanics (AfriComp), Marrakech, Morocco, 7–9 January, 2015.
   (d) International Conference on Computing in Mechanical Engineering (ICCME-2015), Kochi, India, 2015.
2. National
   (a) Seventh South African Conference on Computational and Applied Mechanics (SACAM2010), 10–13 January, Pretoria, 2010.
   (b) CSIR Science Real & Relevant Conference, 2010.
   (c) Eighth South African Conference on Computational and Applied Mechanics (SACAM2012), 3–5 September, Johannesburg, 2012.
   (d) 58th Annual Conference of the SA Institute of Physics (SAIP 2013), 8–12 July, 2013.
   (e) Ninth South African Conference on Computational and Applied Mechanics (SACAM2014), 14–16 January, Somerset West, 2014.
   (f) The Third Southern African Solar Energy Conference (SASEC2015), 11–13 May, Skukuza, 2015.
   (g) Eleventh South African Conference on Computational and Applied Mechanics (SACAM2018), 17–19 September, Vanderbijlpark, 2018.
   (h) 12th South African Conference on Computational and Applied Mechanics (SACAM2020), 29 November –1 December, Cape Town, 2021.

Appointed as internal examiner for the following Masters theses:

1. J.J. Nel, Canine lumbosacral fracture-luxation stabilised with the String of Pearls interlocking plate system or pins with polymethylmethacrylate: A biomechanical comparison, Faculty of Veterinary Science, University of Pretoria, 2016.
2. D. Kafka, Investigation into regression strategies to address model errors in inverse analysis of creep models, Department of Mechanical and Aeronautical Engineering, University of Pretoria, 2017.

3. I. Setshedi, Characterization of Rails Using Guided Wave Ultrasonic Measurements and the Semi-Analytical Finite Element Method, Department of Mechanical and Aeronautical Engineering, University of Pretoria, 2018.

Appointed as external examiner for the following Masters theses:

1. K. van Aswegen, Dynamic modelling of a stented aortic valve, Department of Mechanical and Mechatronic Engineering, Stellenbosch University, 2008.
2. H.J. Nel, Effect of nozzle load on the stress distribution inside unpartitioned plug type header-boxes, Department of Mechanical Engineering, University of Johannesburg, 2011.
3. D.P. Munro, Topology optimisation and simultaneous analysis and design: Material penalisation and local stress constraints, Department of Mechanical and Mechatronic Engineering, Stellenbosch University, 2014.
4. J.H. Grobler, The integration of two stand-alone codes to simulate fluid-structure interaction in breakwaters, Department of Mechanical Engineering, North-West University, 2014.
5. J.C. Maritz, Numerical Modelling and Validation of the Temperature Distribution in a Rolling Tire, Department of Mechanical and Mechatronic Engineering, Stellenbosch University, 2015.
6. M. Cronje, On alternative solution methods for solving approximate subproblems in SAO, Department of Mechanical and Mechatronic Engineering, Stellenbosch University, 2015.
7. K. Moore, A Numerical Assessment of Architectural Parameters for Anisotropic Behaviour in Idealised Trabecular Structures, Department of Mechanical Engineering, University of Cape Town, 2018.
8. T. Kampoy, Structural analysis of spent fuel dry storage casks, Department of Mechanical Engineering, Cape Peninsula University of Technology, 2019.
9. D.D. Wilcox, Methods and techniques for topology optimization, Department of Mechanical and Mechatronic Engineering, Stellenbosch University, 2021.
10. A.N. Oelofse, Design and Development of a Sutureless Bioprosthetic Heart Valve Assembly, Department of Mechanical and Mechatronic Engineering, Stellenbosch University, 2022.

Appointed as external examiner for the following PhD dissertation:

1. W. Beyers, Predicting structural behaviour of pressure vessels using large scale meta-modelling applied to plug type heat exchanger header boxes, Department of Mechanical and Mechatronic Engineering, Stellenbosch University, 2017.
2. K.L. Dhaker, Investigation of optimal parameters for laser trepan drilling of Inconel-718, Jaypee University of Engineering and Technology, Guna, India, 2020.

Appointed as external examiner for the following courses:

1. MSY732: Postgraduate course in structural mechanics, Department of Mechanical and Aeronautical Engineering, University of Pretoria, 2010.
2. MOX410: Final year undergraduate capstone Design course, Department of Mechanical and Aeronautical Engineering, University of Pretoria, 2010.
3. MKM320: Third year continuum mechanics course, Department of Mechanical and Aeronautical Engineering, University of Pretoria, 2010.
4. MSC422: Final year undergraduate Project, Department of Mechanical and Aeronautical Engineering, University of Pretoria, 2011.
5. MEC5068Z: Postgraduate course, "Topics in Computational and Applied Mechanics", Centre for Research in Computational and Applied Mechanics (CERECAM), University of Cape Town, 2014.
6. CIV2011F: Second year mechanics of materials course, Department of Civil Engineering, University of Cape Town, 2015.
7. CIV1007S: First year mechanics course, Department of Civil Engineering, University of Cape Town, 2015-2021.
8. MECN7O26/A: Postgraduate module on the Finite Element Method, Faculty of Engineering and the Built Environment, University of Witwatersrand, 2020-2021.

Appointed as moderator for the following course:

1. MEGI 874: Postgraduate course in Computational Fluid Mechanics, Department of Mechanical Engineering, North-West University, 2010–2013.

9. AWARDS AND SCIENTIFIC/SCHOLARLY RECOGNITION

9.1 Evaluation status as scientist/scholar

Rated as C2 by the NRF for the period January 2022 - December 2027.

9.2 Research awards and prizes

1. 1996 Sasol Medal and Prize, for best master's student in Mechanical Engineering at the University of Pretoria.
2. 1996 S_2A_3 Bronze Medal and Prize for the best master's thesis in a scientific discipline at the University of Pretoria.

3. 2010 CSIR Modelling and Digital Science excellence award in the category Established Researcher
4. 2012 CSIR Modelling and Digital Science excellence award in the category Publications
5. 2014 Best poster presentation by Master's student: M. Beckley, S. Kok, Comparison of sampling methods for use with Kriging, 56th Annual Conference of the South African Statistical Association, Rhodes University, Grahamstown, 27–30 October, 2014.
6. 2014 Best presentation by Ph.D. student: N. Govender, D.N. Wilke, S. Kok, Fast Collision Detection on the GPU for particle simulations, CHPC National Meeting and Conference (CHPC 2014), Kruger National Park, 1–5 December, 2014.
7. 2015 Best student presentation: N. Govender, S. Kok, D.N. Wilke, Blaze-DEM a convex polyhedral particle discrete element framework for NVIDIA GPUs, 4th African Conference on Computational Mechanics (AfriCOMP'15), Marrakech, Morocco, 7–9 January, 2015.
8. 2015 Joseph Arenow Prize: A.E.J. Bogaers, Best PhD student in the EBE Faculty, University of Cape Town.
9. 2017 Joseph Arenow Prize: L. Gregor, Best PhD student in the Science Faculty, University of Cape Town.

9.3 Teaching awards and prizes

1. 1997 Selected to the Incomplete List of Teachers Ranked as Excellent, University of Illinois at Urbana-Champaign, USA.
2. 1998 Selected to the Incomplete List of Teachers Ranked as Excellent, University of Illinois at Urbana-Champaign, USA.
3. 2007 Meritorious Lecturer Award, Department of Mechanical and Aeronautical Engineering, University of Pretoria.
4. 2020 Departmental recipient of the UP Awards for Teaching Excellence.

9.4 Other honors and awards

1. 1991 AECI Bookprize for best 1st year student Mech. Eng. at UP.
2. 1993 GH Marais Medal and Prize for best 3rd year student Mech. Eng. at UP.
3. 1994 CA du Toit Medal and Prize for best 4th year student in Refr. & Aircond. at UP.
4. 1994 Vice-Chancellor Silver Medal for best final year student in Natural Sciences at UP.
5. 1997 Fulbright scholarship for PhD studies in USA.

6. 1997 FRD Prestigious scholarship for PhD studies abroad.
7. 1997 ASME Rice-Cullimore scholarship
8. 2011 CSIR Modelling and Digital Science excellence award in the category Mentor