

# Professor Nicholas (Nick) Hale

# Curriculum Vitae (March 2021)

CONTACT INFORMATION	Room A410, Applied Mathematics, Private Bag X1, Stellenbosch University, Matieland 7602, South Africa.	+27 (0)21 808 4944 <a href="mailto:nickhale@sun.ac.za">nickhale@sun.ac.za</a> <a href="http://appliedmaths.sun.ac.za/~nhale/">http://appliedmaths.sun.ac.za/~nhale/</a>
NATIONALITY	British	
RESEARCH AREAS	Numerical analysis, scientific computing, and computational software; in particular spectral methods for differential equations, fast algorithms for polynomial and related transforms, numerical solution of fractional differential equations, and numerical complex analysis.	
ORCID ID	<a href="http://orcid.org/0000-0002-2023-0044">http://orcid.org/0000-0002-2023-0044</a>	SA NRF RATING Y1 (2017)
EDUCATION	<b>University of Oxford</b> , Oxford, UK <i>DPhil in Numerical Analysis</i> · Thesis title: <i>On the use of Conformal Maps to Speed Up Numerical Computations</i> · Supervisor: Prof LN Trefethen FRS <b>October 2006 – October 2009</b> <b>Imperial College London</b> , London, UK <i>MSci Mathematics (Hons) - 1st Class</i> · Thesis title: <i>A Sixth-Order Extension to the MATLAB bvp4c Software of J. Kierzenka and L. Shampine</i> · Supervisor: Dr DR Moore <b>October 2002 – June 2006</b>	
PROFESSIONAL EXPERIENCE	<b>University of Stellenbosch</b> , Stellenbosch, South Africa <i>Associate Professor</i> <i>Senior Lecturer</i> <i>Post-doctoral Research Fellowship</i> <b>January 2019 – Present</b> <b>March 2016 – December 2018</b> <b>March 2014 – February 2016</b> <b>Oxford Center for Collaborative Applied Mathematics</b> , Oxford, UK <i>Director of the Chebfun Project</i> · Funded by The MathWorks, Inc. (Producers of MATLAB) <i>Postdoctoral Research Assistant</i> <b>April 2011 – February 2014</b> <b>October 2009 – April 2011</b> <b>University of Oxford Numerical Analysis Group</b> , Oxford, UK <i>Lecturer</i> <i>Teaching Assistant</i> <b>October 2009 – February 2014</b> <b>October 2007 – June 2009</b> <b>St Hugh's College</b> , Oxford, UK <i>Non-stipendiary Lecturer of Mathematics</i> <i>Tutor</i> <b>October 2008 – February 2014</b> <b>October 2007 – October 2008</b>	
RESEARCH METRICS (WEB OF SCIENCE)	Total publications (2000-2019): 15 Total citations (excluding self-cites): 430 Average citations per paper: 29.4 Most highly cited paper: 117 citations h-index: 9	POST-GRADUATE SUPERVISION PhD students: +1 Masters students: 1 + 1 Honours students: 6 + 2 AIMs essay students: 9

SELECTED  
PUBLICATIONS

1. AJ Hutchinson, N Hale, K Born, & DP Mason, Prandtl's extended mixing length model applied to the two-dimensional turbulent classical far wake, *Proceedings of the Royal Society A*, 2021
2. D Fortunato, N Hale, & A Townsend, The ultraspherical spectral element method, *Journal of Computational Physics*, 2020
3. TL Chan & N Hale, Pricing European-type, Early-Exercise and Discrete Barrier Options using an Algorithm for the Convolution of Legendre Series, *Quantitative Finance*, 2020
4. N Hale, An ultraspherical spectral method for linear Fredholm and Volterra integro-differential equations of convolution type, *IMA J. Num. Anal.*, 2018.
5. N Hale & S Olver, A fast and spectrally convergent algorithm for rational-order integral and differential equations, *SIAM J. Sci. Comp.*, *SIAM J. Sci. Comp.*, 2018.
6. N Hale & JAC Weideman, Contour integral solution of elliptic PDEs in cylindrical domains, *SIAM J. Sci. Comp.*, 2015.
7. N Hale & A Townsend, A fast FFT-based discrete Legendre transform, *IMA J. Num. Anal.*, 2015
8. T Driscoll & N Hale, Rectangular spectral collocation, *IMA J. Num. Anal.* 2015.
9. N Hale & A Townsend, An algorithm for the convolution of Legendre series, *SIAM J. Sci. Comp.*, 2014.
10. N Hale & A Townsend, A fast, simple, and stable Chebyshev–Legendre transform using an asymptotic formula, *SIAM J. Sci. Comp.*, 2014.
11. N Hale & A Townsend, Fast and accurate computation of Gauss–Legendre and Gauss–Jacobi quadrature nodes and weights, *SIAM J. Sci. Comp.*, 2013.
12. K Burrage, N Hale & D Kay, An efficient FEM implementation for fractional-in-space reaction-diffusion equations, *SIAM J. Sci. Comp.*, 2012.
13. N Hale & TW Tee, Conformal maps to multiply-slit domains, *SIAM J. Sci. Comp.*, 2009.
14. N Hale, NJ Higham & L. N Trefethen, Computing  $A^\alpha$ ,  $\log(A)$ , and related matrix functions by contour integrals, *SIAM J. Num. Anal.*, 2008.
15. N Hale & LN Trefethen, New quadrature methods from conformal maps, *SIAM J. Num. Anal.*, 2008.

IMPACT FACTORS (WEB OF SCIENCE)	<i>SIAM J. Sci. Comp.</i>	Impact factor: 2.951.	Number of publications 7.
	<i>SIAM J. Num. Anal.</i>	Impact factor: 2.937.	Number of publications 2.
	<i>IMA J. Num. Anal.</i>	Impact factor: 2.506.	Number of publications 4.

## TEACHING & LEARNING

MODULES TAUGHT AT STELLENBOSCH UNIVERSITY	<b>NM262 Numerical methods (Engineering)</b>		
	• Years taught: 2014 – 2019	• Number of students: $\pm 400$ (undergraduates)	
	• Role: Course coordinator/lecturer	• Website: <a href="http://appliedmaths.sun.ac.za/NM262/">http://appliedmaths.sun.ac.za/NM262/</a>	
	<b>TW244 Applied Differential Equations (Science)</b>		
	• Years taught: 2016 – 2018, 2020	• Number of students: $\pm 100$ (undergraduates)	
	• Role: Lecturer	• Website: <a href="http://appliedmaths.sun.ac.za/TW244/">http://appliedmaths.sun.ac.za/TW244/</a>	
	<b>TW324 Numerical methods (Science)</b>		
	• Years taught: 2014 – 2020	• Number of students: $\pm 75$ (undergraduates)	
	• Role: Coordinator (2014 & 2015), Lecturer (2016 – 2020)	• Website: <a href="http://appliedmaths.sun.ac.za/TW324/">http://appliedmaths.sun.ac.za/TW324/</a>	
	<b>TW776/876 Numerical linear algebra (Applied Maths (Hons) &amp; Engineering (MEng))</b>		
	• Years taught: 2017 – 2020	• Number of students: $\pm 50$ (post-graduates)	
	• Role: Lecturer	• Website: <a href="http://appliedmaths.sun.ac.za/TW776/">http://appliedmaths.sun.ac.za/TW776/</a>	

TEACHING SCORES 2016: 4.26, 85%, 2017: 4.21, 85%, 2018: 4.36, 86%, 2019: 4.22, 87% 2020: 4.75, (No % given)

SELECTED QUOTES FROM TEACHING EVALUATIONS “Dr Hale is an excellent professor and explains everything very clearly. He is approachable and has made this my favourite module”, “Enthusiasm”, “Effort put into the learning material. Great structure of online slides”, “Enthusiasm, friendly attitude”, “Lecturer communicated clearly”, “Lecturer was always organised”, “Sense of humour”, “Clear and descriptive communication”, “Best lecturer I had this year”, “All hail Dr Nick”