



Professor M. Ahmer Wadee

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Professor of Nonlinear Mechanics
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Biography:

Professor M. Ahmer Wadee obtained his Bachelor of Engineering degree in Civil Engineering in 1994 and his Master of Science degree in Structural Steel Design in 1995 both from Imperial College London, UK. His research career began in the Department of Mechanical Engineering at the University of Bath where he studied for his PhD (completed 1998) under the supervision of Professor Giles Hunt. He specialized in the analytical modelling of nonlinear interactions between local and global buckling modes in sandwich struts that led to buckle pattern localization. Subsequently, he remained in Bath working on a collaborative project in the interdisciplinary Centre for Nonlinear Mechanics, which led to seminal work on the analytical modelling of layered materials and structures, including the modelling of complex instabilities such as kink banding as found in many structures at many different scales. In 1999, Professor Wadee returned to Imperial to take up a lectureship in his former Department. Since then, he has continued to conduct and supervise research in various areas of nonlinear structural instabilities: continuing work on sandwich structures, thin-walled structures along with modelling layered and laminated materials. A particular highlight has been the discovery that thin-walled prismatic members undergoing simultaneous global and local buckling can exhibit so-called “cellular buckling” (or “snaking”), a phenomenon which has also been found in cylindrical shells, twisted rods and kink bands.

Professor Wadee has co-authored well over 120 articles in journals and conferences and has been involved in several funded research projects. He has also been awarded prizes by the Institution of Civil Engineers and the Institute of Mathematics and its Applications for his research work. He was promoted to Senior Lecturer in 2007, then to Reader in Nonlinear Mechanics in 2011 and subsequently to his current position in 2015 where he is now Professor of Nonlinear Mechanics at Imperial leading the Nonlinear Structural Stability research group. In 2011, he was elected a Fellow of the Institute of Mathematics and its Applications. He currently serves on the Editorial Board of the Elsevier journal “Structures” and as the Vice Chairman of the Stability Committee of the ASCE

Engineering Mechanics Institute. In 2014, he was listed by the UK Science Council as one of the 100 leading practising scientists in the country.

Selected Publications:

Hunt, G. W. and Wade, M. A., 1998. Localization and mode interaction in sandwich structures. *Proc. R. Soc. A*, 454(1972):1197–1216.

Wadee, M. A., 2000. Effects of periodic and localized imperfections on struts on nonlinear foundations and compression sandwich panels. *Int. J. Solids Struct.*, 37(8):1191–1209.

Hunt, G. W., Peletier, M. A., Champneys, A. R., Woods, P. D., Wade, M. A., Budd, C. J. and Lord, G. J. Cellular buckling in long structures. *Nonlinear Dyn.*, 21(1):3–29, 2000.

Wadee, M. A. and Blackmore, A., 2001. Delamination from localized instabilities in compression sandwich panels. *J. Mech. Phys. Solids*, 49(6):1281–1299.

Wadee, M. A., Hunt, G. W., and Peletier, M. A., 2004. Kink band instability in layered structures. *J. Mech. Phys. Solids*, 52(5):1071–1091.

Wadee, M. A. and Edmunds, R., 2005. Kink band propagation in layered structures. *J. Mech. Phys. Solids*, 53(9):2017–2035.

Wadee, M. K., Wade, M. A., Bassom, A. P., and Aigner, A. A., 2006. Longitudinally inhomogeneous deformation patterns in isotropic tubes under pure bending. *Proc. R. Soc. A*, 462(2067):817–838.

Saito, D. and Wade, M. A., 2008. Post-buckling behaviour of prestressed steel stayed columns. *Eng. Struct.*, 30(5):1224–1239.

Wadee, M. A., Yiatros, S. and Theofanous, M., 2010. Comparative studies of localized buckling in sandwich struts with different core bending models. *Int. J. Non-Linear Mech.*, 45(2):111–120.

Wadee, M. A. and Gardner, L., 2012. Cellular buckling from mode interaction in I-beams under uniform bending. *Proc. R. Soc. A*, 468(2137):245–268.

Wadee, M. A., Völlmecke, C., Haley, J. F. and Yiatros, S., 2012. Geometric modelling of kink banding in laminated structures. *Phil. Trans. R. Soc. A*, 370(1965):1827–1849.

Wadee, M. A. and Bai, L., 2014. Cellular buckling in I-section struts. *Thin-Walled Struct.*, 81:89–100.

Wadee, M. A. and Farsi, M., 2014. Cellular buckling in stiffened plates. *Proc. R. Soc. A*, 470(2168):20140094.

Bai, L. and Wade, M. A., 2015. Imperfection sensitivity in thin-walled I-section struts susceptible to cellular buckling. *Int. J. Mech. Sci.*, 105:162–173.

Madrazo-Aguirre, F., Wade, M. A. and Ruiz-Teran, A. M., 2015. Non-linear stability of under-deck cable-stayed bridge decks. *Int. J. Non-Linear Mech.*, 77:28–40.

Zschernack, C., Wadee, M. A. and Völlmecke, C., 2016. Nonlinear buckling of fibre-reinforced unit cells of lattice materials. *Compos. Struct.*, 136:217–228.

Bai, L. and Wadee, M. A., 2016. Slenderness effects in thin-walled I-section struts susceptible to local–global mode interaction. *Eng. Struct.*, 124:128–141.

Yu, J. and Wadee, M. A., 2017. Mode interaction in triple-bay prestressed stayed columns. *Int. J. Non-Linear Mech.*, 88:47–66.

Shen, J., Wadee, M. A. and Sadowski, A. J., 2017. Interactive buckling in long thin-walled rectangular hollow section struts. *Int. J. Non-Linear Mech.*, 89:43–58.

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Brief CV

Home page: <http://www.imperial.ac.uk/people/a.wadee>

Higher Education

Imperial College London: 1991-5

1994 BEng in Civil Engineering (with 1st class honours)

1995 MSc in Structural Steel Design (with distinction and top student in cohort)

University of Bath: 1995-8

1998 PhD in Mechanical Engineering

Thesis title: "Localized buckling in sandwich structures"

Supervisor: Professor Giles W. Hunt

Academic Appointments

Centre for Nonlinear Mechanics, University of Bath, UK

1998–1999 Post-Doctoral Research Officer

Department of Civil and Environmental Engineering, Imperial College London, UK

1999–2007 Lecturer

2007–2011 Senior Lecturer

2011–2015 Reader in Nonlinear Mechanics

2015–present Professor of Nonlinear Mechanics

Visiting Appointments

2010 Visiting Research Fellow at the University of the Witwatersrand, Johannesburg, SA

2016 Distinguished Visiting Scholar, The University of Hong Kong, Hong Kong

2016 Visiting Professor at the University of Western Sydney, Australia

Professional Qualifications

2002 Chartered Mathematician: The Institute of Mathematics and its Applications

2005 Chartered Scientist: The Science Council of the UK

Principal Honours and Awards

1994 Bingham Cotterell Undergraduate Prize from Imperial College London

2007 Catherine Richards Prize from The Institute of Mathematics and its Applications

2007 Trevithick Prize from the Institution of Civil Engineers

2011 Elected Fellow of The Institute of Mathematics and its Applications

2014 Listed by the UK Science Council as one of the leading 100 practising scientists in the country

- 2016 Awarded the H. K. Cheng Structural Engineering Fellowship from The University of Hong Kong
2016 Elected Vice Chairman of the ASCE/EMI Stability Committee

Memberships of Learned Societies and Professional Institutions

Fellow of the Institute of Mathematics and its Applications
Member of the Society of Industrial and Applied Mathematics
Member of the European Mechanics Society (EUROMECH)
Member of the Society of Engineering Science
Member of the Royal Institution of Great Britain
Associate Member of the American Society of Civil Engineers
Graduate Member of the Institution of Structural Engineers
Graduate Member of the Institution of Civil Engineers

ASCE Research Group Profile URL

<http://www.asce.org/engineering-mechanics/emi-research-profiles/stability-research-at-imperial-college-london/>