Professor David Roger Jones Owen
FRS, FREng, DSc, PhD, MSc, Bsc

See:

School of Engineering
Department of Civil Engineering
Swansea University

Research area: Solid and Structural Mechanics

Professor Owen is the author of six textbooks and over four hundred scientific publications. In addition to being the editor of thirty monographs and conference proceedings, Professor Owen is also the editor of the International Journal for Engineering Computations and is a member of several Editorial Boards. His involvement in academic research has lead to the supervision of over sixty Ph.D. students.

Professor Owen's research, in the field of solid and structural mechanics, has centred on the development of solution procedures for non-linear problems encountered in science and engineering. After undertaking his initial degrees at University of Wales Swansea, he completed his Ph.D. at Northwestern University, USA, under the guidance of Prof. T. Mura, in the field of Theoretical and Applied Mechanics. This work, and also his early post-doctoral experience as Walter P. Murphy Research Fellow at Northwestern, involved both the analytical and computational study of fundamental plastic material deformation described by continuously distributed dislocation mechanisms. Professor Owen subsequently returned to University of Wales Swansea to take up an

academic post in the Department of Civil Engineering, where under the influence of Prof. O. C. Zienkiewicz, he developed an interest in computational methods. From that time, Prof. Owen has contributed prominently to the development of computational strategies for plastic deformation problems, both for fundamental material studies and for application to Civil and Mechanical structures and components.

Over the last decade or so, Prof. Owen's work has focused on the development of discrete element methods for particulate modelling and the simulation of multi-fracturing phenomena in materials. This work has extended developments in continuum based finitely deforming solids by including damage/fracture based failure and introducing material separation on a local basis to permit modelling of the degradation of a continuum into a multi-fractured particulate state. Based upon this methodology, contributions have been made to fundamental understanding in several key application areas; including explosive simulations which necessitates coupling of the multi-fracturing solid behaviour with the evolving detonation gas distribution, deep level mining operations, defence problems related to high velocity impact, structural failure predictions for impact, seismic and blast loading.

Professor Owen is involved in national and international scientific affairs. He is a member of the Executive Council of IACM (International Association for Computational Mechanics) and is a Board Member of the European Council for Computational Mechanics (ECCM). He is also Past Chairman of the UK Association for Computational Mechanics in Engineering. Prof. Owen was a member of the Research Assessment Exercise panel for Civil Engineering in 2001 and has been appointed to similar panels for the corresponding exercise in Mechanical Engineering for the Netherlands in 2000 and Deutsche Forschungsgemeinshaft (DFG), Germany in 2006 and 2007. He was also a member of the International Advisory Board for the Institute for High Performance Computing in Singapore for a five year period. Due to his industrial involvement, Professor Owen has served for over ten years as elected Council Member of NAFEMS, which is an international organisation aimed at establishing standards and quality assurance procedures for the safe use of finite element methods. He is also the founder and Chairman of Rockfield Software Ltd, a leading SME providing high-technology computational services to the international engineering community.

Awards and Distinctions:

Prof. Owen's contribution to research has been recognised by the following awards and distinctions:

Elected Fellow of the Royal Academy of Engineering in 1996.
Awarded an Honorary D.Sc. by the University of Porto, Portugal in 1998.
Received the Computational Mechanics Award of the International Association for Computational Mechanics (IACM) in 2002.
Awarded the Warner T. Koiter Medal of the American Society of Mechanical Engineers (ASME) in 2003 for "contributions to the field of theoretical and computational solid mechanics".
Awarded the Gauss-Newton Medal of IACM in 2004 for "outstanding contributions in the field of computational mechanics".
Awarded the Gold Medal of the University of Split, Croatia in 2004 for "international achievements in the field of computational mechanics".
Awarded the Premier Medal of the Spanish Society for Computational Mechanics (SEMNI) in 2005 in "recognition of his outstanding scientific work".
Awarded an Honorary D.Sc. by ENS Cachan, France, 2007.
Elected Fellow of the Royal Society in 2009.

Elected Foreign Member of the US National Academy of Engineering in 2011.

Named Lectures:

In addition to the presentation of numerous plenary lectures at the leading international conferences in the field of computational mechanics, Prof. Owen has also been invited to deliver the following named lectures:

2002 Prestige Lecture of the Institution of Civil Engineers and the Royal Academy of Engineering
2003 Warner T. Koiter Lecture of the American Society of Mechanical Engineers
2007 Alan Jennings Memorial Lecture, Queen's University Belfast

Selected Publications:

D. R. J. Owen and T. Mura
Periodic dislocation distributions in a half-space. J. Applied Physics, Vol. 38, No.5, pp. 1999-2009, 1967.
D. R. J. Owen
Solutions to arbitrarily oriented periodic dislocation and eigenstrain distributions in a half-space. Int. J. Solids & Structures, Vol. 7, pp. 1343-1361, 1971.
D. R. J. Owen
The application of dislocation theory to the determination of stress-strain relationships of composite materials. Int. J. Nonlinear Mechanics, Vol. 6, pp. 167-175, 1971.
J. R. Griffiths and D. R. J. Owen
An elastic-plastic stress analysis for a notched bar in plane strain bending. J. Mech. Phys. Solids, Vol.19, pp. 419-430, 1971.
R. N. Haward and D. R. J. Owen
The detergent stress-cracking of polyethylene. Proc. Roy. Soc. A, Vol. 352, pp. 505-521, 1977.
D. R. J. Owen and J. A. Figueiras
Anisotropic elasto-plastic finite element analysis of thick and thin plates and shells. Int. J. Num. Meth. Engng. Vol. 19, pp. 1-26, 1983.
D. R. J. Owen and J. M. M. C. Marques
Implicit-explicit time integration in quasistatic elasto-viscoplasticity using finite and infinite elements. Comp. Meth. Appl. Mech. & Engng. Vol. 42, pp. 167-182, 1984.
D R. J. Owen and Z. H. Li
Elastic-plastic dynamic analysis of anisotropic laminated plates. Comp. Meth. in Appl. Mech.& Engng., Vol. 70, pp. 349-365, 1988.
D. Peric, D. R. J. Owen and M. E. Honnor
A model for finite strain elasto-plasticity based on logarithmic strains: Computational issues. Comp. Meth. in Appl. Mech. & Engng, Vol 94, pp.35-61, 1992
D. Peric and D. R. J. Owen
Computational model for 3-D contact problems with friction based on the penalty method. Int. J. Num. Meth. Engng. Vol 35, pp 1289-1309, 1992.
E. A. de Souza Neto, D. Peric and D. R. J. Owen
On the numerical simulation of elasto-plastic damage at finite strains. Archives of Computational Mechanics, CIMNE Publications, Barcelona, 1997.
D. Peric, J. Yu and D. R. J. Owen

On error estimates and adaptivity in elasto-plastic solids : Applications to the numerical simulation of strain localisation in classical and Cosserat continua. Int. J. Num. Meth. Engng., Vol. 37,pp. 1351-1379, 1994.

Y. T. Feng, D. R. J. Owen and D. Peric
A block Conjugate Gradient method applied to linear systems with multiple right hand sides. Comp. Meth. Appl. Mech. & Engng. Vol. 127 (1-4), pp. 203-215, 1995

E. A. de Souza Neto, K. Hashimoto, D. Peric and D. R. J. Owen
A phenomenological model for frictional contact of coated steel sheets accounting for wear effects : Theory, experiments and numerical simulations. Phil. Trans. Roy. Soc. Lond. A, Vol 354, 1-25, 1996.

Y. T. Feng, D. Peric and D. R. J. Owen
A non-nested Galerkin multi-grid method for solving linear and nonlinear solid mechanics problems. Comp. Meth. Appl. Mech. & Engng., Vol. 144, pp. 307-325, 1997.

D. Peric and D. R. J. Owen
Finite element applications to the nonlinear mechanics of solids. In:Reports on Progress in Physics, Institute of Physics, Vol 61, N0. 11, pp. 1495-1574, 1998.

D. R. J. Owen and M. Vaz Jr.
Computational techniques applied to high-speed machining under adiabatic strain localisation conditions, Comp. Meth. Appl. Mech. & Engng, Vol 171, pp 445-461, 1999

A. Munjiza, D. R. J. Owen and N. Bicanic
A combined finite/discrete element method in transient dynamics of fracturing solids. Int. J. Engng Comp., Vol. 12, pp. 145-174, 1995.

P. A. Klerck, E. J. Sellers and D. R. J. Owen
Discrete fracture in quasi-brittle materials under compressive and tensile stress states. Comp. Meth in Appl. Mech & Engng. Vol. 193: pp. 3035-3056, 2004.

D. R. J. Owen, Y. T. Feng, E. A. de Souza Neto, M. Cottrell, F. Wang and F. M. Andrade Pires, The Modelling of Multi-Fracturing Solids and Particulate Media, Int. J. Num. Meth. Eng., Vol. 60(1): pp. 317-340, 2004

D. Peric and D. R. J. Owen
Computational modeling of forming processes, Chapter 14 in Encyclopedia of Computational Mechanics, Volume 2: Solids and Structures, (edited by E. Stein. R. de Borst and T. J. R. Hughes), pp 461-511, J. Wiley, Chichester, 2004.

K. Han, Y. T. Feng and D. R. J. Owen
Polygon-based contact resolution for superquadrics. Int. J. Numer. Meth. Engng. Vol. 66(3), pp. 485-501, 2006.

C.F. Li, Y. T. Feng and D. R. J. Owen
SMB: Collision detection based on temporal coherence. Comp. Meth. Appl. Mech. Engng. Vol. 195(19-22), pp. 2252-2269, 2006.

A. J. L. Crook, D. R. J. Owen, S. M. Willson and J. Yu
Benchmarks for the evolution of shear localisation with large relative sliding in frictional materials, Comp. Meth in Appl. Mech & Eng. Vol. 195, pp. 4991-5010, 2006.

A. J. L. Crook, S. M. Willson, J. G. Yu and D. R. J. Owen
Predictive modelling of structure evolution in sandbox experiments, J. Structural Geology, Vol. 28, pp. 729-744, 2006.

C. F. Li, Y. T. Feng and D. R. J. Owen
Explicit solution of the stochastic system of linear algebraic equations $(a1A1 + a2A2 + ... + amAm) x = b$, Comp. Methods Appl. Mech. Engng., Vol. 195 (44-47), pp. 6560-6576, 2006.

R. J. Pine, D. R. J. Owen, J. S. Coggan and J. M. Rance

A new discrete fracture model for rock masses, Geotechnique, Vol. 57 (9), pp 757–766, 2007.

M. Vaz, D. R. J. Owen, V. Kalhori, M. Lundblad and L.-E. Lindgren

Modelling and simulation of machining processes, Archives of Computational Mechanics, Vol. 14, pp 174 – 204, 2007.

D. R. J. Owen, F. M. Andrade Pires and E. A. de Souza Neto

A computational model for viscoplasticity coupled with damage including unilateral effects. In: Computational Plasticity, E. Onate and R. Owen (Eds), pp 145 – 164, Springer, 2007.

K. Han, Y. T. Feng and D. R. J. Owen

Numerical simulation of irregular particle transport in turbulent flows using coupled LBM-DEM, Computer Modelling in Engineering & Science, Vol. 18 (2), pp 87 – 100, 2007.

Y. T. Feng, K. Han and D. R. J. Owen

Coupled lattice Boltzmann method and discrete element modeling of particle transport in turbulent fluid flows: Computational issues, Int. J. Num. Meth. In Engng., Vol 72, pp 1111-1134, 2007.

Y. T. Feng, K. Han, C. F. Li and D. R. J. Owen

Discrete thermal element modeling of heat conduction in particle systems: Basic formulations, J Computational Physics, Vol. 227, pp 5072-5089, 2008.

C.F. Li, Y. T. Feng, D. R. J. Owen and I. M. Davies

A Fourier-Karhunen-Loève representation scheme for wide-sense stationary stochastic fields. Int. J. Numer. Meth. Engng. 73(13), 1942-1965, 2008.

K. Han, Y. T. Feng and D. R. J. Owen

Modelling of Thermal Contact Resistance Using Thermal Lattice Boltzmann Method.; International Journal of Thermal Sciences. 47(10), 1276-1283, 2008.

D. R. J. Owen, Y. T. Feng, K. Han and J. Yu

Fluid/structure coupling in fracturing solids and particulate media. Geomechanics and Geoengineering, 4, 27-37, 2009.

D. R. J. Owen

Olgierd (Olek) Zienkiewicz (18th May 1921-2nd January 2009). Bibliographical Memoirs of the Royal Society, 2009.