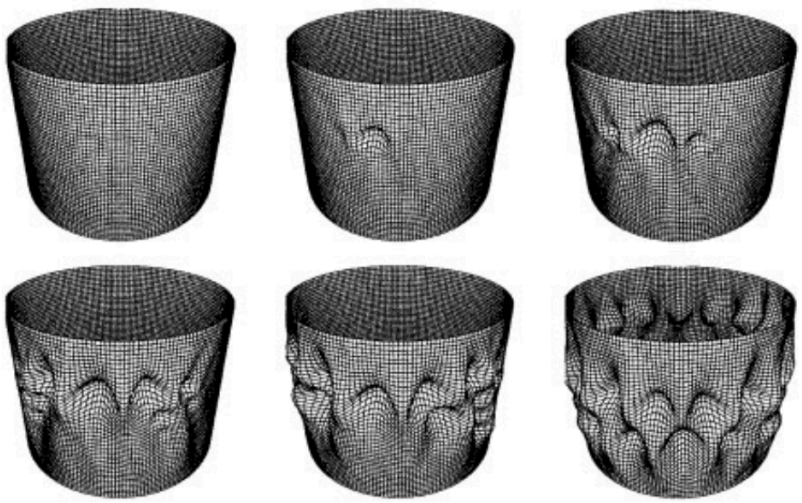

From: “Cylindrical Shell Buckling: A Characterization of Localization and Periodicity” by Hunt, Lord & Peletier, 2003

Professor Gabriel J. Lord

See:
http://www.ma.hw.ac.uk/~gabriel/
http://www.informatik.uni-trier.de/~ley/db/indices/a-tree/l/Lord:Gabriel_J=.html
http://www.researchgate.net/researcher/13368427_Gabriel_J_Lord
http://www.goodreads.com/author/show/4290193.Gabriel_J_Lord
http://booksonlinechoice.com/Gabriel-J-Lord/m41029/
http://www.amazon.co.uk/s?_encoding=UTF8&search-alias=books-uk&field-author=Gabriel%20J%20Lord

School of Mathematical and Computer Sciences
Heriot-Watt University, Edinburgh, UK

Director of the MSc Programmes in Mathematics
Faculty advisor for SIAM student chapter

Autobiography:

I obtained my PhD from Bath university where I worked with Prof Andrew Stuart on the dynamics of numerical methods for initial value problems. After my PhD I had a post-doc position at Bristol university working on localized solutions and cylinder buckling.

I worked in industry for three years at the National Physical Laboratory where there is a great interest in noise an uncertainty in measurements. I returned to academia and started at Heriot-Watt in 2000.

I am always keen to work with graduate students interested in numerical methods, dynamical systems, stochastics and applications of mathematics in particular related to porous flow or mathematical neuroscience but also other areas of applied mathematics.

Research Interests:

Stochastic DEs: Much of my recent work has looked at the role of noise in systems and how this can be simulated and methods for reducing uncertainty and hence obtain better predictions. I am intersted in the numerical solution of stochastic differential equations. I am developing new numerical methods based on exponential integrators.

Porous Media: With Prof Sebastian Geiger in IPE I am developing efficient solvers for 3D flow in heterogeneous porous media. These model potential ground water contamination, underground reservoirs, subsurface storage. These lead to We are examining multilevel MC methods, upscaling, and modelling with stochastic forcing and random fields.

Neuronal Dynamics: Computational models are being increasingly used to gain insight into the behaviour and information processing abilities of neurons. We are interested in models of single neurons, coupled neuron dynamics as well as neural field models. Editor of Stochastic Methods in Neuroscience. Looking at reactions and movements of vesicules, reaction with snap25 and syntaxin.

Buckling of Cylindrical Shells: Work on buckling cylinders in primarily driven by the need for light strong structures (such as silos, rockets, aircraft) and the desire to understand how these structures fail. As anyone who has crushed a can knows - cylinders are very strong but then buckle suddenly with a great release of energy. I am looking at the buckling of thin cylinders under axial compression, and the numerical solution of the von Karman-Donnell equations with a quantitative comparison between experimental and numerical results.
With Jiri Horak (University of Cologne) and Mark Peletier (Eindhoven,NL) we have been investigating the isotropic cylinder and role of a mountain pass solution. With Alan Champneys (Eng Maths, Bristol), Giles Hunt (Mech Eng, Bath), Mark Peletier (Eindhoven,NL) we examined the isotropic cylinder and the maxwell load.

Computational PDEs: The direct approximation of global attractors and the convergence of discrete inertial manifolds and global attractors. Numerical solution of partial differential equations, specifically in the context of dynamical systems. In particular the long-time dynamical behaviour and the process through which chaos (or unpredictability) appears in dynamical systems and investigating how it may be reasonably approximated numerically. In recent work have looked at Epsilon-Entropy, a measure of complexity, in the limit of unbounded domains. This is joint work with Jacques Rougemont on EPSRC grant GR/R29949/01.

In General: Differential equations, dynamical systems, scientific computing, numerical analysis, numerical continuation, computational neuroscience, numerics for stochastic (partial) differential equations.

Selected publications:

Book : Stochastic Methods in Neuroscience. OUP. Edited by C. Laing and G. J. Lord

G.W. Hunt, Centre for Nonlinear Mechanics University of Bath, Bath BA2 7AY, UK
G.J. Lord, Department of Mathematics, Heriot-Watt University, UK
M.A. Peletier, Centrum voor Wiskunde en Informatica PO Box 94079, 1090 GB Amsterdam, NL, "Cylindrical Shell Buckling: A Characterization of Localization and Periodicity", discrete And Continuous Dynamical Systems–Series B Vol. 3, No. 4, November 2003, pp. 505–518.

P. E. Kloeden, G.J. Lord, A. Neuenkirch, T. Shardlow.The exponential integrator scheme for stochastic partial differentialequations: Pathwise error bounds Journal of Computational and Applied Mathematics Volume 235, Issue 5, 1 January 2011, Pages 1245-1260doi:10.1016/j.cam.2010.08.011

A. Tambue,G. J. Lord and S. Geiger. An exponential integrator for advection-dominated reactive transport in heterogeneous porous media Journal of Computational Physics

J. Horak, G. J. Lord, M. A. Peletier Numerical variational methods applied to cylinder buckling , SIAM J. Sci Comp. March 2008. DOI 10.1137/060675241

M Grinfeld and G J Lord Bifurcations in the regularized Ericksen bar model J. of Elasticity, Feb 2008. DOI 10.1007/s10659-007-9137-x

Online papers and preprints