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**Department of Applied Mathematics and Theoretical Physics**

***DAMTP***

**University of Cambridge**

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*Wilberforce Road, Cambridge, CB3 0WA.*

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www.homepages.ucl.ac.uk/~ucess21

***Editor 1998-07, Phil Trans Roy Soc, Series A***

***Mathematical, Physical & Engineering Sciences***

www.pubs.royalsoc.ac.uk

# Professor J.M.T. Thompson, FRS

***Honorary Fellow***

**J. Michael T. Thompson, FRS**

**A. Personal Curriculum Vitae**

**1. A Brief Summary**

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**3. Scientific and Professional Activities**

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**6 Public Understanding of Science: Lectures, DVDs, Websites**

**B. Centre for Nonlinear Dynamics, UCL**

**7. Activities of Dynamics Group 1991-95**

**8. Staff of Dynamics Group 1996-97**

**9. Earnings of Dynamics Group 1980-1997**

**1. A Brief Summary**

**Cambridge University, 1955-64**

First Class Honours in Mechanical Sciences, **B.A.** (1958), **M.A.** (1962)

Prizes: *Rex Moir*, *Archibald Denny*, *John Winbolt*

Higher degrees: **Ph.D.** (1962), **Sc.D.** (1977)

Research Fellowship, Peterhouse, 1961-64

**University College London, 1964-2002**

Professor of Structural Mechanics, 1977-91

Senior Fellow, Science & Engineering Research Council, 1988-93

Professor of Nonlinear Dynamics, 1991-2002 (now Emeritus Professor)

Founder and Director of *Centre for Nonlinear Dynamics*, 1991

**Centre for Nonlinear Dynamics and its Applications, 1991-2002**

This had 31 members: 3 staff, 2 industrial professors, 10 fellows, 16 post-graduates

The MSc course was recognized and supported by EPSRC for many years

Royal Society Research Fellowships: McRobie, Davies, Popov, Heijden

£2 million earned in grants & awards

From 2002 it has become a virtual Centre, linking researchers in many UCL Depts

**Visiting Appointments**

Fulbright Research Associate, Aeronautics & Astronautics, Stanford, 1962-3

Visiting Professor, Faculté des Sciences, Université Libre de Bruxelles, 1976-8

Visiting Mathematician, Brookhaven National Laboratory, New York, 1984

**IUTAM Symposia organised at UCL**

*Collapse: the buckling of structures in theory and practice*, 1982

*Nonlinearity and chaos in engineering dynamics*, 1993

**Principal Honours and Awards**

Fellow of the Royal Society, 1985. Elected to the Council, 11 July 2002

OMAE Award, American Society of Mechanical Engineers, 1985

James Alfred Ewing Medal, Institution of Civil Engineers, 1992

Honorary Doctor of Science (DSc), University of Aberdeen, 2004

Gold Medal of the IMA for contributions to mathematics, 2004

Lyapunov Award (American Society of Mechanical Engineers), 2013

**Industrial Collaborations & Activities**

W.S. Atkins: resonance of articulated moorings, 1984; ships in waves, 1992

Defence Research Agency: long-term contract on transient capsize (1989-98)

British Aerospace: flight dynamics of the Harrier Jump-jet, 1996

SAIPEM: consultancy on the twisting of off-shore pipelines in deep water

**Chairman, Board of Directors, ES-Consult 1995-**

ES-Consult worked on tuned dampers for Great Belt Bridge (was world's longest span)

**Books Published (by John Wiley)**

*A General Theory of Elastic Stability*, 1973

*Instabilities & Catastrophes in Science & Engineering*, 1982 (Trans: Russia, Japan)

*Elastic Instability Phenomena*, 1984

*Nonlinear Dynamics and Chaos*, 1986 (Trans: Japan, Italy). Second Edition, 2002

**Editor, Philosophical Transactions (A) of the Royal Society, 1998-07**

Special Issues: *Three Millennium Issues*, 1999, 2000. *Triennial Series*, 2002-

Created the new ***Royal Society Series on Advances in Science***, with the first book:

Advances in Astronomy, ed. JMT Thompson, Imperial College Press, 2005.

**Research Papers**

Based on first 210 papers, some journals (with approx numbers of papers in each) are:

*Phil. Trans. R. Soc. A.*  (20)  *Int. J. Solids & Structures* (5)

*Proc. R. Soc. A.*  (18) *Dynamics & Stability of Systems* (5)

*J. Mech. Phys. Solids* (13) *Physica D* (3)

*Physics Letters* (6) *J. Appl. Math. Phys. (ZAMP)* (3)

*Int. J. Mech. Sci.* (8) *Int. J. Non-Linear Mechanics* (3)

*Int. J. Bifn & Chaos* (7) *Physical Review* (4)

*J. Sound & Vibration*  (6) *Nature* (3)

**Some Opening and Keynote Lectures**

General Lecture, *14th* IUTAM *Congress*, Delft, 1976

General Lecture, *28th* British *Theoretical Mechanics* Meeting, Bristol, 1986

General Lecture to the *General Assembly* of IUTAM, London, 1986

Opening, AFOSR/ARO Conference, *Nonlinear Vibrations*, Blacksburg, 1987

Closing, Roy. Soc. Meeting on *Newton's Principia* *and its Legacy*, London, 1987

Fellowship of Engng, *Chaos & the danger of unpredictable failure*, London, 1990

Keynote, *2nd* World Congress, *Computational Mechanics*, Stuttgart, 1990

General Lecture, Spring Conference, *Institute of Acoustics*, Southampton, 1990

Plenary, *1st* European *Nonlinear Oscillations* Conference, Hamburg, 1993

Plenary, *Dynamics Day '94*, Theoretical Physics, Eötvös University, Budapest, 1994

Plenary, Conf. *Theory of Ordinary & Partial Differential Equations*, Dundee, 1996

Opening, Conference, *Structural Dynamics*, Palazzo Vecchio, Florence, 1996

Keynote, IUTAM Symp. *Applics Nonlinear ... Dynamics in Mechanics*, Cornell, 1997

Opening, IMA Conf. *Bifurcations: the use and control of chaos*, Southampton, 2003.

**Honorary Fellow, Department of Applied Mathematics and Theoretical Physics**

**(DAMTP), Cambridge University, 2003-**

Lectures in the Millennium Mathematics Project for thepublic understanding of mathematics in the Centre for Mathematical Sciences:

*Chaos and Fractals* (22 Jan 2004). *Instabilities and Catastrophes* (11 Nov 2004).

Popular science lectures available online from [www.xscite.com/MichaelThompson](http://www.xscite.com/MichaelThompson)

**Sixth Century Professor in Theoretical and Applied Dynamics, Aberdeen**

Part–time distinguished chair (20%), from April 2006, University of Aberdeen.

**2. A Chronological Summary**

**J.M.T. Thompson, FRS**

**Summary of *Curriculum Vitae***

*Full Name*: John Michael Tutill Thompson

*Date of Birth*: 7 June 1937

Married with two children

**Hull Grammar School, 1948-55**

Lord Mayor's Prize for Mathematics, 1954

**Clare College, Cambridge, 1955-61**

Major Scholarship and DSIR Research Studentship

First Class Honours Degree in the Mechanical Sciences Tripos

Top prizes of the Engineering Faculty:

*Rex Moir* *Prize* for Part I of the Tripos

*Archibald Denny* *Prize* for Part II of the Tripos

*John Winbolt* *Prize* for research essay, 1960

Degrees: **BA,** 1958; **MA,** 1962; **PhD,** 1962

**Research Fellowship, Peterhouse, Cambridge, 1961-64**

Visiting Research Associate with Fulbright grant in the

Department of Aeronautics & Astronautics, Stanford University, 1962-3

**DEPARTMENT OF CIVIL ENGINEERING, UNIVERSITY COLLEGE LONDON:**

**LECTURER, 1964-68**

Lecture tour of North America, 1965

**READER in Structural Mechanics, 1968-77**

Fellow of the Institute of Mathematics & its Applications, **FIMA,** 1970

*A General Theory of Elastic Stability*, Wiley, London, 1973

Visiting Professor, Faculté des Sciences, Université Libre de Bruxelles, 1976-8

**Sc.D.** (Cantab), 1977

**PROFESSOR of Structural Mechanics, 1977-91**

*Instabilities and Catastrophes in Science and Engineering*, Wiley, Chichester, 1982

Scientific Chairman, Organizer & Editor, IUTAM Symposium at UCL, 1982,

*Collapse: The Buckling of Structures in Theory and Practice*

Chairman, Board of Studies in Civil & Mechanical Engineering, Univ. of London, 1984-6

*Elastic Instability Phenomena*, Wiley, Chichester, 1984

Visiting Mathematician, Brookhaven National Laboratory, Long Island, New York, 1984

**Fellow of the Royal Society, FRS,** 1985

OMAE *Award*, American Society of Mechanical Engineers, for a research paper, 1985

*Nonlinear Dynamics and Chaos*, Wiley, Chichester, 1986

General Lecture to the General Assembly of IUTAM, 1986

Opening Keynote Address, AFOSR/ARO Conf. on Nonlinear Vibrations, Blacksburg, 1987

Closing Lecture, Roy. Soc. Meeting on the 300*th* Anniversary of Newton's *Principia*, 1987,

*The Principia and Contemporary Mechanics*

Visiting Research Fellow, Centre for Nonlinear Studies, University of Leeds, 1987-99

**SENIOR FELLOW, Science & Engineering Research Council, 1988-93**

**Council** of the Institute of Mathematics & its Applications, 1989-92

Ministry of Defence, grant and consultancy on Ship Capsize, 1989-92

Acting Editor, *Phil. Trans. Roy. Soc. Lond., Series A*, 1990

Wolfson Research Award for Computational Dynamics, 1990-93

Organizer and lecturer, IMA Conference, University College London, 1990,

*Chaos: applications in engineering and science*

Editor, First Theme Issue of Phil. Trans. Roy. Soc. Lond. Series A, 1990,

*Chaos and dynamical complexity in the physical sciences*

Lecture course, Centre International des Sciences Mécaniques, Udine, 1990

**DIRECTOR, Centre for Nonlinear Dynamics and its Applications, 1991-2002**

Professor of Nonlinear Dynamics, University of London, 1991-2002

Chartered Mathematician, **C.Math.**, 1991

Grant for research collaborations with Y. Ueda (Kyoto) and H.B. Stewart (Brookhaven),

*Japanese Ministry of Education, Science & Culture (Monbusho)*, 1991-94

Exhibition of Scientific Research at the Royal Society Soirée, 1991,

*Chaos and fractals in mechanics and engineering*

Visit to the Technical Research Centre, and lecture to the Directors, 1991,

*Kansai Electric Power Company, Osaka*

Visit to the Laboratories, and lecture to the Directors, 1991,

*Ship Research Institute, Ministry of Transport, Tokyo*

Editor, Theme Issue of Phil. Trans. Roy. Soc. Lond.(A), 1992,

*Nonlinear dynamics of engineering systems*

**James Alfred Ewing** **Medal**, Institution of Civil Engineers, 1992

Scientific Chairman, Organizer & Editor, IUTAM Symposium at UCL, 1993,

*Nonlinearity and chaos in engineering dynamics*

Lecture course: Centre International des Sciences Mécaniques, Udine, 1993,

*Nonlinear stability of structures: theory and computational techniques*

Grant awarded by the EPSRC, Applied Nonlinear Mathematics Programme, 1994,

*Modal interaction and nonlinear vibrations in shell structures*

Comett II, International University Course, Vienna, 1994,

*Nonlinear oscillations and chaos*

**Chairman, Board of Directors, ES-Consult**, Consulting Engineers, Copenhagen, 1995-

Lecture course: EPSRC Applied Nonlinear Maths, Postgrad. Spring School, Surrey, 1995,

*Nonlinear mathematics and its applications*

Grant for research collaboration with Univ of Strathclyde & Japanese Laboratories, 1995,

*Capsize of intact and damaged ships*

Invited lecture, Danish-American Fund for the Exchange of Technology, Copenhagen, 1995,

*Chaos theory as a tool to solve dynamic stability problems*

Organizer, Minisymposium, 3rd Int Congress Industrial & Applied Maths, Hamburg 1995,

*Nonlinear dynamics and chaos in engineering*

Editor, Theme Issue of Phil. Trans. Roy. Soc. Lond.(A), 1995,

*Chaotic behaviour in electronic circuits*

Contract for research from the Defence Research Agency (Haslar), 1995,

*Transient capsize of surface ships*

Invited lecture, Roy Soc Edinburgh meeting on Chaos & Self Organization in Nature, 1995,

*An introduction to chaotic dynamics: applications in mechanics and ship capsize*

Opening lecture, Eurodyn '96, Conf. Structural Dynamics, Palazzo Vecchio, Florence, 1996,

*Structural dynamics towards the XXIst century: the geometrical approach*

Lecture, Cambridge Philosophical Society, 1996,

*Nonlinear dynamics and chaos*

Editor, Theme Issue of Phil. Trans. Roy. Soc. Lond.(A), 1997,

*Localization and solitary waves in solid mechanics*

Grant awarded by the EPSRC, Applied Nonlinear Mathematics Programme, 1997,

*Localized homoclinic buckling of rods using nonlinear dynamics and bifurcation theory*

Invited keynote lecture, IUTAM Symposium, Cornell, 1997,

*Homoclinic orbits, spatial chaos and localized buckling*

Editor, Theme Issue of Phil. Trans. Roy. Soc. Lond.(A), 1998,

*Nonlinear flight dynamics of high performance aircraft*

**Editor, Philosophical Transactions of the Royal Society,** 1998-07

(*Series A: Mathematical, Physical & Engineering Sciences*)

Editor, Advanced Series in Nonlinear Dynamics, Vol 12, World Scientific, Singapore, 1999,

*Localisation and Solitary Waves in Solid Mechanics*

Compiler and editor, Three Special Millennium Issue of Phil. Trans. A, 1999, 2000

*Science into the next Millennium: young scientists give their visions of the future*

Editor, Theme Issue of Nonlinear Dynamics, 2000

*Solitary Waves and Localisation Phenomena in Elastic Structures*

Exhibition at the Royal Society Soirée, 2000,

*From Newton to Space, Lasers and the Web: Philosophical Transactions (Series A)*

Editor, Theme Issue of Phil. Trans. Roy. Soc. Lond.(A), June 2000,

*The nonlinear dynamics of ships*

Lecture on twisted rods, Budapest, July 2000, Conference on,

*Symmetry and Stability in Nonlinear Mechanics*,

**Elected member of the *Royal Society Club*, 2000.**

Organiser, John Roorda Commemoration Meeting (Sept 2000,UCL) on *Structural Stability*

Lecture, IMA Millennium Event (for World Mathematics Year), Nov 2000, at UCL:

*Super-coiling of DNA plasmids: an application of twisted rod theory*

Opening lecture, Nonlinearity in Engineering Dynamics, Sheffield, Jan, 2001:

*An overview of nonlinear dynamics*

Lecture, IMA-LMS-EPSRC Meeting on Connectivity between Mathematics & Engineering:

*From mathematical dynamics to engineering structures: the static-dynamic analogy*

Editor, Set of 3 Books, Cambridge Univ Press, 2001. *Visions of the Future:*

*(Astronomy & Earth Science, Physics & Electronics, Chemistry & Life Science)*

Emeritus Professor of Nonlinear Dynamics, University of London, 2002-

**Council of the Royal Society (2002-3),** elected, 11 July 2002

*Nonlinear Dynamics and Chaos*, Wiley, Chichester, Second Edition, 2002

Editor, Triennial Series of Christmas Issues, *Visions of the Future by Young Scientists*, 2002-08

To form the basis of the Royal Society book series *Advances in Science*, IC Press.

**Modern Trends in Theoretical and Applied Mechanics** (To celebrate the work of Professor

Michael Thompson), Workshop, Dept of Civil Engineering, UCL, 23-24 April, 2003.

Opening Lecture, IMA Conf. *Bifurcations: the use and control of chaos*, Southampton, 2003.

**HONORARY FELLOW, Department of Applied Mathematics and Theoretical Physics**

**(DAMTP), Cambridge University, 2003-**

Lecture in the Millennium Maths Project for thepublic understanding of mathematics.

*Chaos and Fractals: understanding the unpredictable* (Centre for Mathematical

Sciences, 22 Jan 2004).

External Examiner, Cambridge University Engineering Department, 2004.

Appointed as Honorary Professor in the Engineering and Physical Sciences School, College

of Physical Sciences, University of Aberdeen (1st May 2004 – 30th April 2009).

Editor, Theme Issue of Phil. Trans. Roy. Soc. Lond.(A), July 2004,

*The mechanics of DNA*

**Honorary degree of Doctor of Science (DSc),**

University of Aberdeen, July 2004**.**

**Gold Medal** awarded by the Inst of Maths & its Applications (IMA) at their 40th Anniversary Conf, Univ of Manchester, 2 Sept, 2004.For “**contributions to mathematics**”.

Lecture on *Chaos Theory: The historical emergence of a new branch of mathematics.*

Lecture in the Millennium Maths Project for thepublic understanding of mathematics.

*Instabilities and Catastrophes* (Centre for Mathematical Sciences, 11 Nov 2004).

Scientific Committee, IUTAM Symposium, Hamburg, 2007

*Fluid-Structure Interaction in Ocean Engineering*

Plenary lecture, International Science Summer School, Cambridge University, 29 July, 2005

*Predicting the Unpredictable: seeing Order within Chaos*

Opening lecture, IMA Conference on Recent Advances in Nonlinear Mechanics, Aberdeen University, 30 August, 2005

*An overview of nonlinear phenomena in mechanics*

Recent popular science lectures made available as DVDs and online via

[www.xscite.com/MichaelThompson](http://www.xscite.com/MichaelThompson) (Site maintained by the Science Media Network in association with Cambridge University Science Production)

Created the new ***Royal Society Series on Advances in Science***, with the first book:

Advances in Astronomy: From the Big Bang to the Solar System, ed. JMT Thompson,

Imperial College Press, 2005.

Special Issue of *Nonlinear Dynamics* (An International Journal of Nonlinear Dynamics and Chaos in Engineering Systems): ***Modern Trends in Theoretical & Applied Mechanics –***

***Special Issue in Honour of Michael Thompson*,** Vol 43, Nos 1–2, January 2006.

Opening paper by Lord Chilver, Michael Thompson: His seminal contributions to nonlinear dynamics – and beyond, *Nonlinear Dynamics,* **43**, 3–16 (2006).

**SIXTH CENTURY PROFESSOR in Theoretical and Applied Dynamics, Aberdeen**

Distinguished part–time chair (20%), from April 2006, University of Aberdeen.

**Designated Editor–in–Chief** of Phil. Trans. R. Soc. A on the appointment of 4 Associate

Editors in charge of four new subject clusters:

Giles Davies: Nano–Science, Nano–Engineering and Quantum Computing

Rowan Sutton: Environmental Change and Renewable Energy

Celso Grebogi: Dynamical Systems and Complexity

Blanca Rodriguez: Biophysics, Biological Mathematics and Medical Engineering

**Chairman & Executive Editor (2008–2009), Royal Society's Trailblazing Project**

To establish a web–based timeline of journal articles designed to 'inspire' the general public as part of the Society’s 350th Anniversary celebrations in 2010

Trailblazing went online on 30 November, 2009.

**Schools Masterclass** (Cambridge Science Festival), 5 Mar 2009, Clare College

*How DNA (the molecule of life) keeps itself untangled when working in your body*.

**GEO-ENGINEERING CLIMATE CHANGE**: Environmental necessity or Pandora's Box?

[ed. Brian Launder & J. Michael T. Thompson], Cambridge University Press, 2010.

**TV Science Consultant**

*The Secret Life of Chaos*, BBC 4 (One hour, 14 Jan, 2010)

**Poems on the Underground (Royal Society Project)**

commentary on David Morley’s *Writing a World*, 1 Feb to 30 Mar, 2010.

**Schools Masterclass** (Cambridge Science Festival), 4 Mar 2010, Clare College

*Global Warming: What can we do to stop it?*

**Hungarian Academy of Sciences,** elected Honorary Member, 2010

**Academy of Europe (Academia Europaea), e**lected to Academy, 2010

**Isaac Newton Institute,** lecture on *Climate tipping as a noisy bifurcation: a predictive technique*, workshop on Stochastic Methods in Climate Modelling at the Isaac Newton Institute for Mathematical Sciences, Cambridge (23-27 August 2010).

**Royal Statistical Society,** lecture on climate tipping points, meeting onComplexity and statistics: tipping points and crashes, at the Royal Statistical Society, London (22 Oct 2010).

**RV Jones Lecture**, *From instability to chaos*, Aberdeen University, 26 October, 2011

On the editorial board of *Proc R Soc A*, from 1 January 2012 to 31 December 2014

**Lyapunov Award 2013** (American Society of Mechanical Engineers)

For lifelong impact of research and overall leadership in the field of nonlinear dynamics

**3. Scientific and Professional Activities**

**OPENING, KEYNOTE & GENERAL LECTURES**

Sectional Lecture, *14th* IUTAM *Congress*, Delft, 1976.

General Lecture, *28th* British *Theoretical Mechanics* Meeting, Bristol, 1986.

Invited General Lecture to the *General Assembly* of IUTAM, London, 1986.

Opening Keynote Address, AFOSR/ARO Conf. *Nonlinear Vibrations*, Blacksburg, 1987.

Closing Lecture, Roy. Soc. Meeting on *Newton's Principia* *and its Legacy*, London, 1987.

Invited Keynote Lecture, *2nd* Nat. Cong., Hellenic Soc. *Theoretical & Applied Mechanics*,

Athens, 1989.

Opening Lecture, IMA Conf. *Chaos: Applications in Engineering & Science*, London, 1990.

Keynote Lecturer & Session Organizer, *2nd* World Cong. *Computational Mechanics*,

Stuttgart, 1990.

Presentation of the *New Dynamics*, Autumn meeting of the Directors, *Ove Arup Partnership*,

London, 1990.

Invited Lecture *Chaos and the danger of unpredictable failure*, Fellowship of Engineering,

London, 1990.

Invited General Lecture, Spring Conf. *Institute of Acoustics*, Southampton, 1990.

Invited Plenary Lecture, *1st* European *Nonlinear Oscillations* Conf, Hamburg, 1993.

Invited Plenary Lecture, *Dynamics Day '94*, Budapest, 1994

Invited Opening Address, Eurodyn '96, Conference on *Structural Dynamics*, Florence, 1996.

Invited Plenary Lecture, Conference on *Theory of Ordinary & Partial Differential Equations*,

Dundee, 1996.

Invited Key Lecture, IUTAM Symp. *Applics of Nonlinear and Chaotic Dynamics in Mechanics*, Cornell, 1997.

Opening lecture, meeting on *Nonlinearity in Engineering Dynamics*, Sheffield, 2001.

Forthcoming activity:

Opening Lecture, IMA Conf. *Bifurcations: the use and control of chaos*, Southampton, 2003.

Opening lecture, IMA Conf. *Recent Advances in Nonlinear Mechanics*, Aberdeen, 2005.

**CONFERENCE ORGANIZATION**

**Organizer, IMA Symposium at University College London, 1977,**

***Catastrophe Theory in the Physical Sciences*.**

**Scientific Chairman & Organizer, IUTAM Symposium at Univ College London, 1982,**

***Collapse: The Buckling of Structures in Theory and Practice*.**

Scientific Committee, IUTAM Symposium at Stuttgart, 1989,

*Nonlinear Dynamics in Engineering Systems*.

**Organizer, Institute of Mathematics & its Applications Conference, London, 1990,**

***Chaos: Applications in Engineering and Science*.**

Theme Organizer, Philosophical Transactions of the Royal Society, 1990,

*Chaos and Dynamical Complexity in the Physical Sciences*.

Theme Organizer, Philosophical Transactions of the Royal Society, 1992,

*Nonlinear Dynamics of Engineering Systems*.

**Scientific Chairman & Organizer, IUTAM Symposium at Univ College London, 1993,**

***Nonlinearity and Chaos in Engineering Dynamics*.**

Organizer, Minisymposium, 3rd Int Congress Industrial & Applied Maths, Hamburg 1995,

*Nonlinear Dynamics and Chaos in Engineering*

Theme Organizer, Philosophical Transactions of the Royal Society, 1995,

*Chaotic Behaviour in Electronic Circuits*.

Scientific Committee, Eurodyn '96 Conference, Florence, 1996,

*Structural Dynamics*.

Conference Committee (ENOCC), European Nonlinear Oscillations Conf., Prague, 1996,

*Nonlinear Oscillations*.

International Committee, Second International Workshop, Osaka, 1996,

*Stability and Operational Safety of Ships*.

Scientific Committee, IUTAM Symposium at Cornell, 1997,

*Applications of Nonlinear and Chaotic Dynamics in Mechanics*.

Theme Organizer, Philosophical Transactions of the Royal Society, 1997,

*Localization and Solitary Waves in Solid Mechanics*.

International Committee, Third International Workshop, Crete, 1997,

*Theoretical Advances in Ship Stability and Practical Impact*.

Theme Organizer, Philosophical Transactions of the Royal Society, 1998,

*Nonlinear Flight Dynamics of High Performance Aircraft*.

Scientific Committee, International Conference (sponsored by IEEE), St. Petersburg, 1997,

*Control of Oscillations and Chaos*.

Scientific Committee, IUTAM Symposium at Hanoi, 1999,

*Recent Developments in Nonlinear Oscillations of Mechanical Systems*.

Theme Organiser, Philosophical Transactions of the Royal Society, 2000,

*The nonlinear dynamics of ships*

**Organiser, John Roorda Commemoration Meeting on 13 Sep 2000 at UCL on  *Structural Stability***

Scientific Committee, Institute of Physics, International Conference, Glasgow, 2003

*Modern Practice in Stress and Vibration Analysis*

Scientific Committee, IUTAM Symposium, Hamburg, 2007

*Fluid-Structure Interaction in Ocean Engineering*

Scientific Committee, IUTAM Symposium, Aberdeen, 2010

*Nonlinear Dynamics for Advanced Technologies and Engineering Design*

**EDITORIAL BOARDS**

Reviewer for *Mathematical Reviews*, 1976-78.

Editorial Board, *IMA Journal of Applied Mathematics*, 1981-2002

Editorial Board, *Journal of Structural Mechanics*, 1981-87.

Editorial Board, *Applied Mathematical Modelling*, 1985-95.

Editorial Board, *Dynamics & Stability of Systems*, 1986-99.

Editorial Board, *Phil. Trans. Roy. Soc. Lond. A*. 1989-95.

Editorial Board, *Journal of Sound & Vibration*, 1990-2007.

Acting Editor, *Phil. Trans. Roy. Soc. Lond. A*. Jan-July, 1990.

Advisory Board, *Nonlinear Dynamics*, 1990-

Editorial Board, *Bifurcation and Chaos*, 1990-

**PROFESSIONAL COMMITTEES**

Chairman, University of London *Board of Studies in Civil & Mech Engineering*, 1984-86.

**Royal Society, *Sectional Committee* 1 (Mathematics), 1987-1990.**

**Institute of Mathematics & its Applications, *Council*, 1989-1992.**

Royal Society, *UK Panel for IUTAM*, 1990-1997.

Working group on *Complexity* (European Commission, Brussels, 1994)

Chairman, Board of Directors, ES-Consult, Copehagen, 1995-

**Royal Society, *Sectional Committee* 4 (Engineering), 1996-9.**

**Council of the Royal Society (2002-3)** (elected, 11 July 2002)

External Examiner, Cambridge University Engineering Department, 2004.

**INTERNATIONAL AND ADVANCED COURSES**

Centre International des Sciences Mécaniques, Udine, 1990.

Centre International des Sciences Mécaniques, Udine, 1993.

Comett II, International University Course, Vienna, 1994.

EPSRC Applied Nonlinear Maths, Postgraduate Spring School, Surrey, 1995.

**RADIO AND TELEVISION BROADCASTS**

*Science Now*, Radio 4, 1975. Discussion on Catastrophe Theory.

*Horizon*, BBC 2, 1975. Television programme on Catastrophe Theory.

*Science Now*, Radio 4, 1983. Discussion on Chaos Theory.

*Discovery*, Ch 4, 1985. Demonstration of experiments and computations, Special Opening of Yorks TV Series.

*Nature since Newton*, BBC World Service, 1987. Interview with John Pickford.

*Report on Chaos Meeting*, Danish TV 1 News, 7 June, 1995.

**4. Books and Edited Proceedings**

**BOOKS PUBLISHED**

[I] **A GENERAL THEORY OF ELASTIC STABILITY**

[J.M.T. Thompson & G.W. Hunt], Wiley, London, 1973.

Hard back, 322 pages.

[II] **INSTABILITIES AND CATASTROPHES IN SCIENCE AND ENGINEERING**

[J.M.T. Thompson], Wiley, Chichester, 1982.

Hard back and soft back, 226 pages.

Translations: *Russian,* *Japanese*

[III] **ELASTIC INSTABILITY PHENOMENA**

[J.M.T. Thompson & G.W. Hunt], Wiley, Chichester, 1984.

Hard back, 209 pages.

[IV] **NONLINEAR DYNAMICS AND CHAOS,**

**Geometrical Methods for Engineers & Scientists**

[J.M.T. Thompson & H.B. Stewart], Wiley, Chichester, 1986.

Hard back, 376 pages.

Reprinted: May 87, Oct 87, Jun 88, Nov 88, Sep 89, Sep 91, Jul 93, Oct 94, Jan 97.

Translations: *Japanese,* *Italian*

Second Edition, 2002. Hard back and soft back, 437 pages.

World-wide sales: 14,000 copies.

**EDITED BOOKS & PROCEEDINGS**

[01] **COLLAPSE: THE BUCKLING OF STRUCTURES IN THEORY & PRACTICE**

[ed. J.M.T. Thompson & G.W. Hunt], Cambridge Univ. Press, Cambridge, 1983.

*(Proceedings of the IUTAM Symposium, University College London, August, 1982).*

Hard back, 531 pages. Translation: *Russian*

[02] **CHAOS AND DYNAMICAL COMPLEXITY IN THE PHYSICAL SCIENCES**

[ed. J.M.T. Thompson & P. Gray], The Royal Society, London, 1990.

(First Theme Issue of *Phil. Trans. Roy. Soc. Lond., A*, Vol 332, 1990).

[03] **NONLINEAR DYNAMICS OF ENGINEERING SYSTEMS**

[ed. J.M.T. Thompson & W. Schiehlen], The Royal Society, London, 1992.

(Theme Issue of *Phil. Trans. Roy. Soc. Lond., A*, Vol 338, No 1651, 1992).

[04] **NONLINEARITY AND CHAOS IN ENGINEERING DYNAMICS**

[ed. J.M.T. Thompson & S.R. Bishop], Wiley, Chichester, 1994.

*(Proceedings of the IUTAM Symposium, University College London, July, 1993).*

[05] **CHAOTIC BEHAVIOUR IN ELECTRONIC CIRCUITS**

[ed. J.M.T. Thompson & L.O. Chua], The Royal Society, London, 1995.

(Theme Issue of *Phil. Trans. Roy. Soc. Lond., A*, Vol 353, No 1701, 1995).

*cont ...*

[06] **LOCALIZATION AND SOLITARY WAVES IN SOLID MECHANICS**

[ed. A.R. Champneys, G.W. Hunt & J.M.T. Thompson], The Royal Society,

London, 1997. (Theme Issue, *Phil. Trans. Roy. Soc. Lond., A*, Vol 355, No 1732, 1997).

[07] **NONLINEAR FLIGHT DYNAMICS OF HIGH PERFORMANCE AIRCRAFT**

[ed. J.M.T. Thompson & F.B.J. Macmillen], The Royal Society, London, 1998.

(Theme Issue of *Phil. Trans. Roy. Soc. Lond., A*, Vol 356, No 1745, 1998).

[08] **MILLENNIUM ISSUE, Part I, ASTRONOMY AND EARTH SCIENCES**

[ed. J.M.T. Thompson], The Royal Society, London, 1999.

(Special Issue of *Phil. Trans. Roy. Soc. Lond., A,* Vol 357, No, 1763, 1999).

[09] **MILLENNIUM ISSUE, Part II, MATHEMATICS, PHYSICS & ENGINEERING**

[ed. J.M.T. Thompson], The Royal Society, London, 2000.

(Special Issue of *Phil. Trans. Roy. Soc. Lond., A,* Vol 358, No, 1765, 2000).

[10] **MILLENNIUM ISSUE, Part III, CHEMISTRY & BIOLOGICAL PHYSICS**

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**6. Public Understanding of Science: Lectures, DVDs and Websites**

**[A] Chaos and Fractals: Understanding the Unpredictable**

A lecture in the *Millennium Maths Project* for thepublic understanding of mathematics (Centre for Mathematical Sciences, Cambridge University, 22 Jan 2004).

Power-points of this lecture can be viewed as a slide show on [2].

A video of an extended version of the lecture was on-line from [3].

A DVD of the lecture is available from [4].

**[B] Chaos Theory: The Historical Emergence of a New Branch of Mathematics**

A lecture given at the 40th Anniversary Conference of the *Institute of Mathematics and its Applications* (Manchester, 2 Sept, 2004). At this meeting the lecturer (J.Μ.Τ. Thompson) was awarded the IMA **Gold Medal** for his lifetime contributions to mathematics.

Power-points of this lecture can be viewed as a slide show on [2].

**[C] Instabilities and Catastrophes**

A lecture in the *Millennium Maths Project* for thepublic understanding of mathematics

(Centre for Mathematical Sciences, Cambridge University, 11 Nov 2004).

Power-points of this lecture can be viewed as a slide show on [2].

A video of the lecture was on-line from [3].

A DVD of the lecture is available from [4].

**[D] Predicting the Unpredictable: seeing Order within Chaos**

Plenary lecture, International Science Summer School (Cambridge University, 29 Jul 2005).

**[E] Twisting, coiling and knotting in DNA replication**

A lecture in the *Millennium Maths Project* for thepublic understanding of mathematics

(Centre for Mathematical Sciences, Cambridge University, 24 May 2007).

Power-points of a similar lecture can be viewed as a slide show on [2].

A video of the lecture was on-line from [3].

**[F] Instabilities and Catastrophes**

Plenary lecture, International Science Summer School (Cambridge University, 30 Jul 2008).

**Web Sites & Contacts**

[1] Personal Website of J.M.T. Thompson. Address: [www.homepages.ucl.ac.uk/~ucess21/](http://www.homepages.ucl.ac.uk/~ucess21/)

[2] Introduction to Chaos and Nonlinear Dynamics, by T. Kanamaru & J.M.T. Thompson. Address: http://brain.cc.kogakuin.ac.jp/~kanamaru/Chaos/e/Thompson/

[3] Site maintained by the Science Media Network in association with Cambridge University Science Production. Currently unavailable: <http://mediaplayer.group.cam.ac.uk/MichaelThompson/>

[4] Science Media Network. Postal Address: Björn Haßler, Department of Applied Mathematics and Theoretical Physics (DAMTP), University of Cambridge, Centre for Mathematical Sciences, Wilberforce Road, Cambridge, CB3 0WA. Or contact me (JMTT)

by e-mail.

**7. Activities of Dynamics Group 1991-95**

***CENTRE FOR NONLINEAR DYNAMICS & ITS APPLICATIONS***

***devoted to Interdisciplinary Research Studies***

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

***Centre for Nonlinear Dynamics & its Applications***

***Civil Engineering Building, University College London,***

***Gower Street, London, WC1E 6BT***

**Activities, 1991-95**

The study of nonlinear dynamics is one of the most exciting and fastest growing branches of the mathematical sciences. It is having an increasingly important impact on a variety of applied subjects ranging from the study of turbulence and the behaviour of the weather, through the investigation of electrical and mechanical oscillations in engineering systems, to the analysis of biological and economic phenomena. One branch of the subject has fired the public's imagination under the popular name of *chaos*.

**Establishment of the Centre**

The *Centre for Nonlinear Dynamics and its Applications* was established at University College London (UCL) in 1991, to act as a focus for interdisciplinary research into the theory of nonlinear dynamics and its applications across science and engineering. It is based within the Department of Civil and Environmental Engineering which has a long history of expertise in the advanced dynamics of engineering structures.

The Centre is under the directorship of Professor J.M.T. Thompson, FRS, whose seminal book on *Nonlinear Dynamics and Chaos* (Wiley, 1986) has played a fundamental role in stimulating the application of nonlinear dynamics throughout engineering and the sciences. Steve Bishop is the Manager of the Centre, and Jaroslav Stark, who joined the Centre from the GEC Hirst Laboratories in 1992, is the coordinator of the graduate programme.

The Centre currently has 31 members. In addition to the 3 permanent staff mentioned above, there are 2 honorary visiting professors, 7 fellows and post-doctoral research assistants, 10 research students (working for a PhD), 6 post-graduate students (working for an MSc), and 3 academic visitors. All are accommodated in an attractive central area of UCL where regular colloquia and a small library of current journals make an exciting and focused research environment. The Centre has good links with many other research groups both in the UK and abroad, and with a number of engineering companies.

**Royal Society Research Fellowships**

An early success of the Centre was the winning of two prestigious Royal Society Research Fellowships. The first was awarded to Allan McRobie to work on topological methods for the dynamics of structures. The second was awarded to Mike Davies to study time series analysis using phase-space reconstruction. A sustained thrust by members of the Centre into the analysis and processing of time series, has been strengthened by the appointment of David Broomhead (DRA, Malvern, formerly the Royal Signals & Radar Establishment) as a Visiting Professor.

**IUTAM Symposium**

In 1993 the Centre hosted a Symposium on *Nonlinearity and Chaos in Engineering Dynamics* sponsored by the International Union of Theoretical and Applied Mechanics (IUTAM), and the proceedings have been edited into a coherent account of modern developments. The meeting began with an Opening Address by Sir James Lighthill, who was the President of IUTAM during his period as Provost of UCL, followed by a general lecture given by Philip Holmes. Three papers were given by members of the Centre. Stephen Foale and Steve Bishop presented their elegant study of grazing bifurcations in impacting systems, relevant to the rattling of engineering structures. Mike Davies and Jaroslav Stark described their work on noise reduction, relevant to real-time signal processing and the improved reproduction of speech and music. Allan McRobie and Michael Thompson demonstrated how the theory of knots and braids can be used to establish bifurcational precedences in driven oscillators.

**Industrial Links**

A close link has been forged over a number of years by Steve Bishop and Michael Thompson with *ES-Consult*, a specialized engineering consultancy in Denmark. This consultancy was established in 1990 by Eilif Svensson, who is now the Managing Director. One of Eilif's staff is Hans True, who gave a general lecture on the hunting instability of a railway wheel-set at the IUTAM Symposium: Hans is employed half-time by *ES-Consult* and half-time in the Laboratory of Applied Mathematical Physics at the Technical University of Denmark.

This link has now been strengthened and formalized by the appointment of Michael Thompson as Chairman of the Board of Directors of *ES-Consult*. The consultancy has a strong interest in the aeroelastic instabilities of slender bridge structures, and has worked on tuned mass dampers for the Great Belt bridge, the largest single span suspension bridge in the world. It is now involved with dynamic analysis of the cable-stayed bridge in the new Øresund link between Denmark and Sweden. *ES-Consult* is also active in the highly nonlinear dynamics of railway vehicles, including wheel-rail contact forces and the interactions between a moving train and a bridge: related activity is on impact-absorbing crash-barriers for road vehicles.

This train modelling, together with the Centre's work on the capsize of ships (linked

with the *Ministry of Defence* and *W.S. Atkins*) and a flight dynamics project (linked with *British Aerospace*), define an emerging theme of vehicle dynamics. Meanwhile Jaroslav Stark's links with the *General Electric Company* are being maintained by a part-time research student working on irregularly sampled time series.

**Collaboration with the Anatomy Department**

The interdisciplinary nature of the Centre was nicely consolidated when Jaroslav Stark won a grant to collaborate on pattern formation in embryonic development with Anne Warner, a Royal Society Research Professor in the Anatomy Department. This work on the electrical and chemical properties of living cells is more focused than earlier studies, and aims to incorporate an embryo's known biological properties into a mathematical model that will generate testable predictions. This work is neatly complemented by studies on the death of cells, by Jaroslav's Mexican research student, Alexandra Chavez-Ross.

**International Activities**

The Centre has benefitted from a continuing stream of distinguished visitors from overseas. The IUTAM proceedings, *Nonlinearity and Chaos in Engineering Dynamics*, edited by

Thompson & Bishop, was published by John Wiley in 1994. The appointment of Jaroslav Stark (with Colin Sparrow of the Newton Institute at Cambridge) as editor of the international journal, *Dynamics and Stability of Systems*, has further strengthened the international standing of the Centre.

A triangular collaboration with Bruce Stewart at Brookhaven and Yoshi Ueda at Kyoto is supported by a travel grant from Monbusho, the Japanese Ministry of Education, Science and Culture. Two programmes funded by the European Community support collaboration with key European Universities, one concerned with noise in dynamical systems, the other with stability and universality in classical mechanics. A fellowship in the Centre is also funded by the EC under the Human Capital and Mobility scheme. The British Council is supporting collaboration with the University of Strathclyde and a number of Japanese Research Laboratories on the capsize of intact and damaged ships.

The Centre's Bulletin is now available to the international community on the World Wide Web, in collaboration with the Centre for Nonlinear Studies at Leeds University.

**Grants and Awards**

The foundations of the Centre were laid by early work in the Civil Engineering Department on nonlinear engineering dynamics which was strongly supported by the Marine Technology Directorate (MTD) of the Science and Engineering Research Council (SERC). Two SERC fellowships, and a grant from the Wolfson Foundation brought total earnings to £1 million before the formal creation of the Centre in 1991. Awards since then have brought the running total to £2 million.

Recent grants have generated fruitful lines of research. Stephen Foale's work on the resonance and rattling of impacting systems was supported by the MTD. New concepts of transient capsize in waves have been formulated under grants from the MTD and the Admiralty: this work has benefitted from fruitful collaboration with Rod Rainey (Chief Engineer, W.S.Atkins), the Centre's visiting Industrial Professor. Steve Bishop's successful studies of flash-over in building fires, the subject of a recent television presentation and an article in *New Scientist*, were funded jointly by SERC and the Health and Safety Executive.

Three recent grants were awarded by ANM, the Applied Nonlinear Mathematics initiative of what is now the Engineering and Physical Sciences Research Council (EPSRC). One, to Mike Davies and Jaroslav Stark, is for work on the stability of chaotically driven systems, using inertial manifolds and ideas from ergodic theory. The second, to Michael Thompson, Jim Croll and Allan McRobie, is for work on modal interactions and energy transfer in the nonlinear vibrations of thin shell structures. The third is to Jaroslav Stark for his work with the Anatomy Department.

**Graduate Programme**

**PhD by Research:** The Centre has a lively and expanding research group working on a variety of topical problems in the theory and applications of dynamical systems. Research students, working for the PhD of the University of London, typically have first degrees in mathematics, physics or engineering. Financial support has in the past come from various sources, including SERC (one CASE studentship is linked with the Meteorological Office) and the British Council. Current topics of research include: mechanical systems with impacts and stick-slip friction; transient dynamics including the capsize of ships; electronic circuits and the loss of synchronization in phase-locked communication loops; the large scale circulation of the ocean; flash-over phenomena in the dynamics of building fires; the death of cells in biology; chaotic signal processing; the mathematics of quasi-periodic forcing; and the control and use of

chaos. Whenever possible, a research topic is chosen to suit the individual strengths, interests and enthusiasms of a new student.

**MSc Course:** A taught course in *Nonlinear Dynamics and Chaos* leading to the MSc degree of the University of London was started in 1993. Full time students complete the course in one year, part-time students in two. The course has attracted engineering, physics and mathematics graduates from leading universities including Oxford, Cambridge and London. Mature students have been attracted from the oil-exploration industry, and British Aerospace. After learning the basic theory, students explore a variety of examples drawn from a broad range of subjects using both analytical and computational methods. They discover how to apply the techniques they have learned to real problems in engineering, mathematics and the sciences. A supervised project introducing each student to independent reading and research, culminates in the writing and presentation of a short dissertation. This MSc has now been recognized and supported by EPSRC, and a number of studentships will be available each year.

**8. Staff of Dynamics Group 1996-97**

**SENIOR MEMBERS**

**J.M.T. Thompson FRS** *Director*

Michael was awarded the Ph.D. and Sc.D. degrees at Cambridge, and was elected FRS in 1985. He has written four books on nonlinear bifurcation phenomena, and is currently Professor of Nonlinear Dynamics at UCL.

**S.R. Bishop** *Manager*

Steve has M.Sc. and Ph.D. degrees in applied mathematics. He is currently on the Council of the Institute of Mathematics and its Applications. He is Manager of the Centre, and is Reader in Nonlinear Dynamics at UCL.

**J. Stark** *Reader and M.Sc. Course Director*

Jaroslav has a B.A. and Ph.D. in mathematics. He joined the *Centre* from the GEC Hirst Research Centre and is Reader in Nonlinear Dynamics. He is editor of the international journal, *Dynamics and Stability of Systems*.

**M.E. Davies** *Royal Society Research Fellow*

Mike graduated with a First in engineering at Cambridge, and was awarded his Ph.D. in the *Centre* in 1993. His fellowship is allowing him to develop his phase-space reconstruction techniques of time series analysis.

**G.H.M. van der Heijden** *Research Fellow*

Gert has a degree in theoretical physics, and a Ph.D. in maths, both from the Univ of Utrecht. He is studying coupled oscillators, and homoclinic spatial localization phenomena in rods, on an EC (HCM) Fellowship.

**S.A. Baigent** *Research Assistant*

Steve has an M.Sc. in applied maths, and a D.Phil. from Oxford for which he modelled atmospheric dynamics. With the UCL Anatomy Department, he is now researching the electrical and chemical properties of living cells.

**K.M. Campbell** *Research Assistant*

Kevin has a B.Sc. in maths from Bristol and a Ph.D. from Warwick for work on spatio-temporal chaos. He is working on chaotic forcing, using inertial manifolds and ideas from ergodic theory, on an EPSRC grant.

**A.A. Popov** *Research Fellow*

Atanas has degrees in structural engng and applied maths, and a Ph.D. in applied mechanics from Bulgaria. He held a Royal Society Fellowship, and now works on modal interactions in shell vibrations on an EPSRC grant.

**K.J. Spyrou** *Research Fellow*

Kostas has a C.Eng., Dipl.Eng (N.T.U. Athens) and Ph.D. (Strathclyde) in naval architecture. He was a Science & Technology Fellow in Japan. He works on ship stability in waves on an EC (HCM) Fellowship.

**V. Sepe** *Research Fellow*

Vincenzo has a degree in Civil Eng (Naples) and a Ph.D. in Structural Eng (Italian Univ & Research Ministry). A researcher at the Univ of Rome, *La Sapienza*, he works on impacting beams on an EC (HCM) Fellowship.

**F.A. McRobie** *Honorary Research Fellow*

Allan graduated with a First in physics at Bristol, and was a design engineer in Australia. He held a Royal Society Research Fellowship in the *Centre*. Now a lecturer at Cambridge, he collaborates on modal interactions.

**R.C.T. Rainey** *Visiting Industrial Professor*

Rod graduated in mathematics and engineering from Cambridge, and is currently the Chief Engineer (hydrodynamics) with W.S. Atkins. As visiting professor he has collaborated on the dynamics of ships in waves.

**S.E. Svensson** *Visiting Industrial Professor*

Eilif has a Ph.D. from the Tech Univ of Denmark. He established the consulting engineering firm, *ES-Consult*. He works on the Great Belt suspension bridge (world's longest span) and the Sweden-to-Denmark Oresund link.

**RESEARCH STUDENTS**

**M.A. Chavez-Ross** *(B.Sc., Mathematics, Univ Nac Auton de Mexico)*

Alexandra works with Jaroslav Stark on applications of nonlinear dynamics to biology and the death of cells.

**R.J. Martin** *(B.A., Mathematics, Cambridge)*

Richard works at the GEC Hirst Centre on irregularly sampled time series: part-time Ph.D. with Jaroslav Stark. **J.P.M. Heald** *(M.A., Natural Sciences, Cambridge)*

Following his M.Sc., James works with Jaroslav Stark applying Bayesian methods to noisy time-series analysis.

**J.S. Sehmbi** *(B.Eng., Civil Eng, Univ of East London)*

Following his M.Sc., Jatinder works (part-time) with Steve Bishop on vibrating systems with stick-slip friction.

**D.J. Wagg** *(B.Eng., Civil Eng, UCL)*

David is working with Steve Bishop on the discontinuous dynamics of oscillators which impact against stops.

**D.J. Sudor** *(B.Sc., Mathematical Sciences, Wolverhampton)*

David is working with Steve Bishop on the nonlinear dynamics of forced pendulums, on an EPSRC studentship.

**B. Cotton** *(B.A., Natural Sciences, Cambridge)*

Following his M.Sc., Ben works with Michael Thompson on transient ship capsize, supported by DRA (Haslar).

**G. Karpodinis** *(B.Eng., Civil Engineering, City University)*

Following his M.Sc., George is working with Steve Bishop on the control of chaotic dynamical systems.

**S. Orstavik** *(M.Sc., Industrial Economics, Norwegian Inst Tech)*

Following his M.Sc., Sakse works with Jaroslav Stark on time-series methods for spatio-temporal systems.

**P. Iannelli** *(Mathematics, University of Pavia)*

Pasquale works with Jaroslav Stark and Steve Baigent on application of invariant manifolds to biological models.

**G. Santoboni** *(B.Sc., Physics, Univ of Cagliari, Italy)*

Giovanni is working with Steve Bishop on the subject of the synchronization of coupled chaotic systems.

**ACADEMIC VISITORS**

**Dr Jose Rey Simo** *Economic Analysis, Univ Complutense de Madrid*

Rey Simo was a visitor, from July-Dec 1996, working on geometric measure theory and nonlinear time series.

**DEPARTURES**

**S. Foale** *Research Assistant*

Stephen was awarded a Ph.D. in the *Centre* in 1993, and then worked on modal interactions in shell vibrations on an EPSRC grant. He worked for a year at Smith System Engineering Ltd, and is now a computer consultant.

**J.R. de Souza** *Research Assistant*

Jesse obtained his Ph.D. in the *Centre*, and then worked on heave-roll coupling, supported by the DRA. He has now returned to Sao Paulo, where he is Professor of Naval Architecture in the Escola Politecnica da USP.

**N.H. Tan** *(B.Eng., Electrical Engineering, UCL)*

Heng obtained his Ph.D. in the *Centre*, working with Michael Thompson on the loss of synchronization and basin erosion ideas in phase-locked electronic loops. He has now left the *Centre* and returned to Singapore.

**P.R. Chastell**  *(B.Sc., Mathematics & Computing, Exeter)*

Paul worked for his Ph.D. with Jaroslav Stark on the response of systems under quasi-periodic forcing, on a SERC studentship. He is writing up his thesis, and is currently employed at EDS Unigraphics, Cambridge.

**M.D. Ellis** *(B.Sc., Theoretical Physics, Kent)*

Matthew worked for his Ph.D. with Steve Bishop on large scale ocean circulation, supported by an SERC case award with the Met Office. He is now writing up his thesis, and is currently employed by Racal Research.

**Dao Lin Xu** *(M.Sc., Engineering Mechanics, Dalian, China)*

Dao Lin obtained his Ph.D. in the *Centre*, working with Steve Bishop on the concepts of controlling and utilizing chaos, sponsored by the British Council. He is now employed at the National University of Singapore.

**9. Earnings of Dynamics Group 1980-1997**

**Grants, starting in the year shown Year Each block denotes £ 10,000**

Flow induced instabilities, SERC(mtd), £K 102 1980 ◼◼◼◼◼◼◼◼◼◼

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Instability prediction and control, SERC, £K 20 1983 ◼◼

Nonlinear dynamics of compliant systems, SERC(mtd), £K 50 1983 ◼◼◼◼◼

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Real time prediction of extreme responses, SERC(mtd), £K 72 1985 ◼◼◼◼◼◼◼

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Unexpected capsize due to chaotic motions, SERC(mtd), £K 52 1986 ◼◼◼◼◼

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Design based on nonlinear dynamics, SERC(mtd), £K 51 1987 ◼◼◼◼◼

1988

1988

Senior SERC Fellowship (J.M.T. Thompson), £K 165 1988 ◼◼◼◼◼◼◼◼◼◼◼◼◼◼◼◼◼

1988

Rattling and resonance in marine systems, SERC(mtd), £K 58 1989 ◼◼◼◼◼◼

Transient capsize of surface ships, MOD (Admiralty), £K 96 1989 ◼◼◼◼◼◼◼◼◼◼

Advanced SERC Fellowship (S.R. Bishop), £K 113 1989 ◼◼◼◼◼◼◼◼◼◼◼

1989

Computational dynamics, Wolfson, £K 111 1990 ◼◼◼◼◼◼◼◼◼◼◼

Safe transient basins, SERC(mtd), £K 60 1990 ◼◼◼◼◼◼

Flashover in building fires: SERC, £K 134 & HSE, £K 18 1990 ◼◼◼◼◼◼◼◼◼◼◼◼◼◼◼

Offshore structures in random sea states, SERC(mtd), £K 43 1990 ◼◼◼◼

1991

1991

Noise and chaos in nonlinear dynamical systems, EC, £K 26 1991 ◼◼◼

1991

Case award, SERC & Met Office, £K 3 1992 ◼

Royal Society Research Fellowship (F.A. McRobie), £K 150 1992 ◼◼◼◼◼◼◼◼◼◼◼◼◼◼◼

Royal Society support grant (FAM), £K 5 1992 ◼

1992

Resonance of constrained offshore systems, SERC(mtd), £K 56 1993 ◼◼◼◼◼◼

Royal Society Research Fellowship (M.E. Davies), £K 118 1993 ◼◼◼◼◼◼◼◼◼◼◼◼

Royal Society support grant (MED), £K 13 1993 ◼

Chaotic time series, Nuffield, £K 3 and SERC(anm), £K 5 1993 ◼

Pattern formation, SERC(anm), £K 117 1994 ◼◼◼◼◼◼◼◼◼◼◼◼

Stability in chaotically driven systems, EPSRC(anm), £K 107 1994 ◼◼◼◼◼◼◼◼◼◼◼

Modal interaction in shells, EPSRC(anm), £K 113 1994 ◼◼◼◼◼◼◼◼◼◼◼

Chaotic vibrations (Y.Nath), EC, £K 4 1994 ◼

1995

Royal Society Visiting Fellowship (A.A. Popov), £K 11 1995 ◼

Transient capsize (continuation), DRA (Haslar), £K 124 1995 ◼◼◼◼◼◼◼◼◼◼◼◼

Human Capital Mobility (Heijden, Spyrou, Sepe), EC, £K 160 1995 ◼◼◼◼◼◼◼◼◼◼◼◼◼◼◼◼

1996

British-German Collaboration (JS), British Council, £K 5 1996 ◼

Localized buckling of rods, EPSRC(anm), £K 151 1996 ◼◼◼◼◼◼◼◼◼◼◼◼◼◼◼

Royal Society support grant (MED), £K 10 1996 ◼

Spatio-temporal time series, EPSRC(anm), £K 79 1997 ◼◼◼◼◼◼◼◼

Royal Society Leverhulme Fellowship (J. Stark), £K 24 1997 ◼◼

**Total earned is over £2 million**

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