CURRICULUM VITAE

Svetlana R. Amirova

Mobile Phone: +1 252 364 7348.
Email: sveta.amirova@gmail.com

Nationality: Russian; Citizenship: Russian; Residence: Moscow Region, Moscow;
Date of Birth: 4 May 1982; Foreign Languages: English (fluent), French (fair).

Education

Ph.D. (2008), University of Keele UK (Professor G.A. Rogerson, thesis advisor),
M.Sc. (2005) with honours and B.Sc. (2003) with honours, Moscow Institute of
Physics and Technology (MIPT), State University, Russia.

Professional Experience

2012- 2013 Visiting Assistant Professor, Bioinformatics and Systems Biology,
Mathematics Department, University of Texas at El Paso, USA.
2010 – 2011 Research Associate Fellow, Mathematics Research Institute, University
of Exeter UK.
2008-2010 Research Assistant, Engineering Department, University of Leicester UK.
2006-2008 PhD Student and Part-time Teaching Assistant, Mathematics Department,
University of Keele, UK.
2005-2006 PhD Student and Part-time Teaching Assistant, Mathematics Department,
University of Salford, UK.

Research Interests

Computational systems and synthetic biology; bioinformatics, mathematical biology;
biostatistics; biomaterial research; applications of stochastic process to biological
systems; bioengineering.

Honours

2005 – 2008 Overseas Research Students Awards Scheme PhD Grant, UK.
2005 M.S in Applied Mathematics and Physics, with distinction.
2003 B.S in Applied Mathematics and Physics, with distinction.

Key skills

Research

<u>Applied Mathematics</u>

Application of stochastic process to biological systems; mathematical evolutional biology; computational systems and synthetic biology, theoretical dynamic elasticity; analytical and numerical methods to analyze and solve ordinary and partial differential equations.

<u>Applied Statistics</u>

Applied multivariate analysis for protein structure prediction and analysis; bioinformatics, computational regression methods applied for molecular biology.

<u>Applied Physics</u>

Computational aspects of environmental eco systems and climate systems; theoretical and computational investigations of physic fiber-optic and biosensors.

<u>Engineering</u>
Computational modeling for molecular biology and biotechnology; simulations of the processes in waveguides, biosensors.

Teaching

Developed and taught courses

1. Evolutionary systems biology: mathematical modeling for biomedical applications.
2. Introduction to bioinformatics and systems biology.
3. Computational seminar on MATLAB for bioinformatics students: computer simulations with biomedical applications.

Taught courses

4. Elementary statistical methods: the art and science of learning from the data. The course introduces statistical methods to biology, microbiology, psychology and other non-mathematics major undergraduate students.
5. Tutorial demonstration for mathematics undergraduate courses during graduate studies.
6. College–level courses for computing and graphical design.

Software knowledge

LaTex, Maple, Matlab, R, Minitab, NLREG, SigmaPlot, Table Curve 2D and 3D, C/C++, HTML, MD simulation package (ICM), MS Office.

Professional Activities

January 2012- January 2013

Visiting Assistant Professor for Bioinformatics and Systems Biology
Bioinformatics Program, Mathematics Department, University of Texas at El Paso.
This position was supported by grants RCMI 5G12RR008124-18, NIMHD 8G12MD007592, and 5T36GM0780000 from the National Institutes of Health USA.

The core responsibility of this position was curriculum development and teaching courses in bioinformatics and computational biology.

I have developed curriculum and taught new course "The evolutionary systems biology: mathematical modeling with biomedical applications" for undergraduate and graduate students. The key ideas was to give undergraduate and graduate students an overview of evolutionary game theory, highlight biomedical application of mathematical biology and teach computational biology. The key component of the course was to analyze DNA sequencing, microarray and proteomics data using selected statistical algorithms.

In addition I have developed curriculum and taught an introductory new course to bioinformatics and systems biology for non-mathematics major undergraduate students. The scope of the course was to illustrate selected topics from modern genomics, proteomics, bioinformatics and systems biology by computational labs and to improve students' programming skills.

Also I taught a short introductory new course on R statistical programing language and its applications in computational biology.

In addition I taught graduate student seminar on MATLAB to highlight numerical techniques in mathematical biology and outline the biomedical applications of selected statistical algorithms.

Another course that I taught for two terms was "The elementary statistical methods: the art and science of learning from the data". The course introduces statistical methods in biology, microbiology, psychology and other non-mathematical disciplines for undergraduate students. The material was presented in interactive form involving in-class activities. Students learned how to apply acquired statistical methods to particular problems of their own choice and perform independently statistical research project.

As for research I made investigations in systems biology of intracellular parasite-host interactions and performed bioinformatics analysis of protein-protein interaction motivated by molecular diagnostics of infection deceases. The corresponding material was presented at two international conferences.

2008-2011

Research Associate on BBSRC BB/F019602/1 Project: "*Post-transcriptional feedback control of polyamine metabolism in yeast: an integrated modeling and experimental investigation*" PI's Professor Declan Bates (University of Exeter), Dr. I. Stansfield and Dr Heather Wallace, (University of Aberdeen).

New aspects of research	I play a key role in developing a new complete predictive model of the polyamine metabolism in the yeast Saccharomyces cerevisiae using a Systems Biology approach incorporating enzyme kinetics,

statistical analysis, bioengineering and experimental molecular biology of translation. This quantitative model of the polyamine control system reproduces experimental data and predicts polyamine content under normal conditions and at various decease-induced scenarios that cannot be seen from experiments. Another novel feature of this approach is coupling external and internal cellular control of polyamines. Also developed model bridges the gaps for development of evolutionary studies of programmed ribosomal frameshifting in wide range of species from yeast to mammals. In addition our integrated modelling and experimental investigation provide basis for further development of projects on synthetic biology of polyamines, namely applications of polyamine analogues.

Possible applications are in pharmacology; toxicology, preclinical drug development for cancer and neurodegenerative disorders; further studies of the anti-cancer drug DFMO, Snyder-Robinson Syndrome.

Techniques   Top down and bottom up molecular modeling approaches using Michaels-Menten, mass action kinetics, non linear dynamics (including both transient behavior and steady state analysis) and statistical inference methods; in particular statistical methods of kinetic parameter inference using true non linear regression analysis (NLREG, SigmaPlot, Table Curve 2D and 3D) including development of new statistical multivariate algorithms, numerical analysis of cellular signaling pathways using MATLAB.

2009-2011

Collaboration in Systems and Synthetic biology of Receptors Tyrosine Kinases Signalling

Acknowledgments: Medical Research Council UK
Institutions: Brindle Lab in Department of Cardiovascular Sciences University of Leicester, Centre for Systems, Dynamics and Control at University of Exeter, University of Glasgow.

Participants: Deborah Alawo, Prof Nick Brindle, Dr Svetlana Amirova, Dr Jongrae Kim, Prof Declan Bates.

New aspects of research   Receptors tyrosine kinases (RTK) have essential roles in controlling cellular proliferation, migration, differentiation and gene expression, and defects in RTK signalling underlie numerous diseases, including cancer, heart disease and stroke. However, the underlying mechanisms of signal integration are still poorly understood. The aim of the project was to develop quantitative models of specific RTK signal regulatory mechanisms. Synthetic Biology approach helps to re-engineer these design principles in order to test and refine the models. My role was to assist in supervising PhD student in synthetic biology and to facilitate emergence of grant proposals for

further research funding.
Possible applications are in pharmacology, toxicology, therapeutic manipulation of signalling pathways relevant to ischemic disease, inflammation and antigenic pathologies.

Techniques   Bottom up molecular modeling approaches using Michaels-Menten, mass action kinetics, non linear dynamics; numerical simulations of cellular signaling pathway reactions using MATLAB and Cell Designer.

2005- 2008

PhD project "*The influence of a simple shear deformation on a long wave motion in pre-stressed incompressible elastic layer*", performed in **Applied Mathematics Group, supervisor Prof G.A. Rogerson.**

New aspects of research   New analytical dynamic models were constructed to describe propagation of traveling waves in an incompressible elastic layer subject to initial simple shear deformation. I analysed 2D motion of long dispersive waves in low and high frequency regimes, the wave length was large in comparison to layer thickness. The resulting conditions yield the lack of symmetry, the absence of symmetric and anti-symmetric motion and hence no analogous of bending and extension motions. Three types of boundary value problems were considered: layer with free, fixed and one fixed one free face. An asymptotic and numeric analysis of corresponding dispersion relations was performed. It was shown that both in the layer with fixed faces and one fixed one free face there are no fundamental modes. All analytical results are in the excellent agreement with the numerical simulations in MATLAB.
Possible applications are geo-mechanics and bio-mechanics.

Techniques   Various perturbation methods, asymptotic analysis of systems with small parameter, application of theories of dynamic elasticity: Kirchhoff plate theory, refined Timoshenko-Reissner theory, asymptotic integration method, numerical methods to solve non-linear equations: Newton-Rapson and bracketing-bisection method.

September 2003- July 2005

MSc thesis "*Protein secondary structure prediction based on statistical method of discriminant analysis*". performed in **Laboratory of Bioinformatics and Structural Biology, supervisor Prof V.G.Tymanian**

New aspects of research   The novel approach to predict with high accuracy various elements (alpha-helix, beta-structure, beta-turns, ordered and disordered regions) in the spatial structure of globular and membrane proteins, to identify disordered regions and the active centers in proteins. The high accuracy in structure prediction was achieved without using any kind of (multiple) sequence alignment. The advantage of our method is the possibility to derive the protein physical-chemical properties, which affects the formation of certain types of structure.

Possible applications are molecular and drug design.

Techniques   Application of statistic methods nonlinear regression analysis, linear discriminant analysis and Monte Carlo techniques to develop algorithms, which were implemented on C/C++, computational MD simulations (ICM software), working with PDB database and other online resources for proteomics data.

September 2002 – July 2003

BSc Thesis "*Molecular constructions based on double-stranded nucleic acid liquid crystals: formation, properties, practical application*", performed in the **Laboratory of Condensed State of Nucleic Acids, supervisor Dr. S.G.Scuridin.**

**New aspects
of research**   Participation in developing of novel type of biological sensors based on liquid crystals of double-stranded molecules of nucleic acids, simple thermodynamic model was derived to describe the formation of liquid crystals. This work is done in context of biotechnological project: determining of metabolite homocystine to improve treatment of thromboses in human arteries.
Possible applications are biological and medical sensors, nanomedicine.

Techniques   Experiments and computational simulations of assembling the liquid crystals and obtaining molecular constructions based on double-stranded nucleic acids with implemented molecules of Cu and antibiotics. Theoretical analysis of the formation of molecular construction in liquids from the positions of thermodynamics and stability.

September 1999- July 2005
Moscow Institute of Physics and Technology (MIPT), State University
Specialization in Mathematics and Physics

**New aspects
of research**   Novel mathematical models were derived for non-linear dynamic process in atmosphere and ocean with applications in the field of climate control and eco-systems. These projects include theoretical and numerical investigation of non-linear waves in ocean and atmosphere. Also investigation of non-linear waves in fiber-optic sensors was performed and new models were proposed.
Possible applications are climate systems, medical sensors and purifying systems.

Techniques   Construction of dynamic models; analytical and numerical methods to solve equations and systems of equations; computational simulations of non-linear processes.

Teaching

2012- 2013   Visiting assistant professor at **University of Texas at El Paso**, taught classes: elementary statistical methods; evolutionary systems biology-mathematical model with biomedical application; introduction to bioinformatics and systems biology for undergraduate students; graduate students seminar for bioinformatics and computational biology.

2006-2008   Part time Teaching Assistant, mathematics demonstrator at **University of Keele UK**, example classes and marking on Mathematical Methods, Money Matters.

2005- 2006   Part-time Demonstrator at **University of Salford UK**, tutorials in Mathematics.

2004- 2005   Teacher of Computer science at **MIPT Fizteh College, Moscow**; modulus: Programming C/C++, HTML, Web-design, Computer graphics, MS Office.

References

1. **Prof Ming-Ying Leung,** *PI of Research Grant,* Professor of Mathematics and Director of bioinformatics program, Mathematics Department, University of Texas at El Paso, 500 W. University Avenue, El Paso, TX 79968-0514 USA, Tel: +1 915 747 6836, Email: mleung@utep.edu

2. **Prof Declan Bates,** *PI of Research Grant***,** Professor of Bioengineering, School of Engineering University of Warwick Coventry CV4 7AL UK, Tel: +44 0 24 765 23142, Email: D.Bates@warwick.ac.uk

3. **Prof Nick Brindle,** Work Colleague, Professor of Cell Signaling, Department of Cardiovascular Sciences University of Leicester Clinical Sciences Wing Glenfield General Hospital Leicester LE3 9QP UK, Tel: +44 0 1162 297170, Email: npjb1@le.ac.uk

4. **Prof Graham A. Rogerson**, *Supervisor of PhD,* Head of School of Computing and Mathematics, Professor of Applied Mathematics, Colin Reeves Building, Keele University, Keele, Newcastle, Staffordshire, ST5 5BG, UK, Tel: +44 0 1782 583270, Email: g.a.rogerson@maths.keele.ac.uk.

Books

1. Tamara Tulaikova, Svetlana Amirova, The effective method for atmosphere CO_2 purification, Lambert academic publishing 2011.

2. Тулайкова Т**.**В**.,** Мищенко А**.**В**.,** Амирова С**.**Р**.,** Акустические дожди, Физматкнига, Москва, 2010.

3. Тамара Тулайкова, Светлана Амирова, Вводный курс по специальным функциям для аспирантов**-**физиков, Москва, Книга и бизнес, 2009.

Journal Articles and Papers

Molecular Systems Biology and Bioinformatics

1. Svetlana Amirova, Claudia Rato, Heather M Wallace, Ian Stansfield, Declan G. Bates, "Post-transcriptional feedback control of polyamine metabolism in yeast: an integrated modelling and experimental investigation", submitted to *Physical Biology Journal of IOP Science Publishing,* 2013.

2. Claudia Rato, Svetlana Amirova, Declan G. Bates, Ian Stansfield, Heather M. Wallace (2010), "Translational frameshifting as a feedback controller of polyamine synthesis", *Nucleic Acids Research*, 2011, 39(11), 4587-97.

3. Svetlana R. Amirova, Juri V. Milchevsky, Ivan V. Filatov, Natalia G. Esipova, Vladimir G. Tumanyan (2007), "Study and Prediction of Secondary Structure for Membrane Proteins", *Journal of Biomolecular Structure and Dymanics*, Vol. 24 (4), p. 421-428, ISSN 0739-110, PubMed: 17206856.

4. S R. Amirova, Juri V. Milchevsky, N. G. Esipova, V. G. Tumanyan (2005), "Study of β-Turns in Globular Proteins", *Biofizika*, Vol. 50 (6), pp 1150-1152, ISSN: 0006-3029, PubMed: 16358798.

5. S.G.Scuridin, S.R.Amirova, N.A.Grigorenko, B.S.Efimov, G.B.Lortkipanidze, M.A.Zakharov, Yu.M. Yevdokimov (2003), "Molecular constructions based on double-stranded nucleic acid liquid crystals: formation, properties, practical application", *Journal for liquid crystals and their practical realization*, No.3, pp.48-68.

Dynamic Elasticity and Solid Mechanics

6. S.R.Amirova and G.A.Rogerson (2008), "The influence of simple shear deformation on long-wave motion in an elastic layer", *Journal of Mechanics of Materials and Structures* (JoMMS) Vol.3 (5), pp. 831-851, ISSN: 1559-3959.

7. S.R. Amirova and G.A.Rogerson (2008), Long wave low frequency motion in a sheared pre-stressed layer compose of Neo-Hookean material, *Journal of Mechanics of Solids*.

8. G.A.Rogerson and S.R.Amirova (2008), "Long wave dispersion in a neo-Hookean layer subject to simple shear", *Proceedings of 3rd Canadian Conference on Nonlinear Solid Mechanics*, pp.85-92, CanCNSM 2008, Toronto, Canada.

Mathematical Modelling in Applied Physics: Climate and Micro Sensors

9. Tamara Tulaikova, Anatoly Gladun, Minetada Osano, Svetlana Amirova (2008), "A method to increase the Arctic sea ice cover", *Journal of Applied Physics* No. 103, 064506, ISSN 0021-8979.

10. G.A.Gurchonok, I.A.Djodjua, S.R.Amirova, T.V.Tulaikova (2001), "Using fiber gratings in the short-length sensors based on micromechanical vibrations", *Sensors and Actuators* A 93, p.197-203, ISSN: 0924-4247.

11. Tamara V. Tulaikova, Svetlana R. Amirova (2006), "The method to develop the artificial ice for north seas", *Proceedings of the Society of Photo-optical Instrumentation Engineers (SPIE),* Vol. 6360, pp.636300T-10, ISSN: 0277-786X.

12. Tamara V. Tulaikova, Svetlana R. Amirova (2006), "Theoretical optimization of artificial ice for Arctic seas", *Proceedings of the Society of Photo-optical Instrumentation Engineers* (SPIE), Vol.6312, pp. 636312U1-12, ISSN: 0277-786X.

13. Tamara V. Tulaikova, Svetlana R. Amirova (2006), "Diffraction gratings to reduce tsunami waves", *Proceedings of the Society of Photo-optical Instrumentation Engineers* (SPIE), Vol.6363, pp.6363G0-10, ISSN: 0277-786X.

14. Tamara Tulaikova, Svetlana Amirova, Hannes Bleuler and Philippe Renaud (2004), "Optical-Mechanical Method for Measurements in Micro-Technologies"**,** *Proceedings of the Society of Photo-optical Instrumentation Engineers* (SPIE), Vol. 5553, pp.338-347, ISSN: 0277-786X.

15. G.A.Gurchonok, I.A.Djodjua, S.R.Amirova, T.V.Tulaikova**,** "Fiber optic short-length sensors based on micromechanical vibrations; fiber grating registration", *Proceedings of the Society of Photo-optical Instrumentation Engineers* (SPIE), Vol. 4481 (2002), p. 299-310.

16. S.R.Amirova, Minetada Osano, A.D.Gladun, A.V.Lebedev, T.V.Tulaikova, A.D.Kondratiev (2007), "The method of the increase of Arctic ice as one possible mechanism for the climate recovery**"**, *Rus. J. Science Technologies*, Vol. 8 (7), p.3-17.

17. T.V. Tulaikova, A.V. Michtchenko, G.A. Gurchonok, S.R. Amirova (2003), "The output optimization during nonstationary vibration in fiber-optic sensor", Preprint N.723 of the Institute for Problems in Mechanics of the Russian Academy of Sciences, Moscow.

18. T.V. Tulaikova, A.I. Paskhin, R.R. Karle, S.R. Amirova (2000), "Analysis of the sensitivity of vibrating fiber-optic diffraction-grating sensors"**,** *Journal Laser Physics* Vol. 10 (4), pp.927-931, ISSN: 1054-660X.

Conferences, Symposiums and Workshops

1. Two conferences within Discovery on Target: The Leading Event on Novel Drug Targets, a) Novel strategies for kinase inhibitors and b) Functional Genomics. Attendance of two short courses: a) Epigenetic Drug Discovery Tools and Setting Up Effective RNAi Screens. Boston, Massachusetts, October 1-3 2012.

2. Two conferences within Next Generation Dx Summit 2012: a) Molecular Diagnostics for Infectious Disease and b) Mass Spectrometry in Diagnostics of Infectious Disease, Washington DC, August 21-23 2012.

3. Q-bio conference 2012, Santa Fe, New Mexico, August 8-11 2012.

4. Conference Structure-Based Drug Design and a short course First Principles in Binding Kinetics, Cambridge, Boston, Massachusetts, 6-8 June 2012.

5. Arthur M. Sackler Colloquia of National Academy of Sciences, In light of evolution VI: Brain and Behavior, Arnold and Mabel Beckman Center, Irvine, California, 19-21 January 2012.

6. Invited visit to bioinformatics faculty of Border Biomedical Research Centre (BBRC) with research seminar (8 April), talk at Bioinformatics Symposium, (15 April) and business meetings with BBRC Faculty, Staff and Students (11-14 April), University of Texas at El Paso, USA, 7-16 April 2011.

7. Evolution of Microbial Cooperation, University of Bath, UK, 20-21 January 2011.

8. Bath-Exeter-London-Southampton Control Meeting, University of Exeter, 6-7 January 2011.

9. 2nd Annual Meeting The Human Dimension of Risk: Perception, Behaviour, and Decision Making in Risk Management, The Centre for Risk Studies, Cambridge Judge Business School, 8-9 December 2010.

10. Climate Change Question Time, *Isaac Newton Institute for Mathematical Sciences in collaboration with Knowledge Transfer Network in Industrial Mathematics and the Centre for Science and Policy*, 24 November 2010, The Willis Building, 51 Lime Street, London EC3M 7DQ UK.

11. Institute of Chemical Biology- Colloquium, *Imperial College London*, 11 November 2010.

12. Institute of Systems and Synthetic Biology - Autumn Symposium, *Imperial College London*, 10- 11 November 2010.

13. Complexity and Statistics: tipping points and crashes, *Royal Statistical Society*, London, 22 October 2010.

14. 11th International Conference on Systems Biology, *University of Edinburgh*, UK, 10-16 October 2010.

15. Workshop on Oscillation Dynamics in Neural & Biochemical Systems, *University of Exeter*, UK, 30 September 2010.

16. Frontiers of Multidisciplinary Research: Mathematics, Engineering, and Biology, *University of Exeter*, UK, 21-24 September 2010.

17. Invited Talk at Evolutionary Genomics Group, *Centre for Genomic Regulation*, Barcelona, Spain, 8 September 2010.

18. British Mathematics Colloquium and British Applied Mathematics Colloquium, *University of Edinburgh*, UK, 6-9 April 2010.

19. Invited Talk at Manchester Centre for Integrative Systems Biology, Manchester Interdisciplinary Biocentre*, University of Manchester*, UK, 31 March 2010.

20. EPSRC Symposium Workshop on Learning and Inference in Computational Systems Biology, *University of Warwick*, UK, 30-31 March 2010.

21. Digital Signal Processing in Bioengineering Research Day, *University of Leicester*, UK, 15 December 2009.

22. Institute of Systems and Synthetic Biology - Autumn Symposium, *Imperial College London*, 11-12 November 2009.

23. Cold Spring Harbor Laboratory/ Wellcome Trust Conference Engineering Principles in Biological Systems, *Wellcome Trust Genome Campus* in Hinxton, Cambridge UK, 14 -16 October 2009.

24. Workshop on Indistinguishability and Model Discrimination in Systems Biology, *University of Warwick*, UK, 29 September 2009.

25. International Conference and LMS Workshop, Mathematical Models of Collective Dynamics in Biology and Evolution- MDBE'09, *University of Leicester*, UK, 11-13 May 2009.

26. Mathematical and Statistical Aspects of Molecular Biology, 19th annual MASAMB Workshop, *Imperial College London*, 2-3 April 2009.

27. British Applied Mathematics Colloquium, *University of Nottingham*, UK, 7-9 April 2009.

28. Talk at Control Seminars at Engineering Department, *University of Leicester*, UK, 25 March 2009.

29. Invited Talk at *Schlumberger Moscow Research Centre*, 26 August 2008.

30. LMS-EPSRC Short Course "Advanced Methods in Linear and Nonlinear Elasticity", *Keele University*, UK, 28 July-1 August 2008.

31. 2nd European Postgraduate Fluid Dynamics Conference, *Keele University*, UK, 21-23 July 2008.

32. 3rd Canadian Conference on Nonlinear Solid Mechanics, CanCNSM 2008, *University of Toronto*, Toronto, Ontario, Canada, 25-29 June 2008.

33. Mathematical Conference Magic Liverpool, *University of Liverpool*, UK, 23-24 June 2008.

34. British Applied Mathematics Colloquium, *University of Manchester*, UK, 31 March-3 April 2008.

35. Postgraduates Seminars at Mathematical Department, *Keele University*, UK, 22 June 2007.

36. Euromech Colloquium 481, Recent advances in the theory and application of surface and edge waves, 11-13 June 2007, *Keele Universtiy* UK.

37. Experiments in Space and Beyond*, Microgravity Centre, Brussels Open University,* 12-13 April 2007, Belgium.

38. Waves in Non-linear Pre-stressed Materials, *CISM International Center for Mechanical Sciences*, Udine, Italy, 4-8 September 2006.

39. British Applied Mathematics Colloquium, *Keele University*, UK, 24-27 April 2006.

40. International Moscow Conference on Computational Molecular Biology, *Department of Bioinformatics and Bioengineering, Moscow State University*, 18-21 July, 2005, Russia.

41. The Fourth International Conference on Bioinformatics of Genome Regulation and Structure, *Institute for Cytology and Genetics, Novosibirsk*, 25-30 July, 2004, Russia.

42. Graduate Student Conference, Department of Molecular and Biological Physics, *Moscow Institute of Physics and Technology*, Moscow, 22-25 September 2003**.**