

Curriculum Vitae

Alexander Gammerman

Office Address

Computer Learning Research Centre
Department of Computer Science
Royal Holloway, University of London
Egham, Surrey TW20 0EX, UK
Phone: +44-1784-443434
Fax: +44-1784-439786
e-mail: alex@cs.rhul.ac.uk

Home Address

9 Greenacre Court, Englefield Green
Surrey TW20 0RF, England
Phone: +44-(0)1784-431424

Research Areas

Machine learning; Kolmogorov randomness; applications of machine learning in medical diagnostics, forensic science, homeland security, target recognition, fault diagnosis, bioinformatics and proteomics.

Personal Information

British citizen. Married with three children.

Education

BSc in Physics (1968); PhD in Physics (1974), St.Peterburg. Scientific supervisors: Academician Boris N. Moshkov.

Employment

1974–1976 AgroPhysical Research Institute, St.Peterburg

- Senior Engineer

1976–1980 Regional Research Computer Centre, Academy of Sciences, St.Peterburg

- Senior Research Fellow

1980–1983 Leningrad Health Service Bureau, St.Peterburg

- Fellow

1983–1993 Department of Computer Science, Heriot-Watt University, Edinburgh, UK

- Lecturer in Computer Science 1983–1987
- Senior Lecturer in Computer Science 1987–1990
- Reader 1990–1993

1993–present Department of Computer Science Royal Holloway, University of London

- Professor of Computer Science 1993–present
- Head of Computer Science Department 1995–2005
- Founding Director of Computer Learning Research Centre 1998–present

Research and Expertise

Publications: more than 150 publications including books, journal papers, conference proceedings.

Research Grants: major grants from EPSRC/BBSRC/MRC/EU/UK and industry. The most recent is an BBSRC (also funded by EU EraSysBio) grant (2010-2013) with total funding over 3 million euros (RHUL part – SBS and CS departments – is over 700,000 euros).

PhD students: over twenty students were supervised; currently supervising and co-supervising 6 students - the latest PhD has started in April 2011.

For detailed research programme, grants, publications, and teaching - see <http://www.clrc.rhul.ac.uk/people/alex/index.html>

Awards and Posts Held

- P.W. Allen Prize of Forensic Science Society 1996
for the best paper published in *Science and Justice*

- Transductive Learning. Best paper presentation at SCIS and ISIS *Joint 3rd International Conference on Soft Computing and Intelligent Systems and 7th International Symposium on Advanced Intelligent Systems*, Tokyo, Japan, 2006
- Reliable classification of childhood acute leukaemia from gene expression data using Confidence Machines. Best paper award at *IEEE International Conference on Granular Computing* Atlanta, USA, 2006 (joint work with Z.Luo and A.Bellotti).
- Visiting Professor at School of Telecommunications University Polytechnic de Madrid, Madrid, Spain, 2003.
- Senior Research Scientist/Visiting Professor, Department of Computer Science and Center Computer Learning Systems, Columbia University New York, USA, 2004.
- Honorary Professor, University College London, from 2006 – 2010.
- Visiting Professor, University of Paris 9 (Dauphine), 2008 – 2009.
- Distinguished Professor (Profesor visitante distinguido Santander-UCM) of Complutense University de Madrid, Spain, 2010.

Professional Activities

- Fellow of the Royal Statistical Society from 1985.
- Chartered Fellow of the British Computer Society from 1990.
- EPSRC College 2004-2006.
- Editorial Board: *The Law, Probability and Risk* journal: 2002 - 2009.
- Editorial Board: *The Computer Journal*: 2005 - 2008.
- Member of the Panel for Fellowship selection for Finnish Academy of Science - 2005.
- Referee for numerous journals and conferences in computer science, pattern recognition and artificial intelligence.
 - *IEEE Transactions on Pattern Recognition and Machine Intelligence*
 - *Mathematics and Artificial Intelligence*
 - *Pattern Recognition Letters*
 - *Computational Statistics and Data Analysis*

Chair and Member of Conference Programme and Organising Committees

- Deputy Chair of Programming and Organising Committee University of London Lectures, *Kolmogorov Lecture and Medal*; 2003 – present
- Chair, *Artificial Intelligence and Applications AIA 2008 Conference*, Innsbruck, Austria, February 2008.
- *Symposium Statistical Learning and Data Sciences (SLDS)*, Paris, April 2009.
- *Conference on Intelligent Data Analysis (IDA)*, London, 1995; Amsterdam, 1997; Paris, 1999, 2001, Lisbon; 2003, Berlin; 2005, Madrid, 2007; Barcelona, 2009. *Knowledge and Data Discovery - 02 Conference*, USA, 2002.
- *International Conference on Artificial Intelligence Applications in Biomedicine (AIAB 2011)* and the *12th EANN & 7th AIAI Joint Conference 2011*, 15-18 September 2011, Corfu, Greece.
- *Multidisciplinary MEMORIAL CONFERENCE*: in the memory of RAY SOLOMONOFF (1926-2009), Nov 29, 2011 - Dec 2, 2011, Melbourne, Australia
- *International Classification Conference ICC-2011*, 11-15 July, 2011, St Andrews, Scotland,
- *IEEE International Conference on Data Mining series (ICDM)*, December 2011, Vancouver, Canada.
-

Invited Talks: Conferences and Seminars

- International Joint Conference on Artificial Intelligence, Stockholm, 1999.
- International School for Synthesis of Expert Knowledge (ISSEK-2000), Udine, Italy, 2000.
- Office for National Statistics, London, 2000.
- A MathFIT Workshop: Application of Multiple-Valued Logic to Artificial Intelligence and to Data Mining, Belfast, April, 2001.
- Escuela Tecnica Superior de Ingenieros de Telecomunicacion, Universidad Politecnica de Madrid, July, 2001.
- DTI/EPSRC workshop Risk Assessment Techniques for Design and Safety Management, London, April, 2001.

- Imputation with Support Vector Machine, EU Conference on Imputation and Editing, Jyvaskyla, Finland, 2002.
- National Statistical Office, Neuchatel, Switzerland, 2003
- Heriot-Watt, School of Mathematical Sciences, 2004.
- Bioinformatics workshop, St.Georges Medical School, 2005.
- Czech Technical University, Prague, 2006.
- 2nd Computer Journal Lecture, British Computer Society, London, 2006.
- German Statistical Society and Free University of Berlin, 2007.
- LEARNING 2007, San Juan, Puerto Rico, March 19-22, 2007
- AIA 2008 conference, Innsbruck, Austria, February, 2008.
- Computer Science at Frederick University, Cyprus, June, 2008.
- Dauphine University, Paris, 2008.
- Multivariate Analysis and Econometrics, invited talk, Tsahkadzor, Armenia, September, 2008.
- Statistical Learning and Data Sciences (SLDS), invited talk, Paris, April 2009.
- Multivariate Statistical Analysis, invited talk, Moscow, June 2009.
- Confidence Machine for Proteomic Pattern Diagnostics. The 57th Session of the International Statistical Institute. Durbin, South Africa, August 2009.
- Online Machine Learning in Data Analysis, EURATOM-CIEMAT, Madrid, January 2010.
- Modern Machine Learning Techniques, 7th International Conference on Artificial Intelligence AIAI, Cyprus, October 2010.

Royal Society programmes/visits and Visiting Fellows

- Visit to China, 1995: lectures and seminars in Beijing Tsinghua University, Beijing Xi'an Jiao Tong University, Xian; Jilin University, Changchun; the Academy of Science of China, Beijing.
- "Random number generator"; Royal Society programme with the Russian Academy of Sciences, 2003–2005 (Professor B.Ryabko).
- "Machine learning algorithms" – a Royal Society programme with China Zhejiang University, Hangzhou, 2009–2010 (with Dr.Z.Luo and Professor Guang Li).

- "Application of machine learning to environmental pollution", Girona University, Spain, 2011.
- Professor Nobuo Suematsu - Computer Science, Hiroshima University, 2003-2004;
- Professor Hong Zhao - Computer Science from Beijing (China) visited in 2006-07.
- Professor Matilde Santos - Physics Department, University de Madrid, 2007-08.
- Olga Ivina, University of Girona, 2011.

Selected Publications ¹

Books

1. A. Gammerman, (ed.) Probabilistic Reasoning and Bayesian Belief Networks. Alfred Waller, Henley-on-Thames, 1995.
2. A. Gammerman, (ed.) Computational Learning and Probabilistic Reasoning. John Wiley & Sons, Chichester, 1996.
3. A. Gammerman. Machine Learning: Progress and Prospects. ISBN 0 900145 93 5, 1997.
4. A. Gammerman, (ed.) Causal Models and Intelligent Data Management. Springer-Verlag, 1999.
5. V.Vovk, A.Gammerman and G.Shafer. Algorithmic learning in a random world. New York: Springer, 2005.
6. A.Gammerman, (ed.) Artificial Intelligence and Applications, Proceedings of the Conference, ACTA Press, ISBN: 978-0-88986-709-3, 2008.

Special Issues of Journals

7. A.Gammerman and V.Vovk (editors). Special Issue on Kolmogorov Complexity. *The Computer Journal*, vol. 42, no. 4, pp.254-347, (1999).
8. C. Aitken, T. Connolly, A. Gammerman, G. Zhang, D. Oldfield. Predicting an Offender's Characteristics: an evaluation of statistical modelling. *Special Interest Series - Paper 4*, Home Office, London, 1995.
9. Alexander Gammerman and Vladimir Vovk. The 2nd British Computer Society Lecture. Hedging Predictions in Machine Learning. Published with discussion in *The Computer Journal*, v.50, No.2, 151-163, March 2007. The same journal also published:
 - i) Discussion on Hedging Predictions in Machine Learning. *The Computer Journal*, 2007, 50: 164-172;
 - ii) Rejoinder Hedging Predictions in Machine Learning. *The Computer Journal*, 2007, 50: 173-177.
10. Alex Gammerman, Ilia Nouretdinov, Brian Burford Alexey Chervonenkis, Vladimir Vovk and Zhiyuan Luo. Clinical Mass Spectrometry Proteomic Diagnosis by Conformal Predictors. *Statistical Applications in Genetics and Molecular Biology Journal*, Volume 7, Issue 2 2008 Article 13, 2008.

¹In all joint publications the authors contribution were equal unless it stated otherwise.

**Refereed Book Chapters, Journal Papers,
Conference Proceedings**

11. H. Papadopoulos, V. Vovk and A.Gammerman. "Regression Conformal Prediction with Nearest Neighbours", *Journal of Artificial Intelligence Research*, Volume 40, pages 815-840, 2011.
12. Dmitry Adamskiy, Ilia Nouretdinov and Alex Gammerman. "Conformal prediction in semi-supervised case". Chapter 4 in "*Learning and Data Science*", edited by L.Bottou, F.Murtagh, M.Gettler-Summa, B.Goldfarb, C.Pardoux, M.Touati; Chapman&Hall, Paris, 2011.
13. I.Nouretdinov, S.Costafreda, A.Gammerman, A.Chervonenkis, V.Vovk, V.Vapnik and C.Fu. "Machine learning classification with confidence: Application of transductive conformal predictors to MRI-based diagnostic and prognostic markers in depression". *NEUROIMAGE*, volume 56, issue 2, year 2011, pp. 809 - 813.
14. A.Lambrou, H.Papadopoulos, E.Kyriacou, C.Pattichis, A.Nicolaides and A.Gammerman. "Assessment of stroke risk based on morphological ultrasound image analysis with conformal prediction". Submitted for publication in the *International Journal on Artificial Intelligence Tools (IJAIT)*, 2011. Also appeared in the 6th IFIP International Conference on Artificial Intelligence Applications & Innovations, AIAI 2010.
15. M.Yang, I.Nouretdinov, Z.Luo and A.Gammerman. "Feature selection by Conformal Prediction". Accepted for publication in Proceedings of the *Workshop on Artificial Intelligence Applications in Biomedicine (AIAB 2011)*.
16. C.Zhou, I.Nouretdinov, Z.Luo and A.Gammerman. "Development of the Venn Machine". Accepted for publication in Proceedings of the *Workshop on Artificial Intelligence Applications in Biomedicine (AIAB 2011)*.
17. D.Adamskiy, I.Nouretdinov and A.Gammerman. "Applying Conformal Prediction to the Bovine TB Diagnosing". Accepted for publication in Proceedings of the *Workshop on Artificial Intelligence Applications in Biomedicine (AIAB 2011)*.
18. A.Gammerman and V.Vovk. "Predictions contolees en apprentissage automatique". *MODULAD Journal*, v.42pp.16-33, 2010. In French.
19. Dmitry Devetyarov, Martin J. Woodward, Nicholas G. Coldham, Muna F. Anjum, Alex Gammerman. "A New Bioinformatics Tool for Prediction with Confidence". 2010 International Conference on Bioinformatics and Computational Biology (*BIOCOMP'10*) Proceedings, p. 24-26, 2010.

20. Ola Blixt, Deanna Bueti, Brian Burford, Diane Allen, Sylvain Julien, Michael Hollingsworth, Alex Gammerman, Ian Fentiman, Joyce Taylor-Papadimitriou and Joy M. Burchell. "Autoantibodies to aberrantly glycosylated MUC1 in early stage breast cancer are associated with a better prognosis". Accepted for publication in *Breast Cancer Research Journal* (MS : 1027144559463124).
21. John Francis Timms, Usha Menon, Dmitry Devetyarov, Ali Tiss, Stephane Camuzeaux, Aleksandra Gentry-Maharaj, Zhiyuan Luo, Alex Gammerman, Rainer Cramer, Ian Jacobs. "Early detection of ovarian cancer in pre-diagnosis samples using CA125 and MALDI MS peaks". Submitted to the *Journal of Gynecologic Oncology*.
22. V.Vovk, I.Nouretdinov and A.Gammerman. "On-line predictive linear regression". *Annals of Statistics*, Volume 37, Number 3 (2009), 1566-1590. Permanent link to this document: <http://projecteuclid.org/euclid.aos/1239369032> Digital Object Identifier: doi:10.1214/08-AOS622
23. A. Lambrou, H. Papadopoulos and A. Gammerman. "Evolutionary Conformal Prediction for Breast Cancer Diagnosis". *9th International Conference on Information Technology and Applications in Biomedicine (ITAB'09)*.
24. Harris Papadopoulos, Volodya Vovk and Alex Gammerman. Reliable diagnosis of acute abdominal pain with conformal prediction. *Journal of Engineering Intelligent Systems*, Vol 17 Nos 2/3 June/September 2009, pp.127-137.
25. I.Nouretdinov, D.Devetyarov and A.Gammerman. Application of Inductive Confidence Machine to ICMLA-competition data. 8th International Conference on Machine Learning and Applications - ICMLA 2009, Miami, Florida, 2009.
26. A.Gammerman, R.J.Richards, I.Nouretdinov. Detection and Abundance Estimation of Material Classes from Airborne from LWIR Hyperspectral Data. EMRS DTC 6th Conference, Edinburgh, 2009.
27. D.Devetyarov, I. Nouretdinov and A.Gammerman. Confidence Machine and its application to Medical Diagnosis; Int.Conf.on Biological Computing (BioComp09), July 2009, USA.
28. Ali Tiss, Celia Smith, Dmitry Devetyarov, Aleksandra Gentry-Maharaj, Stephane Camuzeaux, Brian Burford, Ilia Nouretdinov, Jeremy Ford, Zhiyuan Luo, Alex Gammerman, John F. Timms, Ian Jacobs, Usha Menon and Rainer Cramer. Proteomics analysis of ovarian cancer serum samples (Part 1): Peptides generated ex vivo from abundant serum proteins by tumour-specific exopeptidases are not useful biomarkers in ovarian cancer. *Clinical Chemistry*, 56: p. 262-271, 2010.

29. John F. Timms, Rainer Cramer, Stephane Camuzeaux, Ali Tiss, Celia Smith, Brian Burford, Ilia Nouretdinov, Musarat Kabir, Aleksandra Gentry-Maharaj, Jeremy Ford, Zhiyuan Luo, Alex Gammerman, Usha Menon and Ian Jacobs. Proteomics analysis of ovarian cancer serum samples (Part 2): Serum MALDI-TOF MS profiling and CA125 immunoassay as diagnostic tools.
Accepted for publication in *Clinical Chemistry*.
30. Fedor Zhdanov, Vladimir Vovk, Brian Burford, Dmitry Devetyarov, Ilia Nouretdinov and Alex Gammerman. Online Prediction of Ovarian Cancer. *Lecture Notes in Computer Science Volume 5651/2009 Artificial Intelligence in Medicine* DOI 10.1007/978-3-642-02976-9; 2009.
31. F- M. Schleif, T. Willmann, A. Gammerman, M. Kostrzewa, B. Hammer. Cancer informatics by prototype networks in mass spectrometry. *Artificial Intelligence in Medicine* 45(2-3): 215-228, 2009.
32. H. Papadopoulos, A. Gammerman and V. Vovk. Confidence Predictions for the Diagnosis of Acute Abdominal Pain. In L. Iliadis, I. Vlahavas and M. Bramer (Eds.), *Artificial Intelligence Applications & Innovations III*, Volume 296 of IFIP International Federation for Information Processing, 175 - 184. Springer, 2009.
33. A. Gammerman, V. Vovk, B. Burford, I. Nouretdinov, Z. Luo, A. Chervonenkis, M. Waterfield, R. Cramer, P. Tempst, J. Villanueva, M. Kabir, S. Camuzeaux, J. Timms, U. Menon and I. Jacobs. Serum proteomic abnormality predating screen detection of ovarian cancer . *The Computer Journal* Volume 52, Issue 3 Pp. 326-333, 2009.
34. Ramus SJ, Elmasry K, Luo Z, Gammerman A, Lu K, Ayhan A, Singh N, McCluggage WG, Jacobs JJ, Whittaker JC, and Gayther SA. Predicting clinical outcome in patients diagnosed with synchronous ovarian and endometrial cancer. *Clinical cancer research : an official journal of the American Association for Cancer Research* 14(18):5840-8, 2008 Sep 15
35. B. Ryabko, J. Astola and A. Gammerman. Adaptive Coding and Prediction of Sources with Large and Infinite Alphabets, *IEEE Transaction on Information Theory*, v.54, No.8, pp.3808–3813, August 2008.
36. H. Papadopoulos, V. Vovk and A. Gammerman. Normalized Nonconformity Measures for Regression Conformal Prediction. *Artificial Intelligence and Applications - AIA 2008 Conference*, Innsbruck, Austria, pp.64-69, 2008.
37. H. Papadopoulos, V. Vovk and A. Gammerman. Conformal Prediction with Neural Networks. In *Proceedings of the 19th IEEE International Conference on Tools with Artificial Intelligence (ICTAI'07)*, Volume 2, 388 - 395. IEEE Computer Society, 2007.

38. S.Busutill, Y.Kalnishkan and A.Gammerman. Improving the Aggregating Algorithm for Regression. *Artificial Intelligence and Applications*, In Proceedings of the 25th IASTED Conference Artificial Intelligence and Applications (AIA 2007), pp.347–352, Innsbruck, Austria, (2007), Editor: V.Devedzic.
39. John F. Timms, Elif Arslan-Low, Aleksandra Gentry-Maharaj, Zhiyuan Luo, Davy T.Jampens, Vladimir N. Podust, Jeremy Ford, Eric T. Fung, Alex Gammerman, Ian Jacobs, and Usha Menon. Preanalytic Influence of Sample Handling on SELDI-TOF Serum Protein Profiles *Clinical Chemistry*, **53**, 645–656, April 2007.
40. A Gammerman, A Chervonenkis, I Nouretdinov, J Nothard and K Smart. Compact Descriptors for Automatic Target Identification. 7th EMRS DTC Technical Conference, Edinburgh, 2007.
41. B.Ryabko, J.Astola and A.Gammerman. Application of Kolmogorov complexity and universal codes to identity testing and nonparametric testing of serial independence for time series. *Theoretical Computer Science*, v.359, No.1-3, August 2006; also in e-print archive, 2005, <http://arxiv.org/abs/cs/0505079>.
42. A.Gammerman. Transductive Learning. *Joint 3rd International Conference on Soft Computing and Intelligent Systems and 7th International Symposium on Advanced Intelligent Systems*, CD, Tokyo, Japan, 2006.
43. A.Bellotti, Z.Luo and A.Gammerman. Reliable classification of childhood acute leukaemia from gene expression data using Confidence Machines. *IEEE International Conference on Granular Computing*, Atlanta, USA, 2006.
44. A.Bellotti, Z.Luo, A.Gammerman, F.van Delft and V.Saha. Qualified Predictions for Microarray and Proteomics Pattern Diagnostics with Confidence Machines, *International Journal of Neural Systems* vol.15, No.4, pp.247-258, 2005.
45. F. van Delft, T. Bellotti, Z. Luo, A.Gammerman, L. Jones, N. Patel, O.Yiannikouris, A. Hill, M. Hubank, H. Kempinski, D. Fletcher, T.Chaplin, N. Foot, B. Young, I. Hann, and V. Saha. Perspective gene expression analysis accurately subtypes acute Leukaemia in children and establishes a commonality between hyperdiploidy and t(12;21) in acute lymphoblastic leukaemia, *British Journal of Haematology*, Issue 1, pp. 26-35, July 2005.
46. Z.Luo and A.Gammerman. Qualified Probabilistic Predictions using Graphical Models, In L. Godo (eds) *ECSQARU 2005, Lecture Notes in Artificial Intelligence 3571*, pp. 111-122, Springer-Verlag Berlin Heidelberg, August 2005.

47. I Shahmuradov, A.Gammerman and V.V.Solovyev. Plant Promoter Prediction with Confidence Estimation. *Nucleic Acids Research*, 33(3), pp. 1069-1076, 2005
48. Z.Luo and A.Gammerman. Qualified Predictions for Proteomics Pattern Diagnostics with Confidence Machines. In: Intelligent Data Engineering and Automated Learning - IDEAL 2004 *Lecture Notes in Computer Science* 3177, pp 46-51, Springer, 2004.
49. Yuri Kalnishkan, Vladimir Vovk and Alex Gammerman. On-line Predictions with Kernels and the Complexity Approximation *Proceedings of the Twentieth Conference on Uncertainty in Artificial Intelligence (UAI - 04)*, 2004, pp. 170-176, AUAI Press.
50. I.Nouretdinov, V.Vovk and A.Gammerman. Testing exchangeability online. *Proceedings of the 20th International Conference on Machine Learning* (ed. by T Fawcett and N. Mishra), 2003, pp. 768-775, Menlo Park, CA, A AAJ Press.
51. Shahmuradov I.A., Hancock J.M., Bramley P.M., Gammerman A.J. and Solovyev V.V. PlantProm: a database of plant promoter sequences. *Nuclear. Acids. Res.* 31, 2003, pp.114-117.
52. Gordon L., Chervonenkis A.Ya., Shahmuradov I.A. , Solovyev V.V. and Gammerman A.J. Sequence alignment kernel for recognition of promoter regions. *Bioinformatics*, 19, 2003, 1964-1971.
53. Shahmuradov I.A., Akbarova Y. Yu. Gammerman A.J. and Solovyev V.V) Plastid DNA splinters in nuclear genomes of rice and Arabidopsis. In: *European Journal of Biochemistry*, 269, Supplement 1, p. 51.
54. L. Gordon, Chervonenkis A.Ya. Gammerman A. and Shahmuradov I.A.) Genome-wide prokaryotic recognition based on sequence alignment kernel. In: *Advances in Intelligent Data Analysis*, (ed. by Berthold, Lenz, Bradley, Kruse and Borgelt), 2003, pp.386-396, Springer Verlag.
55. A.Gammerman and V.Vovk. Prediction algorithms and confidence measures based on algorithmic randomness theory, *Theoretical Computer Science*, 287 (2002) 209-217.
56. Harris Papadopoulos, Kostas Proedrou, Volodya Vovk and Alex Gammerman. Qualified Predictions for Large Data Sets in the Case of Pattern Recognition. In: *Proceedings of the International Conference on Machine Learning and Applications (ICMLA'02)*, 2002, pp.159-163, CSREA Press.
57. Kostas Proedrou, Ilia Nouretdinov, Volodya Vovk and Alex Gammerman. Transductive Confidence Machines for Pattern Recognition, *European Conference on Machine Learning, Lecture Notes in Artificial Intelligence*, pp. 381-390, 2002.

58. Harris Papadopoulos, Kostas Proedrou, Volodya Vovk and Alex Gammerman. Inductive Confidence Machines for Regression, European Conference on Machine Learning, *Lecture Notes in Artificial Intelligence*, pp.345-356, 2002.
59. A. Chervonenkis, M. Herbster and A.Gammerman. A combined Bayes-maximum likelihood method for regression. *Data Fusion and Perception*, Riccia, Lenz, Kruse eds, Springer-Verlag Wein New York, 2001.
60. I. Nourtdinov, M. V'yugin, V. Vovk and A.Gammerman. Pattern Recognition and density estimation under the general i.i.d. assumption, *Proceedings of Computational Learning Theory (COLT)*, Amsterdam, 2001.
61. Support Vector Machine Learning Algorithm and Transduction. In: *Computational Statistics*, v.15, pp.31-39, 2000.
62. N. Gilardi, A. Gammerman, M. Kanevski, M. Maignan, T. Melliush, C. Saunders, and V. Vovk. Application des methodes d'apprentissage pour l'etude des risques de pollution dans le lac leman. Colloque CLUSE sur les Risques Majeurs, 2000; in French.
63. C. Saunders, A.Gammerman, H. Brown and G. Donald. Application of Support Vector Machines to Fault Diagnosis, In: *Proceedings of the Eleventh International Workshop on the Principles of Design (DX'00)*, 2000.
64. C. Saunders, A.Gammerman and V. Vovk. Computationally Efficient Transductive Machines, In: Proceedings of the Eleventh International Conference on Algorithmic Information Theory (ALT 2000), *Lecture Notes in Computer Science*, Springer-Verlag, pp.325-333, 2000.
65. P. van Trappen, M. Stitson, R. Wools, S. Barnhill, V. Vapnik, I. Jacobs and A.Gammerman) Preoperative Differentiation of Ovarian Tumours using Support Vector Machine and Risk Malignancy Index, In: *Proceedings of the International Federation of Obstetrics and Gynaecology (FIGO) Conference*, Washington, 2000.
66. V.Vovk and A.Gammerman. Statistical applications of algorithmic randomness. *International Statistics Institute*, 52nd Session, Helsinki, 1999.
67. V.Vovk, C.Saunders and A.Gammerman. Machine Learning Applications of Algorithmic Randomness. *Machine Learning, Proceedings of the Sixteen International Conference (ICML'99)*, 1999.
68. C.Saunders, V.Vovk and A.Gammerman. Transduction with Confidence and Credibility. *Proceedings of the International Joint Conference on Artificial Intelligence*, Stockholm, Sweden, 1999, (Postscript).

69. M.Stitson, V. Vapnik, V. Vovk, C.Watkins, J. Weston and A.Gammerman. Support Vector Regression with ANOVA Decomposition Kernels, In Scholkopf B., Burges C.J.C., and Smola A.J., editors, *Advances in Kernel Methods, Support Vector Learning*, pages 285-291. The MIT Press, Cambridge, Mass and London, England, 1999.
70. J.Weston, M.Stitson, V.Vapnik, V.Vovk, C.Watkins and A.Gammerman. Support Vector Density Estimation. In Scholkopf B., Burges C.J.C., and Smola A.J., editors, *Advances in Kernel Methods, Support Vector Learning*, pages 293-305. The MIT Press, Cambridge, Mass and London, England, 1999.
71. A.Gammerman and V.Vovk. Kolmogorov Complexity: Sources, Theory and Applications. The Special Issue of *The Computer Journal*, v.42, No.4, 1999.
72. V.Vovk and A.Gammerman. Predictive Complexity Principle. The Special Issue of *The Computer Journal*, v.42, No.4, 1999.
73. A.Gammerman and V.Vovk. Learning Algorithms in High Dimensional Space. *Causal Models and Intelligent Data Management*, Springer, 1999.
74. A.Chervonenkis, A.Gammerman and M.Herbster. A combined Bayesian - ML approach to model selection. *Proceedings of IJCAI99 Workshop on Support Vector Machine*, Stockholm, Sweden, 1999.
75. A.Gammerman, V.Vovk and V.Vapnik. Learning by Transduction. In Cooper G.F. and Moral S., editors, *Uncertainty in Artificial Intelligence*, Procs of the Fourteenth Conference (1998), Madison, Wisconsin, July 1998, pages 148-155. Morgan Kaufmann, San Francisco, CA, 1998.
76. A.Gammerman. Multivariate analysis and Bayesian belief networks for Intelligent Decision Support Systems. In: Proceedings of the EURO XVI: 16th European Conference on Operational Research, Belgium, 1998.
77. A.Gammerman. Learning by Support Vector Machine, Ridge Regression and Transduction. In: *NTTS98: International Conference on New Techniques and Technologies for Statistics*; pp.175-181, Sorrento, Italy, 1998.
78. C. Saunders, V.Vovk and A.Gammerman. Ridge Regression Learning Algorithm in Dual Variables, *Proceedings of the 15th International Conference on Machine Learning*, 1998.
79. C.G.G.Aitken, T.Connolly, A.Gammerman, G.Zhang, D.B.Bailey, R.Gordon and R.Oldfield. Statistical modelling in specific case analysis. *Science and Justice*, 36(4):245-255, 1996.
80. C.G.G.Aitken, A.Gammerman, G.Zhang, T.Connolly, D.B.Bailey, R.Gordon and R.Oldfield. Bayesian belief networks with an application in specific case analysis. In A. Gammerman, editor, *Computational*

Learning and Probabilistic Reasoning, pages 169-184. John Wiley & Sons, Chichester, 1996.

81. A.Gammerman and A.Bellotti. Emily - a minimal length encoding system. In Procs of IFCS-96, Kobe, Japan, 1996.
82. Z.Luo, A.Gammerman, C.G.G.Aitken and M.Brewer) Exact and approximate algorithms and their implementations in mixed graphical models. In A. Gammerman, editor, *Probabilistic Reasoning and Bayesian Belief Networks*, pages 33-53. Alfred Waller, Henley-on-Thames, 1995.
83. A.Gammerman and A.Bellotti. Induction experiments with a minimal length encoding system. In UNICOM Seminar on Applied Decision Technologies, pages 209-222, London, 1995.
84. M.Brewer, Z.Luo and A.Gammerman. Using multiple chains for Gibbs sampling in mixed graphical association models. *Computational Statistics - COMPSTAT*, pages 185-189, Physica-Verlag, Heidelberg, Germany, 1994.
85. A.Gammerman. Computational models of probabilistic reasoning. In D.J. Hand, editor, *AI and Computer Power, The impact of statistics*, pages 149-168. Chapman and Hall, 1994.
86. A.Gammerman. Geometric analogy problem by minimal-length encoding. In: *International Federation of Classification Societies Conference - IFCS*, pages 201-203, Paris, 1993.
87. A.Gammerman and H.Styri. A connectionist expert system and its application to a large set of medical data. In: *Medical Informatics Europe MIE-93*, Jerusalem, February 1993.
88. C.G.G.Aitken, M.J.Brewer, A.Gammerman and Z.Luo Stochastic simulation in mixed graphical association models. In K. Dodge and F. Whittaker, editors, *Computational Statistics*, volume 1, pages 257-262, 1992.
89. A.Gammerman, R.H.Davis and D.B.Edelman. Machine learning algorithms. *IMA Journal of Mathematics Applied in Business and Industry*, 3(3), 1992.
90. A.Gammerman. The representation and manipulation of the algorithmic probability measure for problem solving. *Annals of Mathematics and Artificial Intelligence*, 4:281-300, 1991.
91. A.Gammerman and A.R.Thatcher. Bayesian diagnostic probabilities without assuming independence of symptoms. *Methods of Information in Medicine*, 30(1):44-52, 1991.
92. Z.Luo and A.Gammerman. PRESS - a probabilistic reasoning expert system shell. Number 548 in *Lecture Notes in Computer Science*, pages 232-237. Springer-Verlag, 1991.

93. Z.Luo and A.Gammerman. STOSS - a stochastic simulation system for bayesian belief networks. Number 521. In: *Lecture Notes in Computer Science*, pages 97-105. Springer-Verlag, 1991.
94. A.Gammerman. Constructing causal trees for a predictive expert system. In 3rd Conference of the International Federation of Classification Societies, Heriot-Watt University UK, 1991.
95. Z.Luo and A.Gammerman. A stochastic simulation system and its application to causal models. In 3rd International Conference on IPMU in Knowledge-Based Systems, pages 186-189, The Institution of Electrical Engineers, Paris, 1990.
96. A.Gammerman and Y.Gu. Computer-aided diagnoses using Bayesian inference. In Proceedings of European Conference Simulation in Biology and Medicine, pages 128-132. Erlangen-Nuremberg, June 1990.
97. A.Gammerman and D.Wang. An intelligent tutoring system for medical students. *Theoretical Surgery*, 5(3), 1990.
98. Y.Gu and A.Gammerman. A computer-aided medical system and its application to the diagnosis of abdominal pain. *Theoretical Surgery*, 5(3), 1990.
99. A.Gammerman. A causal probabilistic reasoning system. In *4th International Symposium on Knowledge Engineering*, pages 23-41, Barcelona, May 1990.
100. A.Gammerman and A.R.Thatcher. Bayesian inference in an expert system without assuming independence. In M. Golumbic, editor, *Advances in Artificial Intelligence, Natural Languages and Knowledge Based Systems*, pages 182-218. Springer-Verlag, 1990.
101. C.Aitken and A.Gammerman. Probabilistic reasoning in evidential assessment. *Journal of the Forensic Science Society*, 29(5):1-13, 1989.
102. X.Liu and A.Gammerman. TBKS: a tool that captures expertise. In Procs of the 3rd International Conference on Knowledge Engineering, pages 35-46, 1988.
103. A hybrid approach to deductive uncertain inference. *International Journal Man-Machine Study*, 28:671-681, 1988.
104. W.Atkinson and A.Gammerman. An application of expert systems technology to identification task. *Taxon*, 36(4):705-714, 1987.
105. A.gammerman and S.Salvini. PROTEST: A prototyping tool for knowledge engineering. In Procs of 7th International Medical Informatics Congress MIE-87, pages 45-49, 1987.

106. X.Liu and A.Gammerman. On the validity and applicability of the IN-FERNO system. In: *Research and Development in Expert Systems III*, pages 47-56. Cambridge University Press, 1987.
107. A.Gammerman and N.Creaney. Modelling of uncertainty in expert systems. In *Procs of the 2nd International Conference on Expert Systems*, London, pages 132-141, 1986.
108. W.Atkinson and A.Gammerman. Expert key: an expert system for identification. In *Computers in Teaching*, Vol. 5. Oxford University, 1986.
109. A.Gammerman, B.Skullerand and W.Atkinson. An expert system for biological identification. In: *SPIE, Applications of Artificial Intelligence IV*, volume 657, pages 34-38, Washington, 1986
110. A.Gammerman, B.Skullerand and W.Atkinson. Sysex: An expert system for biological identification. In John F. Gilmore, editor, *Procs Applications of Artificial Intelligence IV*, Innsbruck, Austria, April 1986.

Selected Technical Reports

111. Theory of SV machines (joint work with M. O. Stitson, J. Weston, V. Vovk and V. Vapnik). Technical Report CSD-TR-96-17, Department of Computer Science, Royal Holloway, University of London, December 1996.
112. Support Vector ANOVA decomposition (joint work with M. O. Stitson, A. Gammerman, V. Vapnik, C. Watkins and J. Weston). Technical Report CSD-TR-97-22, Department of Computer Science, Royal Holloway, University of London, November 1997.
113. Density estimation using support vector machines (joint work with J. Weston, V. Vovk, M. O. Stitson, V. Vapnik and C. Watkins). Technical Report CSD-TR-97-23, Department of Computer Science, Royal Holloway, University of London, November 1997, revised February 1998.
114. Complexity Approximation Principle (joint work with V. Vovk). Technical Report CSD-TR-99-05, Department of Computer Science, Royal Holloway, University of London, January 1999.
115. Transductive Confidence Machines for pattern recognition (joint work with K. Proedrou, I. Nouretdinov and V. Vovk). Technical Report CLRC-TR-01-02, Computer Learning Research Centre, Royal Holloway, University of London, June 2001.
116. Pattern recognition and density estimation under the general i.i.d. assumption (joint work with I. Nouretdinov, M. Vyugin and V. Vovk). Technical Report CLRC-TR-01-06, Computer Learning Research Centre, Royal Holloway, University of London, June 2001.

117. On-line Confidence Machines are well-calibrated. Technical Report CLRC-TR-02-01, Computer Learning Resea
118. Mondrian Confidence Machine (joint work with D. Lindsay, I. Nouretdinov and V. Vovk). On-line Compression Modelling project, Working Paper #4, 2003.
119. Online region prediction with real teachers, (joint work with D. Ryabko and V. Vovk). On-line Compression Modelling project, Working Paper #7, 2003.
120. Mass Spectrometry Data Analysis: Preprocessing and Pattern Recognition of the Sloan-Kettering Data. CLRC Technical Report 01-02-2005; (joint work with I.Nouretdinov, Z.Luo, A.Chervonenkis, V.Vovk Paul Tempst, John Philip, Josep Villanueva). 2004–2005.
121. Data Analysis of Human Serum Proteome II:UKCTOCS Data Pilot Study. (joint work with Ilia Nouretdinov, Brian Burford, Zhiyuan Luo, Alexey Chervonenkis, Volodya Vovk, John Timms, Mike Waterfield, Musarat Kabir, Paul Tempst, Josef Villanueva, Usha Menon and Ian Jacobs). November, 2005.
122. Two New Kernel Least Squares Based Methods for Regression, (joint work with S. Busuttil and Y. Kalnishkan), March 2006.
123. Data Analysis I - Comparison of Protocols, Version 2; (joint work with Ilia Nouretdinov, Brian Burford, Zhiyuan Luo, Alexey Chervonenkis and Volodya Vovk), June 2006;
124. Data Analysis II: Comparison of Plasma Protocols (joint work with Ilia Nouretdinov, Brian Burford, Zhiyuan Luo, Alexey Chervonenkis, Volodya Vovk, Davy T'Jampens, Eric T.Fung, Elif Arslan-Low, Jeremy Ford, Aleksandra Gentry-Maharaj John Timms, Adam Rosenthal, Usha Menon and Ian Jacobs). 2006.
125. Serum proteomic abnormality predating screen detection of ovarian cancer (joint work with Ilia Nouretdinov, Brian Burford, Zhiyuan Luo, Alexey Chervonenkis, Volodya Vovk, Musarat Kabir, John Timms, Paul Tempst, Josef Villanueva, Usha Menon and Ian Jacobs). 2007.
126. Data Analysis of 7 biomarkers –version 4. (with I.Nouretdinov, B.Burford, Z.Luo), RHUL, 2008.
<http://www.clrc.rhul.ac.uk/projects/Private/7bmReport.pdf>
127. MRC UKOPS: CLRC Data Analysis Report. (with D.Devetyarov, B. Burford, Z.Luo, I. Nouretdinov, V. Vovk, A.Chervonenkis; S. Camuzeaux, R.Hallet, J. Ford, A. Gentry-Maharaj, J.Timms, U. Menon, I. Jacobs; R. Cramer, A.Tiss, C.Smith. CLRC Technical Report –TR–08–01.

128. UKOPS Supplementary results I; 2008.
<http://clrc.rhul.ac.uk/projects/proteomic3.htm>
129. UKOPS Supplementary results II. CLRC Technical Report: CLRC-TR-08-01, 2009.
<http://www.clrc.rhul.ac.uk/projects/Private/UKOPS-SUP2-CLRC-08-01.pdf>
130. Identification of proteomic biomarkers in the UKCTOCS Heart Diseases data set. CLRC Technical Report: CLRC-TR-08-04; 2009 (D.Devetyarov, B. Burford, Z.Luo, I. Nouretdinov, V. Vovk, A.Chervonenkis; S. Camuzeaux, R.Hallet, J. Ford, A. Gentry-Maharaj, J.Timms, U. Menon, I. Jacobs; R. Cramer, A.Tiss, C.Smith).
131. Early detection of Breast Cancer in UKCTOCS using proteomic biomarkers. CLRC Technical Report: CLRC-TR-08-03; 2009 (D.Devetyarov, B. Burford, Z.Luo, I. Nouretdinov, V. Vovk, A.Chervonenkis; S. Camuzeaux, R.Hallet, J. Ford, A. Gentry-Maharaj, J.Timms, U. Menon, I. Jacobs; R. Cramer, A.Tiss, C.Smith).
132. Analysis of serial UKCTOCS-OC data: discriminating abilities of proteomics peaks. CLRC Technical Report: CLRC-TR-08-02; 2008 (D.Devetyarov, B. Burford, Z.Luo, I. Nouretdinov, V. Vovk, A.Chervonenkis; S. Camuzeaux, R.Hallet, J. Ford, A. Gentry-Maharaj, J.Timms, U. Menon, I. Jacobs; R. Cramer, A.Tiss, C.Smith).
133. Discovery of proteomic biomarkers for heart disease. B. Burford, A. Tiss, S. Camuzeaux, J. Ford, A. Gentry-Maharaj, U. Menon, I. Jacobs, D. Devetyarov, Z. Luo, I. Nouretdinov, V. Vovk, J. Timms, R. Cramer, A. Gammerman; 2009.
134. Spectra analysis system – documentation (with B.Burford, I.Nouretdinov, D.Devetyarov, Z.Luo, A.Chervonenkis, V.Vovk), RHUL, London, 2009.

Selected Grants

- Engineering and Physical Sciences Research Council (EPSRC), grant GR/L35812, PI. “Support Vector and Bayesian Learning Algorithms: Analysis and Applications” (with V. Vovk and V. Vapnik), £142,360*. 1997–2000.
- Engineering and Physical Sciences Research Council (EPSRC), grant GR/M16856, PI. “Comparison of the Support Vector Machine and Minimum Message Length methods for induction and prediction” (with V. Vovk and C. Wallace), £132,787* 1999–2002.

- Engineering and Physical Sciences Research Council (EPSRC), grant GR/R46670/01, PI. “Complexity Approximation Principle and Predictive Complexity: Analysis and Applications” (with Prof. V. Vovk), £142,996*, 2001–2004.
- Biotechnology and Biological Sciences Research Council (BBSRC), grant 111/BIO14428, PI. “Pattern Recognition Techniques for Gene and Promoter Identification and Classification in Plant Genomic Sequences” (with J. Hancock and V. Solovyev), £145,210*, 2002–2005.
- European Union (EU), grant IST-1999-10226, PI. “EurEdit: The Development and Evaluation of New Methods for Editing and Imputation” (with European partners from Italy, the Netherlands, Switzerland, Portugal), RHUL part: £86,809*, 2000–2003.
- Royal Society grant, PI, “Efficient randomness testing of random and pseudorandom number generators” (with B. Ryabko), £4,961, 2003–2005.
- Medical Research Council (MRC), grant G0301107 (S505/65), PI. “Proteomic Analysis of the Human Serum Proteome” (with I. Jacobs, M. Waterfield, R. Cramer, V. Vovk, S. Gayther, Z. Luo, U. Menon, J. Timms), RHUL part: £170,091*, 2005–2008.
- QinetiQ grant: “Automated Target Identification”. £47,000 2006–2007.
- Research Promotion Foundation of Cyprus. “ASPIDA project: Development of New Conformal Prediction Methods with Applications in Medical Diagnosis”, PI, (with H. Papadopoulos and V. Vovk), £30,770, 2007–2010.
- Engineering and Physical Sciences Research Council “Practical competitive prediction” (with V. Vovk and Y. Kalnishkan), co-PI, £406,000, 2007–2010.
- Department for Environment, Food and Rural Affairs (Defra), Veterinary Laboratories Agency, “Application of Pattern Recognition techniques to Bioinformatics.” PI, £82,000, 2007–2010.
- European Union EU FP7 programme: “Post-translational modification, O-PTM”, HEALTH-2007-2.4.1-2: Translating clinical ‘omics’-technology (genomics, proteomics, metabolomics) into innovative cancer biomarkers aiding in early diagnosis, prognosis and treatment selection of cancer patients. (with Dr Joy Burchell, Prof Joyce Taylor-Papadimitriou, KCL; Z.Luo and V.Vovk from RHUL and 5 other institutions), PI, £193,046, 2008–2011.
- Medical Research Council (MRC) Application of conformal predictors to functional magnetic resonance fMRI imaging research; PI, £85,581, 2009–2010.

- Royal Society grant, "Trace Detection with Confidence for Odor Capture Hybrid Sensor System", co-PI, (with Z.Luo), £7,800, 2009-2010.
- Department for Environment, Food and Rural Affairs (Defra), Veterinary Laboratories Agency (VLA). Machine learning algorithms for analysis of large veterinary datasets; PI, £52,000, 2010–2013.
- BBSRC (and EU) programme: Living with uninvited guests: comparing plant and animal responses to endocytic invasions (ERASysBio). BBSRC project (with VLA, SGUL, Spain, Germany and France); co-PI; over £700,000 for RHUL part, 2010–2013.

Other publications

- Learning by Support Vector Machine (with V. Vovk). Tutorial. Uxbridge, Middlesex: UNICOM Seminars Ltd., 1998.

Patents

Data classification apparatus and method thereof (with V. Vovk).

- European Patent Application No. 99 954 200.4: the application was allowed in July 2004.
- US Patent Application No. 09/831,262: allowed.

Teaching

I feel I have made a valuable contribution to the Education Programme at Royal Holloway. My aim has been to teach students a mathematical/computational culture, i.e. how to approach a problem and solve it in a certain logical way. I have taught at all levels of Computer Science from first year students to Master level students, and in a wide range of courses from theory of computation to very practical programming courses. I was involved (as HoD) in the review of Computer Science curriculum. I developed myself or with my colleagues five new courses: Inference Systems; Inductive Learning; Intelligent Decision-Making Systems; Bayesian Inference; Computer Learning and participated in developing three teaching programmes, including a very successful BIS programme (with Management). I was invited and gave courses in Machine Learning in University of Madrid (Spain) and University of Paris 9 (France).

I taught the following courses:

- CS120 (Autumn 1993, Autumn 1994): C++ programming course.
- CS356 (Autumn 1995 and 1996): developed a new course on Intelligent Decision Systems (postgraduate course, Spring 1997 and Spring 1998): developed and taught this course.
- Business Information Systems MSc course (Spring 1999): developed and taught (jointly with V. Vovk) a course on Intelligent Decision Systems.
- CS392 (Spring 1998, Spring 1999, Autumn 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009) a course on modern machine learning techniques (SVM, transduction, algorithmic randomness).
- CS393 (Spring 2001, 2002, 2003, 2004, 2005): a course (jointly with V. Vovk) on Computational Finance; includes mathematical and computational models of financial markets and numerical methods for valuation of derivative securities.
- Supervising final year projects in machine learning.

Administration

- **Computer Science Department**

From 1995 to 2005 I was serving as Head of the Computer Science. Over this period, the department expanded in research and teaching activities and moved from grade 4 in 1996 to 5 in 2001 RAE. Several new research directions and new research groups were established including **Machine Learning** and **Bioinformatics** and a number of postgraduate and undergraduate programmes were developed. Among them a Master course in Business Information Systems -**BIS** (with School of Management) and a Master course in Computer Science by Research.

- **Computer Learning Research Centre – CLRC**

In 1998 in recognition of our research in machine learning, the College established the **Computer Learning Research Centre (CLRC)** for fundamental and applied research in machine learning and I was appointed as the Director of the Centre. Since then CLRC has become a world leader in developing machine learning algorithms that are used in many applications. Powerful evidence of CLRC international standing are the citation rate for the staff and the global distribution of our software used by over 500 institutions around the world. For details, see <http://clrc.rhul.ac.uk>

- **Kolmogorov Lecture and Medal**

I am serving in the Organising and Programme Committee of the annual **Kolmogorov Lecture** run by CLRC. This is the University of London lecture and is given annually since 2003 by distinguished researchers in the field of theoretical computer science, or related mathematical sciences, who made outstanding contributions to developing research directions initiated by Andrei N. Kolmogorov. This is a public lecture on their work delivered at the Royal Holloway, University of London. More details can be found at: <http://www.kolmogorov.clrc.rhul.ac.uk/index.html>