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P e t e r F l a c h

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## Curriculum Vitæ

January 2008

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## Profile

### Personal information

*Name:* Pieter Adriaan Flach (Peter)  
*Date of birth:* 8<sup>th</sup> of April, 1961  
*Nationality:* Dutch  
*Business address:* Department of Computer Science, University of Bristol  
Merchant Venturers Building, Woodland Road, Bristol BS8 1UB  
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### Academic qualifications

- ◆ PhD in Computer Science from Tilburg University, April 1995 (*cum laude*, nominated for Christiaan Huygens Science Prize 1998).
- ◆ MSc in Electrical Engineering from Twente University, March 1987 (*cum laude*).

### Present and previous appointments

- ◆ *Professor of Artificial Intelligence*, Computer Science Department, Faculty of Engineering, University of Bristol, from August 2003.
  - ◆ *Reader in Machine Learning*, Computer Science Department, Faculty of Engineering, University of Bristol, August 2000 – July 2003.
  - ◆ *Lecturer*, Computer Science Department, Faculty of Engineering, University of Bristol, October 1997 – July 2000.
  - ◆ *Assistant professor*, Management Information Science department, Faculty of Economics, Tilburg University, October 1988 – September 1997.
  - ◆ *Scientific researcher*, Philips Research Laboratories Eindhoven, June 1987 – September 1988.
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## Research

I publish widely and on a broad range of subjects. My main research interests, on which I have published extensively, are mining highly structured data and the evaluation and improvement of machine learning models using ROC analysis. I have also published on the logic and philosophy of machine learning, and on the combination of logic and probability. My most recent research concerns annotation, integration and mining of large volumes of scientific data.

According to Google Scholar, my publications have accumulated 1715 citations (excluding self-citations), with an h-index of 24 (that is, 24 papers have at least 24 citations; data retrieved on 30 January 2008).

### Most cited publications

The following publications have more than 50 Google Scholar citations (excluding self-citations; data retrieved on 30 January 2008).

- (102) N. Lavrac, P.A. Flach & B. Zupan (1999), ‘Rule evaluation measures: a unifying view’. In *Proc. 9<sup>th</sup> International Workshop on Inductive Logic Programming (ILP’99)*, S. Dzeroski & P. Flach (eds.), pp.174–185, Springer.
- (99) S. Kramer, N. Lavrac & P.A. Flach (2001), ‘Propositionalization Approaches to Relational Data Mining’. In *Relational Data Mining*, S. Dzeroski & N. Lavrac (eds.), pp.262–291, Springer.
- (93) T. Gärtner, P.A. Flach & S. Wrobel (2003), ‘On Graph Kernels: Hardness Results and Efficient Alternatives’. In *Proc. 16<sup>th</sup> Annual Conference on Computational Learning Theory (COLT’03)*, M. Warmuth & B. Schölkopf (eds.), pp. 129–143.
- (87) C. Ferri, P.A. Flach & J. Hernandez-Orallo (2002), ‘Learning decision trees using the area under the ROC curve’. In *Proc. 19<sup>th</sup> International Conference on Machine Learning (ICML’02)*, C. Sammut & A. Hoffman (eds.), pp.139–146, Morgan Kaufmann.
- (82) P.A. Flach & A.C. Kakas, eds. (2000), *Abduction and Induction: essays on their relation and integration*, Kluwer Academic Publishers. (xix+309 pp.)
- (76) T. Gärtner, P.A. Flach, A. Kowalczyk & A. Smola (2002), ‘Multi-Instance Kernels’. In *Proc. 19<sup>th</sup> International Conference on Machine Learning (ICML’02)*, C. Sammut & A. Hoffman (eds.), pp.179–186, Morgan Kaufmann.
- (63) P.A. Flach (1994), *Simply Logical: intelligent reasoning by example*, John Wiley. (xvi+240 pp.)
- (56) P.A. Flach (2003), ‘The geometry of ROC space: understanding machine learning metrics through ROC isometrics’. In *Proc. 20<sup>th</sup> International Conference on Machine Learning (ICML’03)*, T. Fawcett & N. Mishra (eds.), pp. 194–201, AAAI Press.
- (54) P.A. Flach & N. Lachiche (1999), ‘1BC: A First-Order Bayesian Classifier’. In *Proc. 9<sup>th</sup> International Workshop on Inductive Logic Programming (ILP’99)*, S. Dzeroski & P. Flach (eds.), Lecture Notes in Artificial Intelligence 1634, pp.92–103, Springer.
- (51) N. Lavrac, B. Kavsek, P.A. Flach & L. Todorovski (2004), ‘Subgroup discovery with CN2-SD’. *Journal of Machine Learning Research*, 5(Feb):153–188.
- (51) P.A. Flach (1995), *Conjectures: an inquiry concerning the logic of induction*, ITK Dissertation Series, Tilburg University. (xii+180 pp.)

## Detailed list of publications

### *Authored books (2)*

1. P.A. Flach (1995), *Conjectures: an inquiry concerning the logic of induction*, ITK Dissertation Series, Tilburg University. (xii+180 pp.)
2. P.A. Flach (1994), *Simply Logical: intelligent reasoning by example*, John Wiley. (xvi+240 pp.)

### *Edited books and special issues (6)*

3. S. Hoche, A. Nürnberger & P.A. Flach, eds. (2007), *Special Issue of AI Communications on Network Analysis in Natural Sciences and Engineering*, Vol. 20 Number 4.
4. P.A. Flach & S. Dzeroski, eds. (2001), *Special Issue of the Machine Learning Journal on Inductive Logic Programming*, Vol. 44 Number 3.
5. L. De Raedt & P.A. Flach, eds. (2001), *Proc. 12<sup>th</sup> European Conference on Machine Learning (ECML 2001)*, Lecture Notes in Artificial Intelligence 2167, Springer. (xvii+618pp.)
6. P.A. Flach & A.C. Kakas, eds. (2000), *Abduction and Induction: essays on their relation and integration*, Kluwer Academic Publishers. (xix+309 pp.)
7. S. Dzeroski & P.A. Flach, eds. (1999), *Proc. 9<sup>th</sup> International Workshop on Inductive Logic Programming (ILP'99)*, Lecture Notes in Artificial Intelligence 1634, Springer. (viii+303 pp.)
8. P.A. Flach & R.A. Meersman, eds. (1991), *Future Directions in Artificial Intelligence*, North-Holland. IFIP TC12 Founding Workshop Collected Papers. (xiv+190 pp.)

### *Proceedings (8)*

9. A. Donescu, P.A. Flach, K. Inoue, A.C. Kakas & O. Ray (2007), *Proc. International Workshop on Abduction and Induction in Artificial Intelligence and Bioinformatics (AIAI'07)*, Aix-en-Provence.
10. P.A. Flach, A.C. Kakas, L. Magnani & O. Ray (2006), *Proc. ECAI'06 Workshop on Abduction and Induction in Artificial Intelligence and Scientific Modelling (AIAI'06)*, Trento.
11. O. Ray, A.C. Kakas, & P.A. Flach (2005), *Proc. International Workshop on the Integration of Abduction and Induction in Artificial Intelligence (AIAI'05)*, Edinburgh.
12. C. Ferri, P.A. Flach, J. Hernández-Orallo & N. Lachiche (2004), *Proc. ECAI'04 Workshop on ROC Analysis in AI*, Valencia.
13. P.A. Flach & A.C. Kakas, eds. (1998), *Proc. ECAI'98 workshop on Abduction and Induction in AI*, Brighton.
14. P.A. Flach & N. Lavrac, eds. (1997), *Proc. CompulogNet Area Meeting on Representation Issues in Reasoning and Learning*, Prague.
15. P.A. Flach & A.C. Kakas, eds. (1997), *Proc. IJCAI'97 workshop on Abduction and Induction in AI*, Nagoya.
16. P.A. Flach & A.C. Kakas, eds. (1996), *Proc. ECAI'96 workshop on Abductive and Inductive Reasoning*, Budapest.

*Invited talks (8)*

17. P.A. Flach (2007), ‘Putting things in order: on the fundamental role of ranking in classification and probability estimation’. In *Proc. 18<sup>th</sup> European Conference on Machine Learning and 11<sup>th</sup> European Conference on Principles and Practice of Knowledge Discovery in Databases*, J.N. Kok, J. Koronacki, R. Lopez de Mantaras, S. Matwin, D. Mladenic & A. Skowron (eds.). Invited talk.
18. P.A. Flach (2006), ‘Reinventing Machine Learning with ROC Analysis’. In *Proc. 10<sup>th</sup> Ibero-American Conference on AI and the 18<sup>th</sup> Brazilian AI Symposium*. Invited talk.
19. P.A. Flach (2001), ‘A perspective on multi-relational data mining’. In *Proc. 10<sup>th</sup> Portuguese Conference on Artificial Intelligence*, P. Brazdil & A. Jorge (eds.). Invited talk.
20. P.A. Flach (2001), ‘The logic of learning’. In *Proc. LICS-2001 Workshop on Logic and Learning*, R. Khardon & G. Turan (eds.). Invited talk.
21. P.A. Flach (2000), ‘The use of functional and logic languages in machine learning’. In *Proc. Ninth International Workshop on Functional and Logic Programming (WFLP2000)*, M. Alpuente (ed.), pp.225–237. Universidad Politecnica de Valencia, September 2000. Invited talk.
22. P.A. Flach (1999), ‘Knowledge representation for inductive learning’. In *Proc. European Conference on Symbolic and Quantitative Approaches to Reasoning and Uncertainty*, A. Hunter & S. Parsons (eds.), pp.160–167, Lecture Notes in Artificial Intelligence 1638, Springer. Invited talk.
23. P.A. Flach (1998), ‘The logic of learning: a brief introduction to Inductive Logic Programming’. In *Proc. CompulogNet Area Meeting on Computational Logic and Machine Learning*, J.W. Lloyd (ed.), pp.1–17, University of Manchester. Invited talk.
24. P.A. Flach (1997), ‘Inductive Logic Databases: from extensional to intensional knowledge’. In *Proc. 5<sup>th</sup> Int. Conference on Deductive and Object-Oriented Databases (DOOD ’97)*, F. Bry, R. Ramakrishnan & K. Ramamohanarao (eds.), p. 3, Lecture Notes in Computer Science 1341, Springer. Invited talk.

*Contributions to edited volumes (17)*

In case of multiple authors, the main author — if any — is underlined.

25. P.A. Flach, H. Blockeel, C. Ferri, J. Hernández-Orallo & J. Struyf (2003), ‘Decision support for data mining: introduction to ROC analysis and its application’. In *Data Mining and Decision Support: Aspects of Integration and Collaboration*, D. Mladenic, N. Lavrac, M. Bohanec & S. Moyle (eds.), Kluwer Academic Publishers.
26. P.A. Flach *et al.* (2003), ‘On the road to knowledge: mining 21 years of UK traffic accident reports’. In *Data Mining and Decision Support: Aspects of Integration and Collaboration*, D. Mladenic, N. Lavrac, M. Bohanec & S. Moyle (eds.), Kluwer Academic Publishers.
27. B. Cestnik, N. Lavrac, P.A. Flach, D. Gamberger & M. Kline (2003), ‘Data mining for decision support: supporting marketing decisions through subgroup discovery’. In *Data Mining and Decision Support: Aspects of Integration and Collaboration*, D. Mladenic, N. Lavrac, M. Bohanec & S. Moyle (eds.), Kluwer Academic Publishers.
28. A. Jorge, D. Bojadziev, D. Mladenic, O. Stepankova, J. Palous, M. Amado Alves, J. Petrak & P.A. Flach (2003), ‘Knowledge management and organizational learning: web support to e-collaboration’. In *Data Mining and Decision Support: Aspects of Integration and Collaboration*, D. Mladenic, N. Lavrac, M. Bohanec & S. Moyle (eds.), Kluwer Academic Publishers.
29. P.A. Flach & N. Lavrac (2003), ‘Rule Induction’. In *Intelligent Data Analysis: An Introduction* (2<sup>nd</sup> edition), M. Berthold & D.J. Hand (eds.), Springer.

30. P.A. Flach & N. Lavrac (2002), ‘Learning in clausal logic: a perspective on inductive logic programming’. In *Computational Logic: Logic Programming and Beyond (essays in honour of Robert A. Kowalski)*, A.C. Kakas & F. Sadri (eds.), pp.437–471, Lecture Notes in Artificial Intelligence 2407, Springer.
31. P.A. Flach (2002), ‘Modern logic and its role in the study of knowledge’. In *A Companion to Philosophical Logic*, D. Jacquette (ed.), pp.680–693, Blackwell.
32. S. Kramer, N. Lavrac & P.A. Flach (2001), ‘Propositionalization Approaches to Relational Data Mining’. In *Relational Data Mining*, S. Dzeroski & N. Lavrac (eds.), pp.262–291, Springer.
33. L. Todorovski, I. Weber, N. Lavrac, O. Stepankova, S. Dzeroski, D. Kazakov, D. Zupanic & P.A. Flach (2001), ‘Internet Resources on ILP for KDD’. In *Relational Data Mining*, S. Dzeroski & N. Lavrac (eds.), pp.375–388, Springer.
34. P.A. Flach & A.C. Kakas (2000), ‘On the relation between abduction and inductive learning’. Introductory chapter of *Handbook of Defeasible Reasoning and Uncertainty, Vol. 4: Abductive Reasoning and Learning*, D.M. Gabbay & R. Kruse (eds.), pp.1–33, Kluwer Academic Publishers.
35. P.A. Flach (2000), ‘Logical characterisations of inductive learning’. Chapter 4 of *Handbook of Defeasible Reasoning and Uncertainty, Vol. 4: Abductive Reasoning and Learning*, D.M. Gabbay & R. Kruse (eds.), pp.155–196 Kluwer Academic Publishers.
36. P.A. Flach & A.C. Kakas (2000), ‘Abductive and inductive reasoning: background and issues’. In *Abduction and Induction: essays on their relation and integration*, P.A. Flach & A.C. Kakas (eds.), pp.1–27, Kluwer Academic Publishers.
37. P.A. Flach (2000), ‘On the logic of hypothesis generation’. In *Abduction and Induction: essays on their relation and integration*, P.A. Flach & A.C. Kakas (eds.), pp.89–106, Kluwer Academic Publishers.
38. P.A. Flach (1998), ‘From extensional to intensional knowledge: Inductive Logic Programming techniques and their application to Deductive Databases’. In *Transactions and Change in Logic Databases*, H. Decker, B. Freitag, M. Kifer & A. Voronkov (eds.), Lecture Notes in Computer Science 1472, pp.356–387, Springer Verlag.
39. P.A. Flach (1994), ‘A model of inductive reasoning’. In *Knowledge Representation and Reasoning under Uncertainty*, M. Masuch & M.L. Polos (eds.), Lecture Notes in Artificial Intelligence 808, pp.41–56, Springer, Berlin.
40. P.A. Flach (1992), ‘A framework for Inductive Logic Programming’. In *Inductive Logic Programming*, S. Muggleton (ed.), Ch. 9, pp.181–195, Academic Press.
41. P.A. Flach (1991), ‘The dialectics of Artificial Intelligence’. In *Future Directions in Artificial Intelligence*, P.A. Flach & R.A. Meersman (eds.), North-Holland.

#### Journal articles (15)

42. J. Fuernkranz & P.A. Flach (2005), ‘ROC ’n’ Rule Learning -- Towards a Better Understanding of Covering Algorithms’. *Machine Learning*, 58(1):39–77.
43. T. Fawcett & P.A. Flach (2005), ‘A Response to Webb and Ting's On the Application of ROC Analysis to Predict Classification Performance Under Varying Class Distributions’. *Machine Learning*, 58(1):33–38.
44. T. Gärtner, J.W. Lloyd & P.A. Flach (2004), ‘Kernels and Distances for Structured Data’. *Machine Learning*, 57(3):205–232.
45. P.A. Flach & N. Lachiche (2004), ‘Naive Bayesian Classification of Structured Data’. *Machine Learning*, 57(3):233–269.

46. N. Lavrac, B. Cestnik, D. Gamberger & P.A. Flach (2004), 'Decision Support Through Subgroup Discovery: Three Case Studies and the Lessons Learned'. *Machine Learning*, 57(1-2):115–143.
47. N. Lavrac, B. Kavsek, P.A. Flach & L. Todorovski (2004), 'Subgroup discovery with CN2-SD'. *Journal of Machine Learning Research*, 5(Feb):153–188.
48. T. Urbancic, M. Skrjanc & P.A. Flach (2002), 'Web-based analysis of data mining and decision support education', *AI Communications* 15(4):199–204.
49. P.A. Flach (2001), 'On the state of the art in Machine Learning: a personal review', *Artificial Intelligence* 131(1/2):199–222.
50. N. Lavrac & P.A. Flach (2001), 'An extended transformation approach to Inductive Logic Programming', *ACM Transactions on Computational Logic* 2(4):458–494.
51. P.A. Flach & N. Lachiche (2001), 'Confirmation-guided discovery of first-order rules with Tertius', *Machine Learning* 42(1/2):61–95.
52. I. Savnik & P.A. Flach (2000), 'Discovery of multivalued dependencies from relations', *Intelligent Data Analysis* 4(3,4):195–211.
53. P.A. Flach & I. Savnik (1999), 'Database dependency discovery: a machine learning approach', *AI Communications* 12(3):139–160.
54. P.A. Flach & A.C. Kakas (1998), 'Abduction and Induction in AI: report of the IJCAI'97 workshop', *Journal of the IGPL* 6(4):651–656.
55. P.A. Flach & A.C. Kakas (1997), 'Abductive and inductive reasoning: report of the ECAI'96 workshop', *Journal of the IGPL* 5(5):773–778.
56. P.A. Flach (1992), 'Logical approaches to Machine Learning — an overview', *THINK* 1:2 (September), pp.25-36.

#### *Refereed conference papers (69)*

57. S. Wu, P.A. Flach & C. Ferri (2007), An Improved Model Selection Heuristic for AUC. 18th European Conference on Machine Learning. Joost N. Kok, Jacek Koronacki, Ramon Lopez de Mantaras, Stan Matwin, Dunja Mladenic, Andrzej Skowron, (eds.), pp. 478–489.
58. P.A. Flach & E.T. Matsubara (2007), A Simple Lexicographic Ranker and Probability Estimator. 18th European Conference on Machine Learning. Joost N. Kok, Jacek Koronacki, Ramon Lopez de Mantaras, Stan Matwin, Dunja Mladenic, Andrzej Skowron, (eds.), pp. 575–582.
59. S. Hoche & P.A. Flach (2006), Predicting Topics of Scientific Papers from Co-Authorship Graphs: a Case Study. Proceedings of the 2006 UK Workshop on Computational Intelligence (UKCI2006), pp. 215–222.
60. P.A. Flach, A.C. Kakas & O. Ray (2006), Abduction, induction, and the logic of scientific knowledge development. Proceedings of the ECAI'06 workshop on Abduction and Induction in AI and Scientific Modelling. P.A. Flach, A.C. Kakas, L. Magnani, O. Ray, (eds.), pp. 21–23.
61. K. Eder, P.A. Flach & H.-W. Hsueh (2006), Towards Automating Simulation-Based Design Verification using ILP. 16th International Conference on Inductive Logic Programming. Stephen Muggleton, Ramon Otero, Alireza Tamaddoni-Nezhad, (eds.), pp. 154–168.
62. P.A. Flach, V. Maraldi & F. Riguzzi (2006), Algorithms for Efficiently and Effectively Using Background Knowledge in Tertius. ``Analisi Sperimentale e Benchmark di Algoritmi per l'Intelligenza Artificiale'' (Incontro del Gruppo di Lavoro Rappresentazione della Conoscenza e Ragionamento Automatico dell'Associazione Italiana per l'Intelligenza Artificiale). Marco Gavanelli, Tony Mancini, (eds.).
63. P.A. Flach & A.C. Kakas (2006), Abduction, Induction, and the Logic of Scientific Knowledge Development. Goedel Centenary 2006.

64. E. Gyftodimos & P.A. Flach (2005), Combining Bayesian Networks with Higher-Order Data Representations. Proceedings of the 6th International Symposium on Intelligent Data Analysis (IDA'06), pp. 145–157.
65. R.C. Prati & P.A. Flach (2005), ROCCER: an Algorithm for Rule Learning Based on ROC Analysis. Proceedings of the 19th International Joint Conference on Artificial Intelligence (IJCAI'05), pp. 823–828.
66. P.A. Flach & S. Wu (2005), Repairing concavities in ROC curves. Proceedings of the 19th International Joint Conference on Artificial Intelligence (IJCAI'05), pp. 702–707.
67. S. Rawles & P.A. Flach (2005), Neighbourhoods of examples for detecting logical redundancy. Late-breaking Papers from the 15th International Conference on Inductive Logic Programming (ILP'2005). Stefan Kramer, Bernhard Pfaffinger, (eds.), pp. 47–52.
68. E. Gyftodimos & P.A. Flach (2005), Combining Bayesian Networks with Higher-Order Data Representations. Probabilistic, Logical and Relational Learning - Towards a Synthesis.
69. J. Fuernkranz & P.A. Flach (2004), An Analysis of Stopping and Filtering Criteria for Rule Learning. Proceedings of the 15th European Conference on Machine Learning, pp. 123–133.
70. C. Ferri, P.A. Flach & J. Hernandez-Orallo (2004), Delegating Classifiers. Proceedings of the 21st International Conference on Machine Learning (ICML 2004). Russ Greiner, Dale Schuurmans, (eds.).
71. A. Appice, M. Ceci, S. Rawles & P.A. Flach (2004), Redundant feature elimination for multi-class problems. Proceedings of the 21st International Conference on Machine Learning (ICML 2004). Russ Greiner, Dale Schuurmans, (eds.), pp. 33–40.
72. E. Gyftodimos & P.A. Flach (2004), Hierarchical Bayesian Networks: An Approach to Classification and Learning for Structured Data.. Proceedings of Methods and Applications of Artificial Intelligence, Third Hellenic Conference on AI (SETN 2004). George A. Vouros, Themis Panayiotopoulos, (eds.), pp. 291–300.
73. M.-A. Krogel, S. Rawles, F. Zelezny, P.A. Flach, N. Lavrac & S. Wrobel (2003), Comparative evaluation of approaches to propositionalization. Proceedings of the 13th International Conference on Inductive Logic Programming (ILP'2003). Tamas Horvath, Akihiro Yamamoto, (eds.), pp. 194–217.
74. C. Ferri, P.A. Flach & Jose Hernandez-Orallo (2003), Improving the AUC of Probabilistic Estimation Trees. Proceedings of the 14th European Conference on Machine Learning, pp. 121–132.
75. E. Gyftodimos & P.A. Flach (2003), Learning Hierarchical Bayesian Networks for Human Skill Modelling. Proceedings of the 2003 UK Workshop on Computational Intelligence (UKCI-2003). Jonathan Rossiter, Trevor Martin, (eds.), pp. 55–62.
76. E. Gyftodimos & P.A. Flach (2003), Hierarchical Bayesian Networks: an Approach to Classification and Learning for Structured Data. Proceedings of the ECML/PKDD - 2003 Workshop on Probabilistic Graphical Models for Classification, pp. 25–36.
77. T. Gärtner, P.A. Flach & S. Wrobel (2003), On Graph Kernels: Hardness Results and Efficient Alternatives. Proceedings of the 16th Annual Conference on Computational Learning Theory and 7th Kernel Workshop, pp. 129–143.
78. P.A. Flach & S. Wu (2003), Repairing concavities in ROC curves. Proc. 2003 UK Workshop on Computational Intelligence, pp. 38–44.
79. N. Lachiche & P.A. Flach (2003), Improving accuracy and cost of two-class and multi-class probabilistic classifiers using ROC curves. Proc. 20th International Conference on Machine Learning (ICML'03), pp. 416–423.
80. J. Furnkranz & P.A. Flach (2003), An analysis of rule evaluation metrics. Proc. 20th International Conference on Machine Learning (ICML'03), pp. 202–209.

81. P.A. Flach (2003), The geometry of ROC space: understanding machine learning metrics through ROC isometrics. *Proc. 20th International Conference on Machine Learning (ICML'03)*, pp. 194–201.
82. N. Lavrac, P.A. Flach, B. Kavsek & L. Todorovski (2002), ‘Adapting classification rule induction to subgroup discovery’. In *Proc. 2002 IEEE International Conference on Data Mining (ICDM'02)*, pp.266–273, IEEE Press.
83. Y. Peng, P.A. Flach, C. Soares & P. Brazdil (2002), ‘Improved data set characterisation for meta-learning’. In *Proc. 5<sup>th</sup> International Conference on Discovery Science (DS'02)*, S. Lange, K. Satoh & C.H. Smith (eds.), *Lecture Notes in Artificial Intelligence 2534*, pp.141–152, Springer.
84. P.A. Flach, E. Gyftodimos & N. Lachiche (2002), ‘Probabilistic reasoning with terms’. In *Proc. 19<sup>th</sup> Machine Intelligence Workshop (MI-19)*, S. Muggleton (ed.).
85. N. Lavrac, P.A. Flach, B. Kavsek & L. Todorovski (2002), ‘Rule induction for subgroup discovery with CN2-SD’. In *Proc. ECML/PKDD'02 workshop on Integration and Collaboration Aspects of Data Mining, Decision Support and Meta-Learning*, M. Bohanec, B. Kavsek, N. Lavrac & D. Mladenic (eds.), pp.77–87.
86. Y. Peng, P.A. Flach, P. Brazdil & C. Soares (2002), ‘Decision tree-based characterization for meta-learning’. In *Proc. ECML/PKDD'02 workshop on Integration and Collaboration Aspects of Data Mining, Decision Support and Meta-Learning*, M. Bohanec, B. Kavsek, N. Lavrac & D. Mladenic (eds.), pp.111–122.
87. S. Wu & P.A. Flach (2002), ‘Feature selection with labelled and unlabelled data’. In *Proc. ECML/PKDD'02 workshop on Integration and Collaboration Aspects of Data Mining, Decision Support and Meta-Learning*, M. Bohanec, B. Kavsek, N. Lavrac & D. Mladenic (eds.), pp.156–167.
88. S. Wu & P.A. Flach (2002), ‘Model selection for dynamic processes’. In *Proc. ECML/PKDD'02 workshop on Integration and Collaboration Aspects of Data Mining, Decision Support and Meta-Learning*, M. Bohanec, B. Kavsek, N. Lavrac & D. Mladenic (eds.), pp.168–173.
89. E. Gyftodimos & P.A. Flach (2002), ‘Hierarchical Bayesian Networks: a probabilistic reasoning model for structured domains’. In *Proc. ICML'02 workshop on Development of Representations*, E. de Jong and T. Oates (eds.).
90. N. Lavrac, D. Gamberger & P.A. Flach (2002), ‘Subgroup discovery for actionable knowledge generation: deficiencies of classification rule learning and the lessons learned’. In *Proc. ICML'02 workshop on Data Mining Lessons Learned*, N. Lavrac, T. Fawcett & H. Motoda (eds.).
91. T. Gärtner, J.W. Lloyd & P.A. Flach (2002), ‘Kernels for structured data’. In *Proc. 12<sup>th</sup> International Conference on Inductive Logic Programming (ILP'02)*, S. Matwin & C. Sammut (eds.), *Lecture Notes in Artificial Intelligence 2583*, pp.66–83, Springer.
92. N. Lachiche & P.A. Flach (2002), ‘1BC2: a true first-order Bayesian classifier’. In *Proc. 12<sup>th</sup> International Conference on Inductive Logic Programming (ILP'02)*, S. Matwin & C. Sammut (eds.), *Lecture Notes in Artificial Intelligence 2583*, pp.133–148, Springer.
93. N. Lavrac, F. Zelezny & P.A. Flach (2002), ‘RSD: relational subgroup discovery through first-order feature construction’. In *Proc. 12<sup>th</sup> International Conference on Inductive Logic Programming (ILP'02)*, S. Matwin & C. Sammut (eds.), *Lecture Notes in Artificial Intelligence 2583*, pp.149–165, Springer.
94. C. Ferri, P.A. Flach & J. Hernandez-Orallo (2002), ‘Learning decision trees using the area under the ROC curve’. In *Proc. 19<sup>th</sup> International Conference on Machine Learning (ICML'02)*, C. Sammut & A. Hoffman (eds.), pp.139–146, Morgan Kaufmann.
95. T. Gärtner, P.A. Flach, A. Kowalczyk & A. Smola (2002), ‘Multi-Instance Kernels’. In *Proc. 19<sup>th</sup> International Conference on Machine Learning (ICML'02)*, C. Sammut & A. Hoffman (eds.), pp.179–186, Morgan Kaufmann.

96. P.A. Flach & D. Gamberger (2001), ‘Subgroup evaluation and decision support for a direct mailing marketing problem’. In *Proc. ECML/PKDD’01 workshop on Integrating Aspects of Data Mining, Decision Support and Meta-Learning*, C. Giraud-Carrier, N. Lavrac & S. Moyle (eds.), pp.45–56.
97. T. Gärtner, S. Wu & P.A. Flach (2001), ‘Data Mining on the Sisyphus Dataset: Evaluation and Integration of Results’. In *Proc. ECML/PKDD’01 workshop on Integrating Aspects of Data Mining, Decision Support and Meta-Learning*, C. Giraud-Carrier, N. Lavrac & S. Moyle (eds.), pp.69–80.
98. Y. Peng & P.A. Flach (2001), ‘Soft Discretization to Enhance the Continuous Decision Tree Induction’. In *Proc. ECML/PKDD’01 workshop on Integrating Aspects of Data Mining, Decision Support and Meta-Learning*, C. Giraud-Carrier, N. Lavrac & S. Moyle (eds.), pp.109–118.
99. T. Gärtner & P.A. Flach (2001), ‘WBC<sup>SVM</sup>: Weighted Bayesian Classification based on Support Vector Machines’. In *Proc. 18<sup>th</sup> International Conference on Machine Learning (ICML’01)*, C.E. Brodley & A.P. Danyluk (eds.), pp.154–161, Morgan Kaufmann.
100. N. Lachiche & P.A. Flach (2000). ‘A First-order Representation for Knowledge Discovery and Bayesian Classification on Relational Data’. In *Proc. PKDD2000 workshop on Data Mining, Decision Support, Meta-learning and ILP: Forum for Practical Problem Presentation and Prospective Solutions*, P. Brazdil & A. Jorge (eds.), pp.49–60.
101. L. Todorovski, P.A. Flach, and N. Lavrac (2000). ‘Predictive Performance of Weighted Relative Accuracy’. In *Proc. 4th European Conference on Principles of Data Mining and Knowledge Discovery (PKDD2000)*, D.A. Zighed, J. Komorowski & J. Zytkow (eds.), pp.255—264, Springer.
102. P.A. Flach and A.C. Kakas (2000), ‘The cycle of abductive and inductive knowledge development’. In *Proc. Machine Intelligence 17 workshop*, K. Furukawa, S. Muggleton, D. Michie & L. De Raedt (eds.), pp.17–24.
103. P.A. Flach and N. Lavrac (2000), ‘The role of feature construction in inductive rule learning’. In *Proc. ICML2000 workshop on Attribute-Value and Relational Learning: crossing the boundaries*, L. De Raedt & S. Kramer (eds.), pages 1–11.
104. P.A. Flach and N. Lachiche (2000), ‘Decomposing probability distributions on structured individuals’. In *Proc. ECML2000 Workshop on Dealing with Structured Data in Machine Learning and Statistics*, P. Brito, J. Costa & D. Malerba (eds.), pp.33—43; and *Work-in-Progress Reports of the 10th International Conference on Inductive Logic Programming*, J. Cussens & A. Frisch (eds.), pp.96–106.
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106. N. Lavrac, P.A. Flach & B. Zupan (1999), ‘Rule evaluation measures: a unifying view’. In *Proc. 9th Int. Workshop on Inductive Logic Programming (ILP’99)*, S. Dzeroski & P. Flach (eds.), Lecture Notes in Artificial Intelligence 1634, pp.174–185, Springer.
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108. P.A. Flach (1998), ‘Comparing consequence relations’. In *Proc. Sixth Int. Conference on Principles of Knowledge Representation and Reasoning (KR’98)*, A.G. Cohn, L. Schubert & S.C. Shapiro (eds.), pp.180–189, Morgan Kaufmann.
109. P.A. Flach (1997), ‘Normal forms for Inductive Logic Programming’. In *Proc. 8th Int. Workshop on Inductive Logic Programming (ILP’97)*, N. Lavrac & S. Dzeroski (eds.), Lecture Notes in Artificial Intelligence 1297, pp.149–156, Springer. Also poster presented at IJCAI’97, Nagoya.

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111. P.A. Flach (1996), ‘Rationality postulates for induction’. In *Proc. Theoretical Aspects of Rationality and Knowledge*, Yoav Shoham (ed.), pp.267-281, Morgan Kaufmann.
112. P.A. Flach (1996), ‘Abduction and induction: syllogistic and inferential perspectives’. In *Proc. ECAI’96 workshop on Abductive and Inductive Reasoning*, P.A. Flach & A.C. Kakas (eds.), Budapest.
113. P.A. Flach (1994), ‘Inductive Logic Programming and philosophy of science’. In *Proc. Int. Workshop on Inductive Logic Programming*, S. Wrobel (ed.), GMD Studien 237, pp.71-84.
114. P.A. Flach (1993), ‘Predicate invention in Inductive Data Engineering’. In *Proc. European Conference on Machine Learning*, P.B. Brazdil (ed.), Lecture Notes in Artificial Intelligence 667, pp.83-94, Springer, Berlin.
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116. P.A. Flach (1992), ‘Generality revisited’. In *Proc. ECAI Workshop on Logical approaches to Machine Learning*, C. Rouveirol (ed.), Vienna.
117. P.A. Flach (1992), ‘An analysis of various forms of ‘jumping to conclusions’’. In *Proc. Analogical and Inductive Inference*, K.P. Jantke (ed.), Lecture Notes in Artificial Intelligence 642, pp.170-186, Springer, Berlin.
118. P.A. Flach (1992), ‘A model of inductive reasoning’. In *Proc. Applied Logic Conference (Logic At Work)*, Amsterdam.
119. P.A. Flach (1991), ‘Towards a theory of Inductive Logic Programming’. In *Proc. International Symposium on Methodologies for Intelligent Systems*, Z.W. Ras & M. Zemankowa (eds.), Lecture Notes in Artificial Intelligence 542, pp.510-519, Springer, Berlin.
120. P.A. Flach (1991), ‘Towards a logical theory of inductive learning’. In *Proc. International Workshop on Inductive Logic Programming*, S.H. Muggleton (ed.), pp.23-31.
121. S.H. Nienhuys-Cheng & P.A. Flach (1991), ‘Consistent term mappings, term partitions, and inverse resolution’. In *Proc. European Working Sessions on Learning*, Y. Kodratoff (ed.), Lecture Notes in Artificial Intelligence 482, pp.361-374, Springer, Berlin.
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123. P.A. Flach (1990), ‘Inductive characterisation of database relations’. In *Proc. International Symposium on Methodologies for Intelligent Systems*, Z.W. Ras, M. Zemankowa & M.L. Emrich (eds.), pp.371-378, North-Holland, Amsterdam.
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125. P.A. Flach (1989), ‘A simple concept learner and its implementation’. In *Proc. Computing Science in the Netherlands*, P.M.G. Apers, D. Bosman & J. van Leeuwen (eds.), pp.149-171, Stichting Mathematisch Centrum, Amsterdam.

#### *Technical Reports and unpublished work (14)*

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<http://www.cs.bris.ac.uk/Tools/Reports/Abstracts/2003-furnkranz.html>

127. P.A. Flach, E. Gyftodimos & N. Lachiche (2002), 'Probabilistic reasoning with terms'. Submitted to *Linköping Electronic Articles in Computer and Information Science*, 7(011), 2002. Available at <http://www.ida.liu.se/ext/epa/cis/2002/011/tcover.html>.
128. P.A. Flach (2000), *On the state of the art in Machine Learning: a personal review*. Technical Report CSTR-00-018, Department of Computer Science, University of Bristol. <http://www.cs.bris.ac.uk/Tools/Reports/Abstracts/flach-aijreview-tr.html>
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130. L. Todorovski, P.A. Flach, and N. Lavrac (2000), *A report on experiments with weighted relative accuracy in CN2*. Technical Report CSTR-00-003, Department of Computer Science, University of Bristol. <http://www.cs.bris.ac.uk/Tools/Reports/Abstracts/todorovski-flach-lavrac-tr00.html>
131. N. Lavrac and P.A. Flach (2000), *An extended transformation approach to Inductive Logic Programming*. Technical Report CSTR-00-002, Department of Computer Science, University of Bristol. <http://www.cs.bris.ac.uk/Tools/Reports/Abstracts/flach-lavrac-tr00.html>
132. P.A. Flach, N. Lavrac, and B. Zupan (1999). *Decompositions, dependencies, and Bayesian networks*. Technical Report CSTR-99-001, Department of Computer Science, University of Bristol. <http://www.cs.bris.ac.uk/Tools/Reports/Abstracts/flach-lavrac-zupan-tr99.html>
133. P.A. Flach and N. Lachiche (1997), *Cooking up integrity constraints with PRIMUS (preliminary report)*. Technical Report CSTR-97-009, Department of Computer Science, University of Bristol. <http://www.cs.bris.ac.uk/Tools/Reports/Abstracts/1997-flach-4.html>
134. P.A. Flach (1992), *A model of inductive reasoning*. Research Report ITK-41, Institute for Language Technology and Artificial Intelligence, Tilburg University.
135. P.A. Flach (1991), *The role of explanations in inductive learning*. Research Report ITK-30, Institute for Language Technology and Artificial Intelligence, Tilburg University.
136. P.A. Flach (1990), *Inductive characterisation of database relations*. Research Report ITK-23, Institute for Language Technology and Artificial Intelligence, Tilburg University.
137. P.A. Flach (1989), *Second-order inductive learning*. Research Report ITK-10, Institute for Language Technology and Artificial Intelligence, Tilburg University.
138. P.A. Flach (1989), *A simple concept learner and its implementation*. Research Report ITK-9, Institute for Language Technology and Artificial Intelligence, Tilburg University.
139. P.A. Flach and L.P.J. Veelenturf (1989), *Concept Learning from Examples: Theoretical Foundations*. Research Report ITK-2, Institute for Language Technology and Artificial Intelligence, Tilburg University.

## Research grants

- a) EPSRC Research Grant *Learning the morphology of complex synthetic languages*, 2006 – 2010 (366,271 GBP)
  - b) Applied Research collaboration with GCHQ, 2004 – 2009 (1,278,000 GBP total funding for UoB, 261,000 GBP to Computer Science)
  - c) EPSRC Research Grant *Efficient first-order probabilistic models for inference and learning*, 2000 – 2003 (51,360 GBP)
  - d) British Council Partnership in Science 18 *Advances in Inductive Learning for Knowledge Discovery*, 2000 – 2003  
In collaboration with Jozef Stefan Institute, Ljubljana, Slovenia.
  - e) Framework V RTD Project 11495 *Data mining and decision support for business competitiveness*, 2000 – 2002 (2,000 KECU total funding, 175 KECU to Bristol)  
The goal of this project was to establish a virtual European enterprise composed of companies and research laboratories with expertise in data mining and decision support.
  - f) Esprit IV Long Term Research Project 26357 *A meta-learning assistant for providing user support in machine learning and data mining*, 1998 – 2002 (1,500 KECU total funding, 335 KECU to Bristol)  
This project was acquired by Christophe Giraud-Carrier; I took over as administrative co-ordinator after he left from January 2001.
  - g) EU-funded European Network of Excellence *ILPnet2*, 1998 - 2002 (network co-ordinator, 200 KECU total funding, 20 KECU to Bristol)  
The co-ordination of this network was shared between Bristol (administrative co-ordinator) and Ljubljana (scientific co-ordinator).  
More information can be obtained at <http://www.cs.bris.ac.uk/~ILPnet2/>
  - h) Royal Society Joint Project with Central/Eastern Europe, 1998 - 2000  
(project co-ordinator, 7000 GBP total funding, 3000 GBP to Bristol)  
In collaboration with Jozef Stefan Institute, Ljubljana, Slovenia.
  - i) Esprit IV Long Term Research Project 20237 *Inductive Logic Programming 2*, 1996 - 1999  
(associate partner, 113 KECU to Tilburg/Bristol).
  - j) PECO Network *ILPnet*, 1993 - 1996 (150 KECU total funding, 5150 ECU to Tilburg)  
This network was aimed at increasing co-operation between Western Europe and Central/Eastern Europe.
  - k) Esprit III Basic Research Action 6020 *Inductive Logic Programming*, 1992 - 1995 (sub-contractor, 15 KECU to Tilburg)
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## Teaching

I have broad and varied teaching experience. At Bristol I have shaped, co-ordinated and taught on the Advanced Computing MSc in Machine Learning and Data Mining from the beginning. Virtually all of the units I teach or taught on have been (re-)designed by me. I have regularly had one of the highest teaching loads in the department, always well above the average.

In the academic year 2006-7 my teaching on three different units was evaluated as 79 out of 100 ( $n=47$ ), while in 2005-6 it was 77 ( $n=46$ ).

In 2004 I instigated a re-design of the second year, with the introduction of *Symbols, Patterns and Signals* to replace *Image Processing*. The unit is innovative in that it brings together material from two disparate fields (image processing and machine learning) and in that it introduces material that is usually only covered in advanced undergraduate or postgraduate courses.

My main responsibility at the moment is to co-ordinate the Computer Science contribution to the newly formed DTC *Bristol Centre for Complexity Sciences*. Computer Science is unique in that it contributes both to the theory and applications sides.

### Taught units at University of Bristol

- a) *Computational Pattern Analysis* (BCCS DTC) — from Spring 2008  
New module to be taken by PhD students of the *Bristol Centre for Complexity Sciences* Doctoral Training Centre. Designed and taught in collaboration with Nello Cristianini, Raphael Clifford and Tijl De Bie.
- b) *Exabyte Informatics* (BCCS DTC) — from Spring 2008  
New module to be taken by PhD students of the *Bristol Centre for Complexity Sciences* Doctoral Training Centre. Co-ordinated by me, this module consists of 5 2-hour lectures by colleagues working on Exabyte Informatics applications.
- c) *Symbols, Patterns and Signals* (COMS21202, 20 credits, level 2) — from Spring 2005  
This compulsory unit is taken by around 80 second-year Computer Science undergraduates. I was the major instigator and first unit director, and designed and teach the unit together with two colleagues, Andrew Calway and Majid Mirmehdi. Two practical Matlab assignments have the students program practical classification and image processing algorithms.
- d) *Learning from Structured Data* (COMSM0301, 10 credits, level M) — from Spring 1999  
This unit is part of the Machine Learning & Data Mining MSc course. It was introduced in Spring 1999 and designed by me. In the absence of standard textbooks, I use my own lecturing material and also teach advanced material from research papers. Two practical assignments give hands-on experience and additional insight.
- e) *Artificial Intelligence and Logic Programming* (COMS30106, 10 credits, level 3) — from Autumn 1998  
This unit is taken by around 50 third- and fourth-year Computer Science undergraduates and MSc students. I am using my own textbook *Simply Logical* (John Wiley, 1994), supplemented with more recent material. I regularly change the coursework to keep the students interested: in 2007–8 the assignments addressed obtaining Google Scholar (self)citation counts and automatically solving Sudoku puzzles. The students enjoy the coursework and generally put a lot of work into it.
- f) *Introduction to Machine Learning* (COMSM0300, 10 credits, level M) — Autumn 1998 until Autumn 2003  
This unit is part of the Machine Learning & Data Mining MSc course and (since Autumn 2000) of the Computer Science MEng course. It was introduced in Autumn 1998 and designed by me.

- g) *Advanced Topics in Machine Learning & Data Mining* (COMSM0304, 30 credits, level M) — Spring 1999 until Spring 2003  
This unit is part of the Machine Learning & Data Mining MSc course, and is mostly a reading course with guest lectures and assignments. It was introduced in Spring 1999 and designed by me.
- h) *Introduction to Software Engineering* (COMS12100, 20 credits, level M) — Spring 1999, Spring 2000  
This unit is taken by 100 first-year undergraduates. It was designed by Ian Holyer (unit director) and me. I was teaching 18 of the 36 lectures on algorithms and datastructures in Haskell and Java.

## Taught units at Tilburg University

- i) *Artificial Intelligence Techniques* — 1989-1996  
I designed this unit, and taught it to 15-20 fourth year undergraduates. I wrote my own lecture notes, which developed into the textbook *Simply Logical — intelligent reasoning by example* (John Wiley, 1994, xvi+240 pages). Assessment was based on weekly lab exercises, a larger programming assignment and a written exam.
- j) *Computational Logic* — 1995-1996  
I designed this unit, and taught it to 50-60 second year undergraduates. I used the book *Tarski's World* by Barwise & Etchemendy, because it includes a software package that I used for lab exercises. Assessment was based on three lab assignments and a written exam.
- k) *Introduction to Computer Science* — 1988-1994  
This unit was taught by several lecturers to groups of 100-150 first-year Economics and Econometrics students. For assessment we used, besides lab assignments, a computer-supported examination system that would generate a random set of multiple-choice questions from a large database.

## International courses, tutorials and lectures

- ◆ Invited tutorial on ROC Analysis for Ranking and Probability Estimation, UAI'07, Vancouver (Canada), July 2007.
- ◆ Tutorial on The many faces of ROC analysis in machine learning, ICML'04, Banff (Canada), July 2004.
- ◆ Lecture on Propositionalisation at the Relational Data Mining Summerschool, collocated with ECML/PKDD'02, Helsinki (Finland), August 2002.
- ◆ Tutorial on Data Mining and Relational Knowledge Discovery (with Nada Lavrac), ECAI'02, Lyon (France), July 2002.
- ◆ Tutorial on Knowledge Representation for Machine Learning, ICML'01, Williams College (USA), June-July 2001.
- ◆ Invited tutorial on Rule Induction, Spring School on Intelligent Data Analysis, Palermo (Italy), March 2001.
- ◆ Invited tutorial on Knowledge Representation for Inductive Logic Programming, CL2000, London (UK), July 2000.
- ◆ Tutorial on Inductive Logic Programming (with Nada Lavrac), ECAI'98, Brighton (UK), August 1998.
- ◆ Graduate course on Inductive Logic Programming (with Nada Lavrac), Aarhus University (Denmark), May 1997.

- ◆ Lecture on induction at *SIKS Graduate course on Reasoning techniques in Artificial Intelligence*, Maarsse (Netherlands), April 1997.
- ◆ Course on Inductive Logic Programming (with Nada Lavrac) at *International Summer School for Logic Programming*, Alghero (Italy), June 1996.
- ◆ Lecture on Inductive Logic Programming at *SIKS Graduate course on Machine Learning*, Amsterdam (Netherlands), January 1992.

### Postgraduate supervision

- ◆ Elias Gyftodimos (PhD 2005: *A Probabilistic Graphical Model Framework for Higher-Order Term-Based Representations*)
- ◆ Simon Rawles (PhD 2007: *Object-Oriented Data Mining*)
- ◆ Simon Price (part-time, from 2002)
- ◆ Qingyi Gao (from 2004)
- ◆ Tarek Abudawood (from 2006)
- ◆ Sebastian Spiegler (from 2007)

### Postdoctoral supervision

- ◆ Shaomin Wu (2000 – 2002)
  - ◆ Yonghong Peng (2000 – 2002)
  - ◆ Susanne Hoche (2005 – 2007)
  - ◆ Ksenia Shalnova (2006 – 2009)
  - ◆ Oliver Ray (2007 – 2011)
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## Professional activities

With regards to University administration, I have sat on a wide range of committees. I have been course director of two courses, and co-ordinated the third undergraduate year. I have also been the Faculty liaison in the committee that appointed the current Dean of Engineering.

One of my main current responsibilities is Departmental Research Director; I have contributed significantly to the Department's RAE-2008 submission, among others by interviewing each department member about their four selected research outputs, and drafting the further details for each output myself. Other main responsibilities are the co-ordination of the Exabyte Informatics University-wide research theme, and implementing the teaching programme for the newly formed *Bristol Centre for Complexity Sciences* Doctoral Training Centre.

Outside the University, I am serving and have served on a large number of programme committees and editorial boards. I have travelled widely and given numerous invited seminars. I was invited speaker at the 2007 European Conference on Machine Learning, and have been appointed Programme Co-Chair of the 2009 ACM International Conference on Knowledge Discovery and Data Mining, which will be held in Europe (Paris) for the first time.

### Administrative activities within the University

#### *At University of Bristol*

- ◆ Member, HPC and Storage Technical Boards (since 2007).
- ◆ Member, Promotions Committee, Faculty of Science (since 2007).
- ◆ Member, Implementation Group, Bristol Centre for Complexity Sciences (since 2006).
- ◆ Academic Lead, Exabyte Informatics research theme (since 2005).
- ◆ Member, Steering Committee, Applied Research project (since 2004).
- ◆ Research Director, Department of Computer Science (since 2003).
- ◆ Member, Dean Appointment Committee, Faculty of Engineering (2006-2007).
- ◆ Member, Promotions Committee, Faculty of Engineering (2004-2007).
- ◆ Course director, Advanced MSc in Machine Learning (2000-2006).
- ◆ Member, Appointment Committee, Chair of Artificial Intelligence, Department of Engineering Mathematics (2005).
- ◆ Member, Teaching Committee, Department of Computer Science (1998-2005).
- ◆ Third year tutor, Department of Computer Science (1998-2005).
- ◆ Third year tutor, Computer Systems Engineering (2001-2002).
- ◆ Course director, Computer Science with Mathematics (1998-2000).
- ◆ Member, Undergraduate Studies Committee, Faculty of Science (1998-2000).
- ◆ Member, Progress Committee, Faculty of Science (1998-2000).

#### *At Tilburg University*

- ◆ Elected member, Faculty Council, Faculty of Economics, September 1995 - September 1997.
- ◆ Board member, Department of Management Information Science, April 1995 - June 1997.
- ◆ Member, Exams Committee, Faculty of Economics, 1994 - 1997.

- ◆ Member, Teaching Committee, Faculty of Economics, 1994 - 1995.
- ◆ Member, Management Team, Institute for Language Technology and Artificial Intelligence, 1993 - 1994.
- ◆ Seminar organiser, Institute for Language Technology and Artificial Intelligence, 1988 - 1992.

## Professional activities outside the University

### *Boards and panels*

- ◆ Member of EPSRC College (2006 – 2009)
- ◆ Assessor, Chair of Intelligent Systems, University of Turku, Finland (2007 – 2008)
- ◆ EPSRC Peer Review Panels: April 2005, May 2006, September 2006 (Large Grants)
- ◆ Shortlisting panel, Chair of Computer Science, University of Exeter (2006)
- ◆ Framework 6 reviewer (2003)
- ◆ Member of BBSRC Panel for Bioinformatics and E-Science (2001 – 2003)
- ◆ Reviewer of Framework V assessment project *APrIL* (2002)
- ◆ Member of the advisory board of Artificial Intelligence and Computer Science Laboratory, University of Porto, Portugal (2001 – 2002)
- ◆ Member of the management board of MLnet II European Network of Excellence (2000 – 2001)

### *Journals*

- ◆ Guest editor (with Susanne Hoche and Andreas Nürnberger) of a special issue of *AI Communications* on Network Analysis in Natural Sciences and Engineering (December 2007).
- ◆ Guest editor (with Saso Dzeroski) of a special issue of the *Machine Learning* journal on Inductive Logic Programming (September 2001).
- ◆ Editorial board memberships:
  - *AI Communications* (since 1997)
  - *Journal of Artificial Intelligence Research* (since 2001)
  - *Journal of Machine Learning Research* (since 2000)
  - *Machine Learning* (since 2000, associate editor 2001 – 2005)
  - *Theory and Practice of Logic Programming* (since 2005)

### *Conferences and workshops*

- ◆ Program co-chair (with Mohammed Zaki) of the Fifteenth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining KDD'09
- ◆ Program co-chair (with Luc De Raedt) of the Twelfth European Conference on Machine Learning ECML'01
- ◆ Program co-chair (with Saso Dzeroski) of the Ninth International Workshop on Inductive Logic Programming ILP'99
- ◆ Invited speaker at
  - ECML'07 (European Machine Learning Conference)
  - SBIA/IBERAMIA'06 (Brazilian/South American AI Conference)
  - EPIA'01 (Portuguese AI Conference)
  - LICS'01 workshop on Logic and Learning
  - WFLP'00 (Workshop on Functional and Logic Programming)
  - ECSQARU'99 (Symbolic and Quantitative Approaches to Reasoning and Uncertainty)
  - DOOD'97 (Deductive and Object-Oriented Databases)

- ◆ Organised workshops:
  - *Abduction and Induction in AI and Bioinformatics*, 2007 (with Oliver Ray, Antonis Kakas, Katsumi Inoue and Andrei Donescu)
  - *Abduction and Induction in AI* at IJCAI'05 and ECAI'06 (with Oliver Ray and Antonis Kakas)
  - *ROC Analysis in AI* at ECAI'04 (with César Ferri, José -Orallo and Nicolas Lachiche)
  - *Abductive and Inductive Reasoning* at ECAI'96, IJCAI'97 and ECAI'98 (with Antonis Kakas)
  - *CompulogNet Area Meeting on Representation issues in learning and reasoning* at ILP'97 (with Nada Lavrac)
  - *IFIP TC12 Founding Workshop* at IJCAI'89 (with Robert Meersman)
- ◆ Program Committee memberships (\* denotes Senior PC/Area Chair)
  - ALT '94, '95, '04 (International Workshop on Algorithmic Learning Theory)
  - DS '98, '99, '00, '02 (International Conference on Discovery Science)
  - ECAI '02, '06\*, '08\* (European Conference on Artificial Intelligence).
  - ECML/PKDD '00, '01, '02, '03, '04, '05\*, '06\*, '07\*, '08 (European Conference on Machine Learning & Principles of Data Mining and Knowledge Discovery)
  - ECSQARU '01, '03 (European Conference on Symbolic and Quantitative Approaches to Reasoning with Uncertainty)
  - ICDM '03, '04, '05, '06, '07, '08 (IEEE International Conference on Data Mining)
  - ICML '02, '04\*, '05\*, '07, '08\* (International Conference on Machine Learning)
  - IDA '03, '05 (International Symposium on Intelligent Data Analysis)
  - ILP '95, '96, '97, '98, '99, '00, '01, '02, '03, '04, '05, '06, '07, '08 (International Workshop/Conference on Inductive Logic Programming)
  - ISMIS '02 (International Symposium on Methodologies for Intelligent Systems)
  - KDD '01, '05, '07\*, '08 (ACM-SIGKDD International Conference on Knowledge Discovery and Data Mining)
  - PAKDD '05 (Pacific-Asia Conference on Knowledge Discovery and Data Mining)
  - PRICAI '08 (Pacific Rim International Conference on Artificial Intelligence)
  - SBIA '00, '04, '08 (Brazilian Conference on Artificial Intelligence)
  - SDM '02, '03, '04, '05, '06, '07 '08 (SIAM Conference on Data Mining)

### *International research co-ordination*

- ◆ Member of the Advisory Board of the European Network of Excellence KDUBiq (2005 – 2008)
- ◆ Administrative co-ordinator of the European Network of Excellence *ILPnet2* (1998 – 2002) and the Esprit project *MetaL* (2001 – 2002)
- ◆ Node co-ordinator of EU-funded Networks of Excellence *CompulogNet* and *MLnet* (1992 – 1997), *CompulogNet II* and *MLnet II* (1998 – 2001), and *KDnet* (2002 – 2004)
- ◆ Secretary of IFIP Working Group 12.2 on Machine Learning (1990 – 1997)

### *Examination*

- ◆ External examiner, MSc in Autonomous Systems, University of Exeter (2003 – 2007)
- ◆ External PhD examiner for Tom Howley (University of Galway, 2007), Arno Knobbe (University of Utrecht, 2004), Carlos Soares (University of Porto, 2004), Peter Waiganjo Wagacha (University of Nairobi, 2003), David Corney (University of London, 2002), Wim Van Laer (Leuven University, 2002), Flaviu Marginean (York University, 2001), Steve Moyle (Oxford University, 2001), Bjarte Ostvold (Norwegian University of Science and Technology, 1999), Antonia Michael (University of London, 1998), and Herman Jurjus (Tilburg University, 1997)
- ◆ Internal PhD examiner for Simon Rogers (2004), Torbjørn Dahl (2002) and Claire Kennedy (2000)
- ◆ Member of Habilitation jury for François Jacquenet (University of Bourgogne, 1999)

*Invited visits and seminars (selection):*

- Google Research, Zürich (Switzerland), February 2007
  - University of Galway (Ireland), April 2007
  - Dagstuhl Seminar (Germany), April 2007
  - Xerox Research Labs, Grenoble (France), February 2007
  - University of Rio de Janeiro (Brazil), October 2006
  - University of Sao Paulo at Sao Carlos (Brazil), October 2006
  - University of Bristol (UK), September 2006
  - University of Freiburg (Germany), March 2006
  - University of Konstanz (Germany), January 2006
  - University of Swansea (UK), January 2006
  - University of Liverpool (UK), April 2005
  - University of Bari (Italy), March 2005
  - Dagstuhl Seminar (Germany), February 2005
  - University of Porto (Portugal), September 2004
  - Polytechnic University of Valencia (Spain), August 2004
  - University of Madison at Wisconsin (USA), July-August 2004
  - University of Birmingham (UK), April 2004
  - Imperial College (UK), April 2004
  - University of Freiburg (Germany), March 2004
  - University of Strasbourg (France), November 2003
  - University of Amsterdam (Netherlands), October 2003
  - New York University (USA), August-September 2003
  - University of Waikato, Hamilton (New Zealand), July 2003
  - Australian National University, Canberra (Australia), July 2003
  - University of New South Wales, Sydney (Australia), May-July 2003
  - University of Nairobi (Kenya), April 2003
  - Tokyo Institute of Technology (Japan), December 2002
  - University of Strasbourg (France), November 2002
  - De Morgan seminar, London (UK), November 2002
  - Machine Intelligence workshop, Wye (UK), September 2002
  - Catholic University Leuven (Belgium), June 2002
  - Jozef Stefan Institute, Ljubljana (Slovenia), April 2002
  - University of Porto (Portugal), March 2002
  - University of Vienna (Austria), February 2002
  - University of Aberystwyth (UK), January 2002
  - University of Porto (Portugal), December 2001
  - Birkbeck College, London (UK), November 2001
  - Jozef Stefan Institute, Ljubljana (Slovenia), November 2001
  - University of York (UK), October 2001
  - University of Strasbourg (France), August 2001
  - Oxford University (UK), November 2000
  - Machine Intelligence workshop, Bury St Edmunds (UK), July 2000
  - University of Freiburg (Germany), January 2000
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