



Professor Ian Nabney
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Head of School

Professor and Head of SCEEM School of Engineering

Area of research

System Analytics

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Summary

My research spans both the theory and applications of neural networks and other pattern recognition techniques, with a special focus on data visualisation and probabilistic modelling. Much of my work is inspired, directly or indirectly, by industrial problems in bioinformatics, biosignal processing, condition monitoring, remote sensing and financial forecasting. I have put my experience of software engineering to good use through developing the [Netlab toolbox](#) for neural networks and related pattern analysis techniques: this has now been downloaded more than 48,000 times and the accompanying book has 1300 citations. At Bristol, I am a member of the Intelligent Systems Lab.

Between October 2000 and June 2002 I was the Director of the Cardionetics Institute of Bioinformatics, which researched methods for extracting clinically valuable information from electrocardiogram (ECG) data. The current focus of my research is in data visualisation (representing high-dimensional data faithfully in 2D so that users can analyse its structure visually) and time series analysis and characterisation (with applications in biomedical signal processing and condition monitoring of complex machinery).

Biography

I joined the University of Bristol as Head of School in October 2017.

After studying mathematics for a BA at Oxford, I moved to Cambridge to do my PhD, which was in abstract algebra. I then spent five years with Logica (a UK software house) at their R&D lab, where I developed a wide range of neural network applications and also worked in formal methods.

I joined Aston University as a Lecturer in Applied Mathematics in 1995. In my 22 years there I took on a wide range of different positions. In my last year, I was the Acting Executive Dean for the School of Engineering and Applied Science, and at the University level I was Associate PVC International for China. I was a 50th Anniversary Professor of Systems Analytics: one of a small group of professors to receive a special award on the 50th anniversary of the establishment of Aston as a University. I was formerly Head of Computer Science (2009-2016), Head of Mathematics (2012-2015) and Associate Dean for Research in the School (2006-2008).

I led the introduction of a range of innovations at Aston: a university-wide research publication repository; work-based Degree Apprenticeships recruiting about 100 students per year, with the first graduates in 2017; and a student-led software company to provide on-campus experience of industrial-standard software development.

Externally, I am the Chair of the Natural Computing Applications Forum (NCAF) and have organised the scientific program for many of their meetings. In my spare time I play the piano.

Teaching

I am a Fellow of the Higher Education Academy and have a PGCert in Teaching and Learning in HE.

At Bristol I have supervised undergraduate and MSc projects.

My most recent teaching at Aston focused on software development (a first-year 20-credit module: Java Program Development CS1410). Prior to that, I taught a wide range of mathematics (statistics, numerical analysis, maths for computer science, group project skills), machine learning (a final-year Data Mining module and at Master's level: algorithms and computational mathematics), and software (object-oriented programming in C++ and Java, software project management) modules.

Keywords

- Bayesian machine learning
- Data Analytics
- Data Visualisation

Memberships

Organisations

[Department of Computer Science](#)

[Department of Electrical & Electronic Engineering](#)

[Department of Engineering Mathematics](#)

[Merchant Venturers' School of Engineering](#)

Other sites

- [Computerscience](#)

Research Groups

- [Intelligent Systems - Core](#)

Selected publications

- Almeida, VG & Nabney, IT, 2017, '[Detecting dynamical changes in vital signs using switching Kalman filter](#)'. in: *2017 39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBC 2017*. IEEE Computer Society, United States, pp. 2223
- Ender, A, Ribarsky, W, Turkay, C, Wong, BW, Nabney, I, Blanco, ID & Rossi, F, 2017, '[The state of the art in integrating machine learning into visual analytics](#)'. *Computer Graphics Forum*, vol 36., pp. 458-486
- Nabney, I & Mumtaz, S, 2017, '[Scrutinizing human MHC polymorphism: Supertype analysis using Poisson-Boltzmann electrostatics and clustering](#)'. *Journal of Molecular Graphics and Modelling*, vol 77., pp. 130-136
- Marcos, JV, Hornero, R, Nabney, IT, Álvarez, D, Gutiérrez-Tobal, GC & Campo, Fd, 2016, '[Regularity analysis of nocturnal oximetry recordings to assist in the diagnosis of sleep apnoea syndrome](#)'. *Medical Engineering and Physics*, vol 38., pp. 216-224

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Recent publications

- Patelli, A, Lewis, PR, Ekárt, A, Wang, H, Nabney, IT, Bennett, D, Lucas, R & Cole, A, 2017, '[An architecture for the autonomic curation of crowdsourced knowledge](#)'. *Cluster Computing*, vol in press.
- Almeida, VG & Nabney, IT, 2016, '[Early warnings of heart rate deterioration](#)'. in: *2016 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBC 2016*. IEEE Computer Society, United States, pp. 940-943
- Emambakhsh, M, He, Y & Nabney, I, 2016, '[Handwritten and machine-printed text discrimination using a template matching approach](#)'. in: *Proceedings : 12th IAPR International Workshop on Document Analysis Systems, DAS 2016*. IEEE Computer Society, United States, pp. 399-404
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- Pararasa, C, Ikwuobe, J, Shigdar, S, Boukouvalas, A, Nabney, IT, Brown, JE, Devitt, A, Bailey, CJ, Bennett, SJ & Griffiths, HR, 2016, '[Age-associated changes in long-chain fatty acid profile during healthy aging promote pro-inflammatory monocyte polarization via PPARγ](#)'. *Aging Cell*, vol 15., pp. 128-139
- Bunkute, E, Cummins, C, Crofts, F, Bunce, G, Nabney, IT & Flower, DR, 2015, '[PIP-DB: the protein isoelectric point database](#)'. *Bioinformatics*, vol 31., pp. 295-296

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