

# jonathanfieldsend

computer science senior lecturer

## contact

Computer Science  
CEMPS  
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## languages

Fluent English  
Intermediate French  
Basic Spanish  
Beginners Italian

## programming

Java, Matlab, C, C++,  
Python  
github.com/fieldsend

## google citation metrics

h-index: 18  
i10-index: 26  
g-index: 38  
citations: 1722  
(as of June 2015)

## professional membership

IEEE (member)  
IEEE CIS (member)  
BCS (member)  
ACM SIGEVO (member)  
HEA (fellow)

## education

- 1999–2003 **PhD** in Computer Science University of Exeter  
Thesis: *Novel Algorithms for Multi-Objective Search and their application in Multi-Objective Evolutionary Neural Network Training.*
- 1998–1999 **MSc** in Computational Intelligence University of Plymouth  
Dissertation: *Non-linear ARCH Volatility Estimation Using Neural Networks.*
- 1995–1998 **BA** in Economics Durham University, St Chad's College  
Dissertation: *On the impact of tourism on the Cornish economy.*

## academic positions

- 2014–now **University of Exeter** Exeter, United Kingdom  
*Senior Lecturer, Computer Science*
- 2006–2014 **University of Exeter** Exeter, United Kingdom  
*Lecturer, Computer Science*
- 2005–2006 **University of Exeter** Exeter, United Kingdom  
*Business Fellow*
- 2002–2005 **University of Exeter** Exeter, United Kingdom  
*Research Fellow*

## externally funded research

- 2015–2018 **EPSRC** Everson, Fieldsend, Tabor (Exeter), Jin, Doherty (Surrey)  
EP/M017915/1 & EP/M017869/1: Data-Driven Surrogate-Assisted Evolutionary Fluid Dynamic Optimisation, £865,455.
- 2014–2017 **Technology Strategy Board and Lineal Software Solutions Ltd** Fieldsend, Wakeling  
KTP009620: Developing a software framework for next generation, integrated and richly featured mobile real-time data management, £163,225.
- 2013 **Met Office** Everson, Fieldsend  
MASS Modelling and Optimisation, £60,000.
- 2011–2014 **Technology Strategy Board and IMC group** Everson, Fieldsend  
KTP008748: Developing a practical, robust, self optimising and battery powered radio mesh network with long inter-node hop capability, £131,000.
- 2008–2012 **EPSRC Case Award with Motorola Plc** Everson, Fieldsend  
Automatic Coverage and Capacity Optimisation for Next Generation Access Technology, £83,064.
- 2006–2009 **EPSRC, Technology Strategy Board and NATS Ltd** Everson, Fieldsend  
KTP001395: Optimising the performance of the Short Term Conflict Alert System. £95,000.
- 2004–2007 **Department of Trade and Industry and ai Corporation** Everson, Fieldsend  
KTP001046: Next generation fraud detection software, £223,480.

## interests

Optimisation (real-valued & combinatorial, multi-objective, multi-modal, and uncertain), machine learning, pattern recognition, nature inspired computation, data analysis, visualisation.

## awards

2014	<b>GECCO</b>	Vancouver, Canada
	Best paper award in Real-World Applications track.	
2013	<b>GECCO</b>	Amsterdam, The Netherlands
	Best paper award in Evolutionary Multi-Criterion Optimisation track.	
2006	<b>IPSI</b>	Carcassonne, France
	Conference best paper award.	

## teaching experience

2006-now	<b>Project supervision</b>	Levels 2, 3, 4, MRes, MPhil and PhD
	I have supervised the full range of projects from UG through to PGR. Four PhD students have graduated with me as either first or joint supervisor, one MPhil and one MRes. I have also examined two external and five internal PhD candidates.	
2006-2014	<b>Social &amp; Professional Issues of the Information Age</b>	Level 1
	Coordinator and lecturer on module covering computer ethics, law and the societal impact of computing technology.	
2006-2011	<b>Design and Method for Software Engineering</b>	Level 2
	Coordinator and lecturer on module covering software engineering, GUI design, multi-program and remote systems, version control, team development.	
2008-2014	<b>Frontiers of Computer Science</b>	Levels 1 & 2
	Lecturer on module covering research frontiers of computer science, my aspect being multi-objective optimisation and data visualisation.	
2008-now	<b>Machine Learning and Optimisation</b>	Level 4
	Coordinator and lecturer on module covering statistical machine learning, along with classical and heuristic optimisation approaches.	
2008-now	<b>Object-Oriented Programming</b>	Level 1
	Coordinator and lecturer on module covering OO programming concepts, and implementation in the Java language.	
2009-2012	<b>Tools and Techniques</b>	Level 4
	Lecturer on module covering computational tools for masters students, my aspect being the use of the Matlab language.	
2011-now	<b>Software Development</b>	Level 2
	Coordinator and lecturer on module covering different architectures, event-based programming, generic programming, multi-threaded programs, software testing, and implementation in the Java language.	
2014-now	<b>ITMB Project</b>	Level 3
	Coordinator of the IT Management for Business project.	
2014-now	<b>MSci Project</b>	Level 4
	Coordinator of the MSci Computer Science research project.	
2014-now	<b>Software Development for Business</b>	Level 4
	Lecturer on a module covering software development in the business environment – specifically on software correctness, testing and collaborative development.	

## administrative roles

- 2007-now **Admissions Tutor/Deputy Admissions Tutor, UG computing degrees** University of Exeter  
Organising open days, bespoke visits, providing talks, responding to enquiries, outreach, developing material for prospectuses, brochures and web.
- 2007-now **Committee member of the BCS South West Branch** South West England  
University of Exeter representative sitting on the south west committee branch of one of the main professional computing bodies in the UK. Organising talks, prizes, outreach, etc.
- 2009-now **Member of University Innovation Group** University of Exeter  
Computer science academic member of the university group mandated with exploring new technologies for teaching and learning.
- 2011-now **Member of Information Security Steering Group** University of Exeter  
Computer science academic member of the university group mandated with forming policy and guidance on secure use of computing systems across the institution.
- 2008-2011 **Member of Senate** University of Exeter  
An academic staff association representative on the chief academic decision-making body of the University.
- 2003-now **Programme committee** Various  
Organising committee member of VizGEC 2012, 2013, 2014 & 2015, AISB 2013 and UKCI 2015. Programme committee member of numerous conferences and conference special sessions, including IEEE CEC, GECCO, PPSN, EMO, UKCI, AISB, ANTS.
- 2002-now **Reviewer** Various  
I have reviewed for a wide range of journals including: IEEE Transactions on Evolutionary Computation, Evolutionary Computation Journal, IEEE Transactions on Systems, Man and Cybernetics- Part B, IEEE Transactions on Neural Networks and Learning Systems, IEEE Transactions on Medical Imaging, IEEE Transactions on Automation Science and Engineering, Swarm Intelligence, Knowledge and Information Systems, Biosystems, Pattern Analysis and Applications, International Journal of Forecasting, International Journal of Parallel, Emergent and Distributed Systems, European Journal of Operations Research, Journal of Mathematical Modelling and Algorithms, Computational Optimization and Applications.

## publications

I have published widely in the top journals and peer-reviewed conferences in my field.

### articles in peer-reviewed journals

Multi-objective optimisation of viscoelastic damping inserts in honeycomb sandwich structures

P Aumjaud, J E Fieldsend, M-A Boucher, K E Evans, C W Smith

*Composite Structures (Accepted). Elsevier, Accepted*

Hybrid Evolutionary Approaches to Maximum Lifetime Routing and Energy Efficiency in Sensor Mesh Networks

Alma AM Rahat, Richard M Everson, Jonathan E Fieldsend

*Evolutionary Computation (Accepted). MIT Press, Accepted*

Using an adaptive collection of local evolutionary algorithms for multi-modal problems

J E Fieldsend

*Soft Computing 19.6 (2015) pp. 1445–1460. Springer, 2015*

The Rolling Tide Evolutionary Algorithm: A Multi-Objective Optimiser for Noisy Optimisation Problems

J E Fieldsend, R M Everson

*IEEE Transactions on Evolutionary Computation 19.1 (2015) pp. 103–117. IEEE, 2015*

Life on the Edge: Characterising the Edges of Mutually Non-dominating Sets

R M Everson, Walker D J, Fieldsend J E

*Evolutionary Computation 22.3 (2014). MIT Press, 2014*

Visualising Mutually Non-dominating Solution Sets in Many-objective Optimisation

D J Walker, R M Everson, J E Fieldsend

*IEEE Transactions on Evolutionary Computation 17.2 (2013) pp. 165–184. IEEE, 2013*

Dominance-based multiobjective simulated annealing

K I Smith, R M Everson, J E Fieldsend, C Murphy, R Misra

*IEEE Transactions on Evolutionary Computation 12.3 (2008) pp. 323–342. IEEE, 2008*

Confident interpretation of Bayesian decision tree ensembles for clinical applications

V Schetinina, J E Fieldsend, D Partridge, T J Coats, W J Krzanowski, R M Everson, T C Bailey, A Hernandez

*IEEE Transactions on Information Technology in Biomedicine 11.3 (2007) pp. 312–319. IEEE, 2007*

Representing classifier confidence in the safety critical domain: an illustration from mortality prediction in trauma cases

T C Bailey, R M Everson, J E Fieldsend, W J Krzanowski, D Partridge, V Schetinina

*Neural Computing & Applications 16.1 (2007) pp. 1–10. Springer, 2007*

Multi-class ROC analysis from a multi-objective optimisation perspective

R M Everson, J E Fieldsend

*Pattern Recognition Letters 27.8 (2006) pp. 918–927. Elsevier, 2006*

Multiobjective optimization of safety related systems: An application to short-term conflict alert

R M Everson, J E Fieldsend

*IEEE Transactions on Evolutionary Computation 10.2 (2006) pp. 187–198. IEEE, 2006*

Confidence in classification: A Bayesian approach

W J Krzanowski, T C Bailey, D Partridge, J E Fieldsend, R M Everson, V Schetinina

*Journal of Classification 23.2 (2006) pp. 199–220. Springer, 2006*

Comparison of the Bayesian and Randomised Decision Tree Ensembles within an Uncertainty Envelope Technique

V Schetinina, J E Fieldsend, D Partridge, W J Krzanowski, R M Everson, T C Bailey, A Hernandez

*Journal of Mathematical Modelling and Algorithms 5.4 (2006) pp. 397–416. Springer, 2006*

Notes on shape orientation where the standard method does not work

J Žunić, L Kopanja, J E Fieldsend

*Pattern Recognition 39.5 (2006) pp. 856–865. Elsevier, 2006*

Pareto evolutionary neural networks

J E Fieldsend, S Singh

IEEE Transactions on Neural Networks 16.2 (2005) pp. 338–354. IEEE, 2005

### Using unconstrained elite archives for multiobjective optimization

J E Fieldsend, R M. Everson, S Singh

IEEE Transactions on Evolutionary Computation 7.3 (2003) pp. 305–323. IEEE, 2003

## book chapters

### Optimizing Decision Trees Using Multi-objective Particle Swarm Optimization

J Fieldsend

Coello Coello, C, S Dehuri, and S Ghosh, *Swarm Intelligence for Multi-objective Problems in Data Mining*, Springer, 2009

### Multiobjective Supervised Learning

J E Fieldsend, R M Everson

Knowles, J, D Corne, and K Deb, *Multiobjective Problem Solving from Nature*, Springer, 2008

### Estimating Classification Uncertainty of Bayesian Decision Tree Technique on Financial Data

V Schetinin, J Fieldsend, D Partridge, W Krzanowski, R Everson, T Bailey, A Hernandez

Batyrshin, I, J Kacprzyk, L Sheremetov, and L Zadeh, *Perception-based Data Mining and Decision Making in Economics and Finance*, Springer, 2007

### Multi-objective optimisation for receiver operating characteristic analysis

R Everson, J Fieldsend

Jin, Y, *Multi-Objective Machine Learning*, Springer, 2006

### Regression error characteristic optimisation of non-linear models

J Fieldsend

Jin, Y, *Multi-objective machine learning*, Springer, 2006

### A Bayesian Methodology for Estimating Uncertainty of Decisions in Safety-Critical Systems

V Schetinin, J E Fieldsend, D Partridge, W J Krzanowski, R M Everson, T C Bailey, A Hernandez

Zha, X and R Howlett, *Integrated Intelligent Systems for Engineering Design*, IOS Press, 2006

### A Bayesian Methodology for Estimating Uncertainty of Decisions in Safety-Critical Systems

V Schetinin, J Fieldsend, D Partridge, W Krzanowski, R Everson, T Bailey, A Hernandez

Zha, X and R Howlett, *Integrated Intelligent Systems for Engineering Design*, IOS Press, 2006

### Optimizing forecast model complexity using multiobjective evolutionary algorithms

J E Fieldsend, S Singh

Coello Coello, CA and GB Lamont, *Applications of Multi-Objective Evolutionary Algorithms*, World Scientific, 2004

## peer-reviewed conferences/proceedings

### Strength through diversity: Disaggregation and multi-objectivisation approaches for genetic programming

Jonathan E Fieldsend, Alberto Moraglio

GECCO, 2015

### Efficiently Identifying Pareto Solutions when Objective Values Change

J E Fieldsend, R M Everson

*Genetic and Evolutionary Computation Conference (GECCO)*, 2014

### Running Up Those Hills: Multi-Modal Search with the Niching Migratory Multi-Swarm Optimiser

J E Fieldsend

*IEEE Congress on Evolutionary Computation (CEC)*, 2014

### Multi-Objective Routing Optimisation for Battery-Powered Wireless Sensor Mesh Networks

A A M Rahat, R M Everson, Fieldsend J E

*Genetic and Evolutionary Computation Conference (GECCO)*, 2014

### Multi-Modal Optimisation using a Localised Surrogates Assisted Evolutionary Algorithm

J E Fieldsend

*UK Workshop on Computational Intelligence (UKCI'13)*, 2013

### Visualising and Understanding Many-Criterion League Tables

- D J Walker, R M Everson, J E Fieldsend  
*OR55 Annual Conference - Keynote Papers and Extended Abstracts*, 2013
- The Impact of an Automated Checklist on Reliability of Inpatient Psychiatric Care**  
M Harrison, J Fieldsend, A Lawes, D Somerfield  
*The Royal College of Psychiatrists, International Congress*, 2013
- Visualising High-Dimensional Pareto Relationships in Two-Dimensional Scatterplots**  
J Fieldsend, R Everson  
*Evolutionary Multi-Criterion Optimization*, 2013
- Edges of mutually non-dominating sets**  
R M Everson, D J Walker, J E Fieldsend  
*Genetic and Evolutionary Computation Conference (GECCO)*, 2013
- On the effect of selection and archiving operators in many-objective particle swarm optimisation**  
M M Woolard, J E Fieldsend  
*Genetic and Evolutionary Computation Conference (GECCO)*, 2013
- Visualising many-objective populations**  
D Walker, J Fieldsend, R Everson  
*Proceedings of the fourteenth international conference on Genetic and evolutionary computation conference companion*, 2012
- Rank-based dimension reduction for many-criteria populations**  
D J Walker, R M Everson, J E Fieldsend  
*Proceedings of the 13th annual conference companion on Genetic and evolutionary computation*, 2011
- Novel Methods for Ranking District Metered Areas for Water Distribution Network Maintenance Scheduling**  
K McClymont, D Walker, E Keedwell, R Everson, J Fieldsend, D Savić, M Randall-Smith  
CCWI, 2011
- Visualisation and ordering of many-objective populations**  
D J Walker, R M Everson, J E Fieldsend  
*IEEE Congress on Evolutionary Computation (CEC)*, 2010
- Variable interactions and exploring parameter space in an expensive optimisation problem: Optimising Short Term Conflict Alert**  
W J Reckhouse, J E Fieldsend, R M Everson  
*IEEE Congress on Evolutionary Computation (CEC)*, 2010
- A Bayesian framework for active learning**  
R Fredlund, R M Everson, J E Fieldsend  
*International Joint Conference on Neural Networks (IJCNN)*, 2010
- Assessment and optimisation of STCA performance: Using the Pareto optimal receiver operating characteristic**  
W Reckhouse, R Everson, J Fieldsend, D Bush, T Arnold, R Hayward, K Slater  
*Eurocontrol Annual Safety R&D Seminar*, 2008
- On the efficient use of uncertainty when performing expensive ROC optimisation**  
J E Fieldsend, R M Everson  
*IEEE Congress on Evolutionary Computation, (CEC)*, 2008
- Interpretability of Bayesian decision trees induced from trauma data**  
D Partridge, V Schetinin, Dayou Li, T Coats, J Fieldsend, W Krzanowski, R Everson, T Bailey  
*Artificial Intelligence and Soft Computing-ICAISC 2006*, 2006
- Classification with Confidence for Critical Systems**  
D Partridge, T C Bailey, R M Everson, J E Fieldsend, A Hernandez, W J Krzanowski, V Schetinin  
*Developments in Risk-based Approaches to Safety*, 2006
- Multi-Objective Supervised Learning**  
J E Fieldsend  
*Workshop On Multiobjective Problem-Solving from Nature. The origins and benefits of multiple objectives, 9th International Conference on Parrallel Problem Solving from Nature (PPSN IX)*, 2006

### Computing with confidence: a Bayesian approach

D Partridge, J E Fieldsend, W J Krzanowski, T C Bailey, R M Everson, V Schetinin  
*Internet, Processing, Systems, and Interdisciplinary (Research) Conference (IPSI-2006)*, 2006

### Optimising Data-Driven Safety Related Systems

R Everson, J Fieldsend, T Bailey, W Krzanowski, D Partridge, V Schetinin, A Hernandez  
*Proceedings of the Fourteenth Safety-critical Systems Symposium*, 2006

### A MOPSO algorithm based exclusively on Pareto dominance concepts

J Alvarez-Benitez, R Everson, J Fieldsend  
*Evolutionary Multi-Criterion Optimization*, 2005

### Multi-objective Optimisation in the Presence of Uncertainty

J E Fieldsend, R M Everson  
*IEEE Congress on Evolutionary Computation, (CEC)*, 2005

### Formulation and comparison of multi-class ROC surfaces

J E Fieldsend, R M Everson  
*Proceedings of the ICML 2005 workshop on ROC Analysis in Machine Learning*, 2005

### On evidence weighted mixture classification

R M Everson, W J Krzanowski, T C Bailey, J E Fieldsend  
*Joint Annual Meeting of the Interface and the Classification Society of North America*, 2005

### Visualisation of multi-class ROC surfaces

J E Fieldsend, R M Everson  
*2nd ROCML workshop, part of the 22nd International Conference on Machine Learning (ICML 2005)*, 2005

### Multi-Objective Simulated Annealing for Optimisation of CDMA Network Air-Interface

K Smith, R Everson, R Fieldsend, C Murphy  
*Third Annual Motorola Symposium*, 2004

### Dominance measures for multi-objective simulated annealing

K I Smith, R M Everson, J E Fieldsend  
*Congress on Evolutionary Computation, (CEC)*, 2004

### Cardinality constrained portfolio optimisation

J Fieldsend, J Matatko, M Peng  
*Intelligent Data Engineering and Automated Learning-IDEAL 2004*, 2004

### ROC optimisation of safety related systems

J E Fieldsend, R M Everson  
*ROCAI 2004, part of the 16th European Conference on Artificial Intelligence*, 2004

### The Bayesian decision tree technique with a sweeping strategy

V Schetinin, J E Fieldsend, D Partridge, W J Krzanowski, R M Everson, T C Bailey, A Hernandez  
*International Conference on Advances in Intelligent Systems - Theory and Applications (AISTA 2004)*, 2004

### A variable metric probabilistic k-nearest-neighbours classifier

R Everson, J Fieldsend  
*Intelligent Data Engineering and Automated Learning-IDEAL 2004*, 2004

### Experimental comparison of classification Uncertainty for randomised and Bayesian Decision Tree ensembles

V Schetinin, D Partridge, W Krzanowski, R Everson, J Fieldsend, T Bailey, A Hernandez  
*Intelligent Data Engineering and Automated Learning-IDEAL 2004*, 2004

### Precision and Recall Optimisation for Information Access Tasks.

M Fisher, J E Fieldsend, R M Everson  
*ROCAI 2004, part of the 16th European Conference on Artificial Intelligence*, 2004

### Bayesian inductively learned modules for safety critical systems

J E Fieldsend, T C Bailey, R M Everson, W J Krzanowski, D Partridge, V Schetinin  
*Proceedings of the 35th Symposium on the Interface: Computing Science and Statistics, Salt Lake City*, 2003

### A Multi-Objective Algorithm based upon Particle Swarm Optimisation, an Efficient Data Structure and Turbulence.

J E Fieldsend, S Singh  
*UK Workshop on Computational Intelligence (UKCI'02)*, 2002

Full elite sets for multi-objective optimisation

R M Everson, J E Fieldsend, S Singh

*Adaptive Computing in Design and Manufacture V*, 2002

Pareto multiobjective nonlinear regression modelling to aid CAPM analogous forecasting

J E Fieldsend, S Singh

*International Joint Conference on Neural Networks (IJCNN'02)*, 2002

Pattern matching and neural networks based hybrid forecasting system

S Singh, J Fieldsend

*International Conference on Advances in Pattern Recognition, ICAPR 2001*, 2001

Identification of masses in digital mammograms with MLP and RBF nets

K Bovis, S Singh, J Fieldsend, C Pinder

*IEEE-INNS-ENNS International Joint Conference on Neural Networks (IJCNN 2000)*, 2000

Financial time series forecasts using fuzzy and long memory pattern recognition systems

S Singh, J Fieldsend

*Proceedings of the IEEE/IAFE/INFOR MS 2000 Conference on Computational Intelligence for Financial Engineering, (CIFEr)*, 2000

## patents

A method of selecting operational parameters in a communication network

K I Smith, R M Everson, J E Fieldsend, Misra R

*EP Patent 1,730,980*, 2006

Method of selecting operational parameters in a communication network

K I Smith, R M Everson, J E Fieldsend, Misra R

*US Patent App. 10/598,266*, 2005

## technical reports

A performance assessment of dynamic heuristic optimisers on the IEEE CEC 2015 niching competition test problems

Jonathan E Fieldsend

*Tech. rep.*, 2015

On the efficient maintenance and updating of Pareto solutions when assigned objectives values may change

J E Fieldsend, Everson R M

*Tech. rep.*, 2013

League Tables: Construction and Visualisation from Multiple Key Performance Indicators

R M Everson, D J Walker, J E Fieldsend

*Tech. rep.*, 2012

Simulated annealing and greedy search for multi-objective optimisation

R M Everson, J E Fieldsend, K I Smith

*Tech. rep.*, 2009

A short note on the efficient random sampling of the multi-dimensional pyramid between a simplex and the origin lying in the unit hypercube

J E Fieldsend

*Tech. rep.*, 2005

Multi-objective particle swarm optimisation methods

J E Fieldsend

*Tech. rep.*, 2004