Robert Elliott Smith

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Work Address:
University College London
Dept. of Computer Science
Gower Street
London WC1E 6BT
United Kingdom

Employment History:

August, 2007 to Present:

Scientific Systems Company, Inc.
Woburn, Massachusetts, USA

Leader, Knowledge Representation and Computational Intelligence Group (half time)

- Leading various projects with the United States Navy, Army, and Air Force, NASA, and leading industrial clients (primarily in the defence and aerospace sectors).

July, 2005 to Present

Senior Research Fellow and College Teacher
Department of Computer Science
Intelligent Systems Group
University College London

1995 to Present:

- Consultant to Government and Industry, President of *RESystems, Inc.*
  - Active consultant in various projects with the United States Navy, Army, and Air Force, NASA, The National Science Foundation, First Quadrant Financial (Pasadena, CA), Scientific Systems Corporation (Woburn, MA), Boeing, DERA, and others.
  - Founding technical consultant to Plexus Planning Ltd. (www.plexusplanning.com), a company developing revolutionary project planning solutions.

June, 1997 to May, 2005:

Intelligent Computer Systems Centre
Computing, Engineering, and Mathematical Sciences Faculty
The University of the West of England

Senior Researcher/Lecturer, Director of The Intelligent Computer Systems Centre

- Leading and consulting in ongoing research efforts on complex systems based aritical intelligence, including evolutionary computation, theory, evolving mobile agents, neural networks, reinforcement learning, knowledge representation, and cooperative computation.
- Occasional lecturing, in The Machine Learning and Adaptive Computing Master of Science and other programs.
- Leading a team of approximately 5 research fellows, and 9 post-graduate research students.
- General management of the Centre, including interface with University administration, and representing the Centre as a part of the University internally and externally.

July to August, 1997:

British Telecom Laboratories, Ipswich, Suffolk, UK
Position: Visiting Research Fellow
Supervisor: Paul Kearney
Responsibilities:

- Conducting a research project on the use of evolutionary computation in Java-based mobile agents.

January, 1986 to August, 1998:

University of Alabama, Tuscaloosa, Alabama
Position: Associate Professor (Awarded tenure August 1997)
Assistant Professor (May, 1991 to August, 1996)
Graduate Research and Teaching Assistant (January, 1986 to May, 1991)
Supervisor: Dr. James L. Hill
Responsibilities:

- Developed and taught a regularly-offered graduate course on genetic algorithms in optimization and machine learning.
- Developed and taught a regularly-offered graduate course in neural networks in engineering. (These courses were cross-listed in engineering and computer science, and, at the time, were among the few of their kind in U.S. engineering curricula.)
- Developed and taught these graduate courses for satellite and video tape delivery across the U.S.
- Conducted research on genetic algorithms in optimization and machine learning, and on the application of neural networks.
- Taught traditional engineering mechanics courses to undergraduates (statics, fluids, and dynamics).
- Developed and taught new interdisciplinary undergraduate courses as a part of the National Science Foundation's Foundation Coalition Program.
- Administered the University of Alabama Genetic Algorithms Laboratory.
- Administered The Clearinghouse for Genetic Algorithms, a distribution centre offering over 43 technical reports that have been delivered throughout the U.S. and to 40 other countries.

June, 1992 to August, 1992:

U. S. Army Strategic Defense Command, Huntsville, Alabama
Position: Research Consultant
Contact: Luis Lopez
Responsibilities:

- Initiated a research project to use genetics-based learning to dynamically balance parallel computer programs on the BBN TC2000 computer.

May, 1991 to August, 1991 (project continued remotely until May 1993):

The Centre for Nonlinear Studies
Los Alamos National Laboratory, New Mexico
Position: Research Collaborator
Contact: Dr. Stephanie Forrest
Responsibilities:

- Involved in an interdisciplinary research project to use genetic algorithms to model immune system behaviour, and analyze the use of these models in genetics-based machine learning.

May, 1986 to August, 1986 and
May, 1987 to August, 1987:

Oak Ridge National Laboratories, Oak Ridge, Tennessee
Position: Research Consultant
Contact: Dr. Mike Hilliard
Responsibilities:

- Developed a software environment for studying the learning classifier system.
- Investigated learning of transferable heuristics with the classifier system applied to the domain of job shop scheduling.
- Assisted in an investigation of the role of penalty functions in constrained optimization with genetic algorithms.

Education

- University of Alabama, Tuscaloosa, Alabama

Engineering Science and Mechanics
Doctor of Philosophy awarded May, 1991.

- University of Alabama, Tuscaloosa, Alabama

Engineering Science and Mechanics
Master of Science awarded May, 1988.

- University of Alabama, Tuscaloosa, Alabama

Mechanical Engineering
Bachelor of Science awarded September, 1985.

- Resource Learning Centre, Birmingham, Alabama

High School for the Gifted and Talented
Advance Academic Diploma awarded May, 1981.

Interests

Machine Learning and Complex Adaptive Systems - Development of systems that automatically adapt based on experience. The thrust of this research is to improve understanding of these systems using mathematical models rather than high-level descriptions. The goal is the integration of artificial intelligence technology into automated analysis, control, and design methods.

Evolutionary Computation in Optimization and Machine Learning - Further development, analysis and application of evolutionary computation methods - algorithms whose mechanics are based on those of natural evolution. This research is directed towards further understanding of these algorithms' dynamic behaviour, their application to complex problems, and their efficiency. The effort requires the integration of discrete and continuous mathematical modelling, dynamic systems analysis, and computer simulation.

Science, Mathematics, and Engineering Education - Emphasis on the use of fundamental principles and problem-solving techniques, communication skills, and the use of computer technology. Of particular interest is the integration of advanced computer-assisted mathematics into undergraduate education.

Public and University Service

Co-author of Grand Challenge for Computing Research: Journeys in Non-Classical Computation. (http://www.nesc.ac.uk/esi/events/Grand_Challenges/proposals/stepney.pdf). One of seven such challenges posed by the UK Computing Research Committee, with support from EPSRC and The UK National e-Science Centre (http://www.nesc.ac.uk/esi/events/Grand_Challenges/)

Associate Editor of the journal Evolutionary Computation since 1996

Former member of the Management Board of EvoNet, The European Network of Excellence in Evolutionary Computation

Organizer of The Complex Systems in Computation session of the VI Madeira Math Encounters

Genetic Algorithm Methods Editor for GECCO 99, the 1999 Genetic and Evolutionary Computation Conference This conference was the first combination of The International Conference on Genetic Algorithms, The International Conference on Genetic Programming, and The Parallel Problem Solving from Nature Conference

Former Associate Editor of the IEEE Transactions on Evolutionary Computation, 1993-1996

Frequent reviewer for several other publications, including

- ACM Transactions on Mathematical Software,
- Adaptive Behaviour,
- Applied Artificial Intelligence,
- Artificial Intelligence; An International Journal,
- Complex Systems,
- Computers and Mathematics; An International Journal,
- IEEE Transactions on Neural Networks,
- IEEE Transactions on Pattern Analysis and Machine Intelligence,
- IEEE Transactions on Systems, Man, and Cybernetics,
- Kluwer Academic Publishers,
- ORSA Journal on Computing,
- Physica D,
- Proceedings of the IEEE

Proposal referee for the National Science Foundation Division of Information, Robotics, and Intelligent Systems, the Division of International Programs, and The National Research Council (Twinning Program)

Committee member for many other international conferences

Secretary of the University of Alabama Chapter of Sigma Xi, the National Scientific Research Society, 1996-97

Publicity chair for The Sixth International Conference on Genetic Algorithms, July 17, 1995, Pittsburgh, Pennsylvania

Publicity chair for The Fifth International Conference on Genetic Algorithms, July 17, 1993, Champaign, Illinois

Co-organizer and co-chair of The First International Workshop on Learning Classifier Systems, October 6, 1992 at the Johnson Space Centre, Houston, Texas

University of Alabama representative at the Sloan Foundation New Liberal Arts Conference (Atlanta, October, 1991)

Captain in the Alabama Science Olympiad (an annual science competition for Alabama high school students), 1990-1996

Honours

Member of the PLEXUS team, winners of the 2003 UWE Business Plan Competition

Engineering Mechanics Outstanding Dissertation Award, 1991

University of Alabama Graduate Teaching Fellow, 1990

Inducted into Tau Beta Pi (national engineering honorary fraternity), 1990

Honorable Mention in The Council of Southern Graduate Schools and University Microfilms Outstanding Thesis in the Natural and Mathematical Sciences Competition for 1985-1989

Outstanding Master's Thesis Awards at the Departmental, College, and University levels, 1988

NASA Graduate Student Research Fellow, 1987-1990

General Motors/Rochester Products Division Graduate Fellow, 1986-1987

Engineering Mechanics Outstanding Graduate Research Assistant, 1987

Math and Science Competition Scholarship to Birmingham-Southern College, 1981 (refused in favour of attending the University of Alabama)

Publications

Refereed Journal Papers and Book Chapters

Smith, R., Jiang, M. K., Bacardit, J., Stout, M., Krasnoger, N., and Hirst, J.
A Learning Classifier System with Mutual-Information-Based Fitness
Evolutionary Intelligence
Year accepted 2010

Bacardit, J., Stout M. Hirst, J. D., Valencia, A. Smith, R. E. and Krasnogor, N.
Automated Alphabet Reduction for Protein Datasets
BMC Bioinformatics
Year 2009 **Volume** 10:6 **Page(s)**

Stout, M., Bacardit, J., Hirst, J. D., Smith, R. E., Krasnogor, N.
Prediction of topological contacts in proteins using learning classifier systems
Soft Computing
Year 2009 **Volume** 11:3 **Page(s)** 245-258
Publisher Springer

R. E. Smith and M. K. Jiang
A Learning Classifier System with Mutual-Information-Based Fitness
Learning Classifier Systems
Year 2008 **Volume** LNCS 4998 **Page(s)** 136-153
Publisher Springer

Coffin, D., and R. E. Smith
Linkage Learning in Estimation of Distribution Algorithms
Linkage in Evolutionary Computation
Year 2008 **Volume** Studies in Computational Intelligence 157 **Page(s) 141-156**
Publisher Springer

B. Ravichandran, A. Ghandhi, and R. E. Smith
Machine Learning for Robust Automatic Target Recognition
Information Fusion: The International Journal on Multi-Sensor, Multi-Source Information Fusion
Year 2007 **Volume** 8 **Page(s)** 252-264
Publisher Elsevier

Susan Stepney, Robert E. Smith, Jonathan Timmis, Andy M. Tyrrell, Mark J. Neal, Andrew N. W. Hone
Conceptual Frameworks for Artificial Immune Systems
International Journal of Unconventional Computing
Year accepted February 2005
Publisher OCP Journals

Susan Stepney, Samuel L. Braunstein, John A. Clark, Andy Tyrrell, Andrew Adamatzky, Robert E. Smith, Tom Addis, Colin Johnson, Jonathan Timmis, Peter Welch, Robin Milner, Derek Partridge.
Journeys in Non-Classical Computation II: Initial Journeys and Waypoints.
International Journal of Parallel, Emergent and Distributed Systems
Year 2006
Publisher Taylor and Francis

Susan Stepney, Samuel L. Braunstein, John A. Clark, Andy Tyrrell, Andrew Adamatzky, Robert E. Smith, Tom Addis, Colin Johnson, Jonathan Timmis, Peter Welch, Robin Milner, Derek

Partridge.
Journeys in Non-Classical Computation I: A Grand Challenge for Computing Research.
International Journal of Parallel, Emergent and Distributed Systems
Year 2005
Publisher Taylor and Francis

Brown, M. and Smith, R. E.
Directed Multi-Objective Optimization
International Journal of Computers, Systems, and Signals
Year 2005
Publisher IAAMSTAD

Smith, R. E., Bonacina, C., Kearney, P., and Merlat, W.
Embodiment of Evolutionary Computation in General Agents
Evolutionary Computation
Year 2001 **Volume** 8 **Number** 4 **Page(s)** 475-493
Publisher MIT Press

R. E. Smith , B. A. Dike , R. K. Mehra , B. Ravichandran , and A. El-Fallah
Classifier Systems in Combat: Two-Sided Learning of Maneuvers for Advanced Fighter Aircraft
Computer Methods in Applied Mechanics and Engineering
Year 2000 **Volume** 186 **Page(s)** 421-437
Publisher Elsevier

Kearney, P., Smith, R., Bonacina, C., and Eymann, T.
Integration of Computational Models Inspired by Economics and Genetics
BT Technology Journal
Year 2000 **Volume** 18 **Number** 4 **Page(s)** 150-161
Publisher Kluwer

Smith, R. E., Kearney, P. J., and Merlat, W.
Evolutionary adaptation in autonomous agent systems -- a paradigm for the emerging enterprise
BT Technology Journal
Year 1999 **Volume** 17 **Number** 4 **Page(s)** 157-167
Publisher Kluwer

Nims, J. W., Smith, R. E. and El-Keib, A. A.
Application of a Genetic Algorithm to Power Transformer Design
Electric Power Systems Research
Year 1997 **Volume** 43 **Number** 1 **Page(s)** 69-76(8)
Publisher Elsevier

Smith, R. E. and Cribbs, H. B.
Combined Biological Paradigms: A Neural, Genetics-Based Autonomous Systems Strategy
Robotics and Autonomous Systems
Year 1997 **Volume** 22 **Number** 1 **Page(s)** 65-74
Publisher Elsevier

Nims, J. W., Smith, R. E. and El-Keib, A. A.
Application of a Genetic Algorithm to Power Transformer Design
Electric Machines and Power Systems Journal
Year 1996 **Volume** 24 **Number** 6 **Page(s)** 669-680
Publisher Elsevier

Smith R. E. and Dike, B. A.
Learning Novel Fighter Combat Maneuver Rules Via Genetic Algorithms

International Journal of Expert Systems
Year 1995 **Volume** 8 **Number** 3 **Page(s)** 247-276
Publisher JAI Press

Ma, X., El-Keib, A. A. and Smith, R. E. and Ma, H.
A Genetic Algorithms--Based Approach for Thermal Unit Commitment
Electric Power Systems Research Journal
Year 1995 **Volume** 34 **Page(s)** 29-36
Publisher Elsevier

Smith, R. E. and Smuda, E.
Adaptively Resizing Populations: Algorithm, Analysis, and First Results
Complex Systems
Year 1995 **Volume** 9 **Number** 1 **Page(s)** 47-72
Publisher Complex Systems

Guleyupoglu, S. and Smith, R. E.
Prediction of Hypervelocity Orbital Debris Impact Damage to the Space Station by Neural
Mathematical and Computer Modelling Journal
Year 1995 **Volume** 21 **Number** 1/2 **Page(s)** 229-242
Publisher Pergamon

Smith, R. E.
Memory Exploitation in Learning Classifier Systems
Evolutionary Computation
Year 1995 **Volume** 2 **Number** 3 **Page(s)** 199-220
Publisher MIT Press

Smith, R. E. and Cribbs, H. B.
Is the Learning Classifier System a Type of Neural Network?
Evolutionary Computation

Year 1994 **Volume** 2 **Number** 1 **Page(s)** 19-36
Publisher MIT Press

Ding, H., El-Keib, A. A. and Smith, R. E.
Optimal Clustering of Power Networks Using Genetic Algorithms
Electric Power Systems Research Journal
Year 1994 **Volume** 30 **Page(s)** 209-214
Publisher Elsevier

Forrest, S., Javornik, B., Smith, R. E. and Perelson, A.
Using Genetic Algorithms to Explore Pattern Recognition in the Immune System
Evolutionary Computation
Year 1993 **Volume** 1 **Number** 3 **Page(s)** 191-212
Publisher MIT Press

Smith, R. E. and Forrest, S. and Perelson, A. S.
Searching for Diverse, Cooperative Populations with Genetic Algorithms
Evolutionary Computation
Year 1993 **Volume** 1 **Number** 2 **Page(s)** 127-149
Publisher MIT Press

Reynolds, S. B., Faulkner, W. B. and Smith, R. E.
A Neural Network Approach to the Inventory Range Problem
Air Force Journal of Logistics

Year 1993 **Page(s)** 7--11
Publisher Air Force Journal of Logistics

Smith, R. E. and Goldberg, D. E.
Reinforcement Learning with Classifier Systems: Adaptive Default Hierarchy Formation
Applied Artificial Intelligence
Year 1992 **Volume** 6 **Number** 1 **Page(s)** 79-102
Publisher Hemisphere

Smith, R. E. and Goldberg, D. E.
Diploidy and Dominance in Artificial Genetic Search
Complex Systems
Year 1992 **Volume** 6 **Number** 3 **Page(s)** 251--285
Publisher Complex Systems

Invited Book Chapters

S.-H. Yu, A. Gandhe, and R. E. Smith
Fused, Multi-Spectral Automatic Target Recognition with XCS
Learning Classifier Systems in Data Mining
Year 2007 **Page(s)**
Publisher Springer

Smith, R. E., El-Fallah, A., Ravichandran, B., Mehra, R., and Dike, B. A.
The Fighter Aircraft LCS: A Real-World, Machine Innovation Application
Applications of Learning Classifier Systems
Year 2004 **Page(s)** 113-142
Publisher Springer

R. Smith and C. Bonacina
Evolutionary Computation as a Paradigm for Engineering Emergent Behaviour in Multi-Agent Systems
Intelligent Agent Software Engineering
Year 2002 **Page(s)** 118-136
Publisher Idea Group

R. E. Smith, B. A. Dike, B. Ravichandran, A. El-Fallah, and R. K. Mehra
Discovering Novel Fighter Combat Maneuvers in Simulation: Simulating Test Pilot Creativity
Creative Evolutionary Systems
Year 2001
Publisher Morgan Kaufmann

Clement, S., Halliday, J., and Smith R. E.
Memory-Efficient Code for GAs
Practical Handbook of Genetic Algorithms: Complex Coding Systems
Year 1999 **Volume** 3 **Page(s)** 407-431
Publisher CRC Press

Smith, R. E. and Cribbs, H. B.
What Can I Do With A Learning Classifier System?
Industrial Applications of Genetic Algorithms
Year 1998 **Page(s)** 299-320
Publisher CRC Press

Smith, R. E.
Derivative Methods: Classifier Systems
The Handbook on Evolutionary Computation
Year 1997
Publisher Oxford University Press

Smith, R. E.
Population Size
The Handbook on Evolutionary Computation
Year 1997
Publisher Oxford University Press

Smith, R. E. and Dike, B. A.
Application of GAs to air combat maneuvering
The Handbook on Evolutionary Computation
Year 1995
Publisher Oxford University Press

Smith, R. E.
Genetic and Evolutionary Systems
Adaptive Computing: Mathematics, Electronics, and Optics
Year 1994 **Volume** CR5 **Page(s)** 151--174
Publisher SPIE Press

Conference Papers

R. E. Smith and B. Behzadan
Mutual information neuro-evolutionary system (MINES)
IEEE Congress on Evolutionary Computation
Year 2009 **Page(s)** 1523-1529
Publisher IEEE

R. E. Smith and M. K. Jiang
MILCS in protein structure prediction with default hierarchies
Genetic and Evolutionary Computation Conference
Year 2009 **Page(s)** 953-956
Publisher ACM

D. Coffin and R. E. Smith
The Limitations of Distribution Sampling for Linkage Learning
Proceedings of the 2007 Congress on Evolutionary Computation
Year 2007
Publisher IEEE

R. E. Smith and M. K. Jiang
A Learning Classifier System with Mutual-Information-Based Fitness
Proceedings of the 2007 Congress on Evolutionary Computation
Year 2007
Publisher IEEE

R. E. Smith and M. K. Jiang
MILCS: A Learning Classifier System with Mutual-Information-Based Fitness
Proceedings of the 2007 International Workshop on Learning Classifier Systems
Year 2007
Publisher ACM

R. E. Smith and M. K. Jiang
MILCS: A Mutual Information Learning Classifier System
Proceedings of GECCO 2007
Year 2007
Publisher ACM

A. Gandhe, S. H. Yu, R. Mehra and R. E. Smith
Fused, Multi-Spectral Automatic Target Recognition with XCS
Proceedings of GECCO 2007
Year 2007
Publisher ACM

D. Coffin and R. E. Smith
Why Is Parity Hard for Estimation of Distribution Algorithms?
Proceedings of GECCO 2007
Year 2007
Publisher ACM

R. E. Smith
An Iterative Mutual Information Histogram Technique for Linkage Learning in Evolutionary Algorithms
Proceedings of the Congress on Evolutionary Computation
Year 2005
Publisher IEEE

B. Ravichandran, A. Ghandhi, and R. E. Smith
XCS for Robust Automatic Target Recognition
Proceedings of the Genetic and Evolutionary Computation Conference (GECCO)
Year 2005
Publisher ACM

B. Ravichandran, A. Ghandhi, and R. E. Smith
Machine Learning for Robust Automatic Target Recognition
Proceedings of The SPIE Conference on Algorithms for Synthetic Aperture Radar Imagery XII (OR49)
Year 2005
Publisher SPIE

Susan Stepney, Robert E. Smith, Jonathan Timmis, Andy M. Tyrrell.
Towards a Conceptual Framework for Artificial Immune Systems
Proceedings of the Third International Conference on Artificial Immune Systems
Year 2004 **Volume** LNCS 3239 **Page(s)** 53-64
Publisher Springer

Susan Stepney, John A. Clark, Colin G. Johnson, Derek Partridge, Robert E. Smith
AIS and the Grand Challenge for Non-Classical Computation
Proceedings of the Second International Conference on Artificial Immune Systems
Year 2003 **Volume** LNCS 2787 **Page(s)** 204-216
Publisher Springer

Mitja Lenič, Petra Povalej, Werner Brunck, Enis Avdičaušević, Robert E. Smith
PROCOMPLEX: Analysing Project Complexity Using Chaos Theory
Proceedings of the 7th IASTED International Conference on Software Engineering and Applications
Year 2003

M. Brown and R. E. Smith
Effective Use of Directional Information in Multi-Objective Evolutionary Computation
Proceedings of the Genetic and Evolutionary Computation Conference, GECCO 2003
Year 2003
Publisher Springer
Note Nominated for a Best Paper Award

R. E. Smith and C. Bonacina
Mating Restriction and Niching Pressure: Results from Agents and Implications for General EC
Proceedings of the Genetic and Evolutionary Computation Conference, GECCO 2003
Year 2003 **Page(s)** 118-136
Publisher Springer

M. Danek and R. E. Smith
XCS Applied to Mapping FPGA Architectures
Proceedings of the Genetic and Evolutionary Computation Conference, GECCO 2002
Year 2002 **Page(s)** 912-919
Publisher Morgan Kaufmann

B. Ravichandran, A. Gandhe, M. Perloff, R. K. Mehra, R. E. Smith, and L. Bush.
CMARS: Cruise Missile Autonomous Routing System
Proceedings of the 69th Military Operations Research Society Symposium
Year 2001
Publisher **Proceedings Classified**

Smith, R. E., Dike, B. A., Ravichandran, B., El-Fallah, A., and Mehra, R. K.
Two-Sided, Genetics-Based Learning to Discover Novel Fighter Combat Maneuvers
Lecture Notes in Computer Science: *Applications of Evolutionary Computing (Evoworkshops 2001)*
Year 2001 **Number** 2037 **Page(s)** 233-242
Publisher Springer

Smith, R. E. and Smith, J.
New Methods for Tunable, Random Landscapes
Foundations of Genetic Algorithms 6
Year 2001 **Page(s)** 47-68
Publisher Morgan Kaufmann

W. Andy Wright, Robert E. Smith, Martin Danek, and Phillip Greenway
A Generalisable Measure of Self-Organization and Emergence
Artificial Neural Networks - ICANN 2001
Year 2001 **Volume** LNC **Number** 2130 **Page(s)** 857-864
Publisher Springer Verlag

Smith, R. E., Kearney, P. K., Eymann, T. and Bonacina, C.
Integrating Economics and Genetics Models in Information Ecosystems
Proceedings of the 2000 Congress on Evolutionary Computation
Year 2000 **Page(s)** 959-966
Publisher IEEE

Wright, W. A., Smith, R. E., Danek, M. A., and Greenway, P.
A Measure of Emergence in an Adapting, Multi-Agent Context
SAB 2000 Proceedings Supplement
Year 2000 **Page(s)** 20-27
Publisher ISAB

Smith, R. E., Dike, B. A., Ravichandran, B., El-Fallah, A., and Mehra, R. K.
The Fighter Aircraft LCS: A Case of Different LCS Goals and Techniques
Proceedings of The 1999 Genetic and Evolutionary Computation Conference Workshop Program
Year 1999 **Page(s)** 282-289
Publisher Elsevier

Smith, R. E. and Smith, J.
An Examination of Tunable, Random Search Landscapes
Foundations of Genetic Algorithms 5
Year 1998
Publisher Morgan Kaufmann

Smith, R. E. and Taylor, N.
A Framework for Evolutionary Computation in Agent-Based Systems
Proceedings of the 1998 International Conference on Intelligent Systems
Year 1998 **Page(s)** 221-224
Publisher ISCA Press

Smith, R. E.
Analytical Design of Reinforcement Learning Tasks
Proceedings of the 1998 Florida Artificial Intelligence Research Symposium
Year 1998 **Page(s)** 362-366
Publisher AAAI Press

Smith, R. E. and Holtkamp, D.
A Representation of Permutation Optimization with a Combinatorial Genetic Algorithm
Proceedings of the Fifth International Conference on Intelligent Systems
Year 1996 **Page(s)** 31-34
Publisher International Society for Computers and Their Applications

Pereda, R. and Smith, R. E.
Searching for Self-Referencing Pangrams with a Genetic Algorithm
Proceedings of the Fifth Annual International Conference on Intelligent Systems
Year 1996 **Page(s)** 160-163
Publisher International Society for Computers and Their Applications

Cribbs, H. B. and Smith, R. E.
Classifier System Renaissance: New Analogies, New Directions
Proceedings of the First Genetic Programming Conference
Year 1996 **Page(s)** 547-551
Publisher MIT Press

Smith, R. E. and Cribbs, H. B.
Cooperative versus competitive elements in coevolutionary systems
Proceedings of the Fourth International Conference on the Simulation of Adaptive Behaviour
Year 1996 **Page(s)** 497-505
Publisher MIT Press

Kumaralingam, R., Smith, R. E., and Miller, D.
Comparison of Neural Network Training Using Backprop and Levenberq-Marquardt Algorithm for Multi-Product Forecasting
Proceedings of the 1995 Annual Meeting of the Decision Sciences Institute
Year 1995
Publisher DSI

Raina, S., Smith, R. E. and Mellichamp, J. M.
A Neural Network Approach to Software Development Cost Estimation Using Function Points
Proceedings of the 1995 Annual Meeting of the Decision Sciences Institute
Year 1995
Publisher DSI

Chapman, W. and Smith, R. E.
Optimal Allocation of Interceptors for Theater Missile Defense Using the Genetic Algorithm
Proceedings of the Fourth Golden West International Conference on Intelligent Systems
Year 1995
Publisher ISCA

Kukreja, A. and Smith, R. E.
Application of Neural Networks in Forecasting Demand
Proceedings of the 1995 Southwest Decision Sciences Institute Conference
Year 1995
Publisher DSI

Smith, R. E. and Gray, B.
Co-Adaptive Genetic Algorithms: An Example in Othello Strategy
Proceedings of the 1994 Florida Artificial Intelligence Research Symposium
Year 1994 **Page(s)** 259-264
Publisher Florida AI Research Society

Smith, R. E., Dike, B. A. and Stegmann, S. A.
Inheritance in Genetic Algorithms
Proceedings of the ACM 1995 Symposium on Applied Computing
Year 1994 **Page(s)** 345-350
Publisher

Dike, B. and Smith, R. E.
Tactics Discovery Using Genetic Algorithms and Machine Learning
Proceedings of the 62nd Military Operations Research Society Symposium
Year 1994
Publisher Proceedings Classified

Kloske, D. A. and Smith, R. E.
Bulk Cable Routing Using Genetic Algorithms
Industrial and Engineering Applications of Artificial Intelligence and Expert Systems
Year 1994 **Page(s)** 427-431
Publisher Gordon and Breach Science

Ma, X., El-Keib, A. A. and Smith, R. E.
A Genetic Algorithm--Based Approach to Economic Dispatch of Power Systems
Proceedings of IEEE Southeastcon '94
Year 1994 **Page(s)** 212-216
Publisher IEEE

Smith, R. E., Forrest, S. and Perelson, A. S.
Population Diversity in an Immune System Model: Implications for Genetic Search
Foundations of Genetic Algorithms 2
Year 1993 **Page(s)** 153--165
Publisher Morgan-Kaufmann

Bhattacharyya, S. K. and Smith, R. E. and Haskew, T.
A Neural Network Based Approach to Transformer Fault Diagnosis Using Dissolved Gas
Proceedings 1993 North American Power Symposium
Year 1993 **Page(s)** 125-128
Publisher IEEE Computer Society Press

Dike, B. A. and Smith, R. E.
Application of Genetic Algorithms to Air Combat Maneuvering
Proceedings of the Fifth Workshop on Neural Networks: Academic/Industrial/NASA/Defense
Year 1993 **Volume** 2204 **Page(s)** 84-94
Publisher SPIE

Lopez, L. R. and Smith, R.E.
Evolving Artificial Insect Brains for Artificial Compound Eye Robotics
From Animals to Animats 2: Proceedings of the 2nd Simulation of Adaptive Behaviour Conference
Year 1993 **Page(s)** 425--430
Publisher MIT Press

Smith, R. E.
Adaptively Resizing Populations: An Algorithm and Analysis
Proceedings of the Fifth International Conference on Genetic Algorithms
Year 1993 **Page(s)** 653
Publisher Morgan Kaufman

Lopez, L. R. and Smith, R. E.
A Genetic Fuzzy Expert for Compound Eye Robot Control
Proceedings of the IEEE International Workshop on Emerging Technologies and Factory
Year 1992
Publisher IEEE

Guleyupoglu, S. and Smith, R. E.
A Neural Network Approach to Predicting Orbital Debris Impact Damage to the Space Station
Intelligent Engineering Systems through Artificial Neural Networks
Year 1992 **Volume** 2 **Page(s)** 699-705
Publisher ASME Press

Song, Q and Smith, R. E.
Defuzzification via Neural Networks
Intelligent Engineering Systems through Artificial Neural Networks
Year 1992 **Volume** 2 **Page(s)** 363-368
Publisher ASME Press

El-Keib, A. A., Ding, H., Carroll, C. C., Haskew, T., Smith, R. E., Black, L. and Frazier, G.
Current Challenges for the Electric Power Industry
Proceedings of the Workshop on Real-Time Control and Operation of Electric Power Systems
Year 1991
Publisher ORNL

Kargupta, H. and Smith, R. E.
System Identification with Evolving Polynomial Networks
Proceedings of the Fourth International Conference on Genetic Algorithms
Year 1991 **Page(s)** 370-376
Publisher Morgan-Kaufmann

Smith, R. E. and Goldberg, D. E.
Variable Default Hierarchy Separation in a Classifier System
Foundations of Genetic Algorithms
Year 1991 **Page(s)** 148-167
Publisher Morgan-Kaufmann

Smith, R. E. and Goldberg, D. E.

Reinforcement Learning with Classifier Systems
Proceedings of AI, Simulation and Planning in High Autonomy Systems
Year 1990 **Page(s)** 184--192
Publisher IEEE Computer Society

Smith, R. E. and Valenzuela-Rendon, M.
A study of rule set development in a learning classifier system
Proceedings of the Third International Conference on Genetic Algorithms
Year 1989 **Page(s)** 340--346
Publisher Morgan-Kaufmann

Smith, R. E.
Diploid genetic algorithms for search in time varying environments
Proceedings of the 25th Annual Southeast Regional Conference of the ACM
Year 1987 **Page(s)** 175--178
Publisher ACM

Goldberg, D. E. and Smith, R. E.
Nonstationary function optimization using genetic algorithms with dominance and diploidy
Proceedings of the Second International Conference on Genetic Algorithms
Year 1987 **Page(s)** 59--68
Publisher Morgan-Kaufmann

Wilson, H. B. and Smith, R. E.
Optimized flexural design of variable depth beams
Developments in Mechanics: Proceedings of the 20th Midwestern Mechanics Conference
Year 1987 **Volume** 14(a) **Page(s)** 312-317
Publisher Purdue University Press

Graduate Student Advising

Doctoral Dissertations Supervised:

2009 Max Kun Jiang
MILCS: A Mutual Information based Learning Classifier System
University College London
Department of Computer Science

2004 Martin Danek
Timing-Driven Physical Design for FPGAs
Czech Technical University
Department of Computer Science and Engineering
Second Supervisor

2003 Bonacina, Claudio
Evolutionary Computation in Multi-Agent Systems: Lessons on Diversity and Co-Evolutionary Control
University of the West of England, Bristol
Department of Computing, Engineering, and Mathematical Sciences

2000 Cribbs, Brown
An Adaptive Agent for Flight Testing
University of Alabama, Tuscaloosa
Department of Engineering Science and Mechanics

Doctoral Dissertation Committees Served:

Internal Examiner
2002

Krasnogor, Natalio
Studies on the Theory and Design Space of Memetic Algorithms
University of the West of England
Faculty of Computing Engineering, and Mathematical Sciences

External Examiner
2001
Kovacs, Tim
A Comparison of Strength and Accuracy-Based Fitness in Learning Classifier Systems
University Of Birmingham (UK)
Faculty of Computer Science

External Examiner
2001
Margetts, Stephen
Adaptive Genotype to Phenotype Mapping for Evolutionary Algorithms
Cardiff University (Wales)
Faculty of Computer Science

Internal Examiner
2000
Ahluwalia, Manu
Coevolving Functions in Genetic Programming
University of the West of England
Faculty of Computer Studies and Mathematics

Internal Examiner
1999
Tomlinson, Andy
Corporate Classifier Systems
University of the West of England
Faculty of Computer Studies and Mathematics

Internal Examiner
1999
Melhuish, Chris
Strategies for Collective Minimalist Mobile Robots
University of the West of England
Faculty of Engineering

External Advisor
1998
Terashima-Marin, Hugo
Combinations of GAs and CSP Strategies for Solving Examination Timetabling Problems
Monterey Tech (Mexico)
Department of Computer Science

Committee Member
1997
Deb, Debasis
Development of the Longwall Strata Control and Maintenance System (LoSCoMS)
University of Alabama
Department of Mineral Engineering

Committee Member
1993
Kim, Hunmo
Artificial neural network for identification and tracking control of a flexible joint robot
University of Alabama

Department of Mechanical Engineering

Master of Science Committees Chaired:

1995 Cribbs, Brown
Cooperative learning classifier systems: A neural network approach
University of Alabama, Tuscaloosa
Department of Engineering Science and Mechanics

1994 Williams, Reginald
Improving petroleum well production via genetic algorithms
University of Alabama, Tuscaloosa
Department of Engineering Science and Mechanics

Master of Science Committees Co-Chaired:

1996 Ferguson, Scott
Information Filtering Profile Generation Using Genetic Algorithms and Co-Evolution
University of Alabama in Birmingham
Department of Computer Science

1992 Cantrell, Chris
A parallel bus architecture for artificial neural networks
University of Alabama, Tuscaloosa
Department of Electrical and Computer Engineering

Master of Science Committees Served:

1993 Smuda, E.
Combinations of genetic algorithms and neural networks with aerospace control applications
University of Alabama, Tuscaloosa
Department of Aerospace Engineering

1992 Montgomery, Laddin
Structural control using connectionist learning procedures
University of Alabama, Tuscaloosa
Department of Aerospace Engineering

1991 West, J. D.
Dependence analysis of array variables in program loops for parallel processing
University of Alabama, Tuscaloosa
Department of Electrical and Computer Engineering

1991 Smith, D. J.
Task allocation for efficient parallel processing using a parallel genetic algorithm
University of Alabama, Tuscaloosa
Department of Electrical and Computer Engineering

1991 Callahan, Kevin
Strength-to-weight and stiffness-to-weight optimization of laminates using genetic algorithms
University of Alabama, Tuscaloosa
Department of Aerospace Engineering

Research Projects

Investigator(s) N. Krasnogor, J.D. Hirst, E.K. Burke (U. Nottingham) and Smith, R. E. (21%)
Topic Robust Prediction with Explanatory Power for Protein Structure and Related Prediction Problems
Client Agency EPSRC
Date Range (contract pending) February, 2005 - February, 2008
Approximate Value £227,602

Investigator(s) Kokol, P. (University of Maribor, Slovenia), Smith, R. E. (14%). et al.
Topic METOD: MetaTool for Educational Tool Design
Client Agency European Union
Date Range (contract pending) Feb 2005 - Sept, 2006
Approximate Value £190,700

Investigator(s) Smith, R. E.
Topic CARD: Complexity in Aerospace Reliability and Design
Client Agency EPSRC/Airbus (CASE Award)
Date Range March, 2003 - March, 2006
Approximate Value £64,596

Investigator(s) Scanlan, J. and R.E. Smith
Topic DATUM: Design Analysis Tool for Unit Cost Modelling
Client Agency Rolls Royce
Date Range March, 2003 - March, 2004
Approximate Value £175,000

Investigator(s) Kokol, P. (University of Maribor, Slovenia) and Smith, R. E.
Topic SQUFOL: Complexity Based Software Metrics
Client Agency European Union
Date Range June, 2002 - June, 2003
Approximate Value £16,694

Investigator(s) **Smith, R. E.**
Topic Examining Evolved Emergent Multi-Agent Behaviour
Client Agency British Aerospace, Sowerby Research Centre
Date Range June, 1999 - June, 2000
Approximate Value £15,500

Investigator(s) Smith, R. E.
Topic A Demonstration of Evolutionary Computation Applied to Synthetic Environments for UAV Combat Scenarios
Client Agency The Defence Evaluation and Research Agency (DERA)
Date Range December, 1999 - March, 2000
Approximate Value £28,230

Investigator(s) Smith, R. E.
Topic Examining Coevolution in a Framework of Producer/Consumer
Client Agency British Telecom
Date Range June, 1999 - June, 2002
Approximate Value £52,230

Investigator(s) Cribbs, H. B. and Smith, R. E.
Topic Genetics-Based Adaptive Agents for Strategy Learning in Aerospace Applications
Client Agency NASA
Date Range August 1996 - August 1999
Approximate Value $66,000

Investigator(s) Smith, R. E.
Topic Genetic Algorithm Research in HARPOON Missile Application
Client Agency McDonnell Douglas Corporation
Date Range April 1995-December 1995
Approximate Value $9,408

Investigator(s) Smith, R. E.
Topic National Science Foundation Research Experiences for Undergraduates Supplement
Client Agency National Science Foundation
Date Range January, 1993 - January, 1996
Approximate Value $26,000

Investigator(s) Benson, D. J., Carlson, E. A., Chen, H. C., Fang, J. H., Groshong, R. H., Smith, R. E., Visscher, P.B.
Topic Petroleum Reservoir Characterization
Client Agency U.S. Department of Energy
Date Range August, 1994 - August, 1996
Approximate Value $818,173

Investigator(s) Smith, R. E.
Topic Study of X-13 Tactics for Flight Test Planning
Client Agency McDonnell-Douglas Corporation
Date Range May, 1991 - December, 1994
Approximate Value $59,042

Investigator(s) Smith, R. E.
Topic Automating the Application of Genetic Algorithms
Client Agency NASA Johnson Space Centre
Date Range August, 1992 - May, 1993
Approximate Value $20,000

Investigator(s) Smith, R. E.
Topic Genetic Algorithms in Connectionist Networks for Reinforcement Learning Control
Client Agency The National Science Foundation
Date Range August, 1992 - August, 1995
Approximate Value $98,054

References

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