GECCO 2004 Conference Organization

Conference Committee

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    Dipankar Dasgupta, Artificial Immune Systems
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    Paul Darwen, Coevolution
    Hans-Georg Beyer, Evolution Strategies, Evolutionary Programming
    Dario Floreano, Evolutionary Robotics
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    Andy Tyrrell, Evolvable Hardware
    Dirk Thierens, Genetic Algorithms
    Lee Spector, Genetic Programming
    Pier Luca Lanzi, Learning Classifier Systems
    Andrea Tettamanzi, Real World Applications
    Mark Harman, Search Based Software Engineering

Late Breaking Papers Chair: Maarten Keijzer
Workshops Chair: Stefano Cagnoni

Workshop Organizers

E. Costa, F. Pereira and G. Raidl, Application of Hybrid Evolutionary Algorithms to Complex Optimization Problems
S. C. Upton and D. E. Goldberg, Military and Security Applications of Evolutionary Computation
H. Lipson, E. De Jong and J. Koza, Modularity, Regularity and Hierarchy in Open-Ended Evolutionary Computation
H. Suzuki and H. Sawai, Evolvability in Evolutionary Computation (EEC)
I. Parmee, Interactive Evolutionary Computing
M. Pelikan, K. Sastry and D. Thierens, Optimization by Building and Using Probabilistic Models (OBUPM 2004)
W. Stolzmann, P.L. Lanzi and S.W. Wilson, International Workshop on Learning Classifier Systems (IWLCS)
J. Ocenasek, S. Mueller, S. Kern, N. Hansen, and P. Koumoutsakos, Learning, Adaptation, and Approximation in EC
M. O'Neill and C. Ryan, Grammatical Evolution (GEWS 2004)
T. Yu, Neutral Evolution in Evolutionary Computation
J.F. Miller, Regeneration and Learning in Developmental Systems (WORLDS)

I. Garibay, G. Holifield and A.S. Wu, Self-Organization on Representations for Genetic and Evolutionary Algorithms
A. Wright and N. Richter, Evolutionary Computation Theory
Jason H. Moore and Marylyn D. Ritchie, Biological Applications of Genetic and Evolutionary Computation (BioGEC 2004)
T. Riopka, Graduate Student Workshop
M.M. Meysenburg, Undergraduate Student Workshop

Tutorial Speakers

Erik Goodman, Genetic Algorithms
John Koza, Genetic Programming
Thomas Bäck, Evolution Strategies
Kenneth De Jong, A Unified Approach to EC
Tim Kovacs, Learning Classifier Systems
Martin Pelikan, Probabilistic Model-Building GAs
Russ Eberhart, Particle Swarm Optimization
Steffen Christensen and Mark Wineberg, Introductory Statistics for Evolutionary Computation
W.B. Langdon, Genetic Programming Theory
Jonathan Rowe, Genetic Algorithm Theory
J. Foster and W. Banzhaf, Biological Applications
Chris Stephens, Taxonomy and Coarse Graining in EC
Darrell Whitley, No Free Lunch
Kalyanmoy Deb, Multiobjective Optimization with EC
Ingo Wegener, Computational Complexity and EC
Julian Miller, Evolvable Physical Media
Tetsuya Higuchi, Evolvable Hardware Applications
Franz Rothlauf, Representations
Lee Altenberg, Theoretical Population Genetics
Ingo Rechenberg, Bionik: Building on Biological Evolution
Marco Tomassini, Spatially Structured EAs
Hideyuki Takagi, Interactive Evolutionary Computation
Garry Greenwood, Evolutionary Fault Tolerant Systems
Maarten Keijzer, GP for Symbolic Regression
Conor Ryan, Grammatical Evolution
Dario Floreano, Evolutionary Robotics
Al Biles, Evolutionary Music
Peter Ross, EAs for Combinatorial Optimization
Jürgen Branke, Optimization in Dynamic Environments
Ian Parmee, Evolutionary Algorithms for Design
Xin Yao, Evolving Neural Networks
Arthur Kordon, Guido Smits and Mark Kotanchek, Industrial Evolutionary Computing

Keynote Speakers

Leroy Hood, President, Institute for Systems Biology, Seattle
François Baneyx, Professor of Chemical Engineering and adjunct Professor of Bioengineering, Center for Nanotechnology at University of Washington, Seattle

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A Word from the Chair of ISGEC

You may have just picked up your proceedings, in hard copy and CD-ROM, at GECCO 2004. We've chosen once again to work with Springer-Verlag, including our proceedings as part of their Lecture Notes in Computer Science (LNCS) series, which makes them available in many libraries, broadening the impact of the GECCO conference.

If you're now at GECCO 2004, we, the organizers, hope your experience is memorable and productive, and you will find the proceedings to be of continuing value. The opportunity for first-hand interaction among authors and other participants at GECCO is a big part of what makes it exciting, and we all hope you come away with many new insights and ideas.

If you were unable to come to GECCO 2004 in person, I hope you'll find many stimulating ideas from the world's leading researchers in evolutionary computation reported in the proceedings, and that you'll be able to participate in future GECCO conferences, for example, next year, in the Washington, DC area!

The International Society for Genetic and Evolutionary Computation, sponsoring organization of the annual GECCO conferences, is a young organization, formed through merger of the International Society for Genetic Algorithms (sponsor of the ICGA conferences) and the organization responsible for the annual Genetic Programming Conferences. It depends strongly on the voluntary efforts of many of its members. It is designed to promote not only exchange of ideas among innovators and practitioners of well-known methods such as genetic algorithms, genetic programming, evolution strategies, evolutionary programming, learning classifier systems, etc., but also the growth of newer areas such as artificial immune systems, evolvable hardware, agent-based search, and others. One of the founding principles is that ISGEC operates as a confederation of groups with related but distinct approaches and interests, and their mutual prosperity is assured by their representation in the program committees, editorial boards, etc., of the conferences and journals with which ISGEC is associated. This also insures that ISGEC and its functions continue to improve and evolve with the diversity of innovation that has characterized our field.

The ISGEC saw many changes last year, in addition to its growth in membership. We anticipate yet more advances in the next year. A second round of Fellows and Senior Fellows will be added to our society this year, after last year's inaugural group. GECCO continues to be subject to dynamic development – the many new tutorials, workshop topics, and tracks will evolve again next year, seeking to follow and encourage the developments of the many fields represented at GECCO. The best paper awards will be presented for the third time at this GECCO, and we hope many of you will participate in the balloting. This year, most presentations at GECCO will once again be made electronically, displayed with the LCD projectors that ISGEC purchased last year. Our journals, Evolutionary Computation and Genetic Programming and Evolvable Machines, continue to prosper, and we are exploring ways to make them even more widely available.

The ISGEC is your society, and we urge you to become involved or continue your involvement in its activities, to the mutual benefit of the whole evolutionary computation community. Three members were re-elected to five-year terms on the Executive Board at GECCO 2003 – Ken De Jong, David Goldberg, and Erik Goodman.

Since that time, the ISGEC has been active on many issues, through actions of the Board and our two Councils – the Council of Authors and the Council of Conferences. Last year, the Board voted to combine the Council of Authors and Council of Editors into a single body, the Council of Authors.

The organizers of GECCO 2004 are shown in this front matter, but special thanks are due to Riccardo Poli, General Chair, and Kalyanmoy Deb, Editor-in-Chief of the proceedings, as well as to John Koza and Dave Goldberg, the Business Committee. Each year has seen many new features in GECCO, and it is the outstanding efforts of this group that "make GECCO come together."

Of course, we all owe a great debt to those who chaired or served on the various Core and Special Program Committees that reviewed all of the papers for GECCO 2004. Without their effort, it would not be possible to put on a meeting of this quality.

Another group also deserves the thanks of GECCO participants and ISGEC members – the members of the ISGEC Executive Board and Councils, who are listed on the next page. I am particularly indebted to them for their thoughtful contributions to the organization and their continuing demonstrations of concern for the welfare of the ISGEC.

I invite you to communicate with me (goodman@egr.msu.edu) if you have questions or suggestions for ways ISGEC can be of greater service to its members, or if you would like to get more involved in ISGEC and its functions.

Don't forget about the eighth Foundations of Genetic Algorithms (FOGA) workshop, also sponsored by ISGEC, the biennial event that brings together the world's leading theorists on evolutionary computation. FOGA will be held January 5–9, 2005 at the University of Aizu, Japan, which will be a fascinating place to visit for those of us who haven't spent much time in Japan. I hope you'll join many of your fellow ISGEC members there!

Finally, I hope to see you at GECCO 2005 in the Washington, DC area. Get your ideas for new things for GECCO 2005 to Una-May O'Reilly, the General Chair of GECCO 2005, when you see her at GECCO 2004, and please check the ISGEC Web site, www.isgec.org, regularly for details as the planning for GECCO 2005 continues.

<div align="right">
Erik D. Goodman
ISGEC Chair
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Council of Conferences, Una-May O'Reilly (chair)

The purpose of the Council of Conferences is to provide information about the numerous conferences that are available to researchers in the field of Genetic and Evolutionary Computation, and to encourage them to coordinate their meetings to maximize our collective impact on science.

ACDM, Adaptive Computing in Design and Manufacture, Bristol, UK, April 2004, Ian Parmee, Ian.Parmee@uwe.ac.uk

EuroGP, European Conference on Genetic Programming, Coimbra, Portugal, April 2004, Ernesto Costa, ernesto@dei.uc.pt

EvoCOP, European Conference on Evolutionary Computation in Combinatorial Optimization, Coimbra, Portugal, April 2004, Günther Raidl, raidl@ads.tuwien.ac.at and Jens Gottlieb, jens.gottlieb@sap.com

EvoWorkshops, European Evolutionary Computing Workshops, Portugal, Coimbra, Portugal, April 2004, Stefano Cagnoni, cagnoni@ce.unipr.it

FOGA, Foundations of Genetic Algorithms Workshop, Fukushima, Japan, January 2005, Lothar M. Schmitt, info@foga05.org

GECCO 2004, Genetic and Evolutionary Computation Conference, Seattle, USA, June 2004, Riccardo Poli, rpoli@essex.ac.uk

PATAT 2004, 5th International Conference on the Practice and Theory of Automated Timetabling, Pittsburgh, USA, August 2004, Edmund Burke, ekb@cs.nott.ac.uk

PPSN-VIII, Parallel Problem Solving from Nature, Birmingham, UK, September 2004, Xin Yao, xin@cs.bham.ac.uk

SAB, 8th international conference on Simulation of Adaptive Behavior, Los Angeles, USA, July 2004, John Hallam, john@mip.sdu.dk and Jean-Arcady Meyer, jean-arcady.meyer@lip6.fr

EMO 2005, 3rd Evolutionary Multi-Criterion Optimization, Guanajuato, Mexico, March 2005, Carlos Coello Coello, coello@cs.cinvestav.mx

An up-to-date roster of the Council of Conferences is available online at http://www.isgec.org/conferences.html.

Papers Nominated for Best Paper Awards

In 2002, ISGEC created a best paper award for GECCO. As part of the double blind peer review, the reviewers were asked to nominate papers for best paper awards. The Chairs of Core and Special Program Committees selected the papers that received the most nominations for consideration by the conference. One winner for each program track was chosen by secret ballot of the GECCO attendees after the papers had been presented in Chicago. The titles and authors of all 32 papers nominated for the best paper award for GECCO 2004 are given below:

Robot Trajectory Planner Using Multi-objective Genetic Algorithm Optimization: E.J. Solteiro Pires, J.A. Tenreiro Machado, and P.B. de Moura Oliveira   I-615

Evolved Motor Primitives and Sequences in a Hierarchical Recurrent Neural Network: Rainer Paine and Jun Tani   I-603

Actuator Noise in Recombinant Evolution Strategies on General Quadratic Fitness Models: Hans-Georg Beyer   I-654

An Analysis of the $(\mu + 1)$ EA on Simple Pseudo-Boolean Functions: Carsten Witt   I-761

On the Choice of the Population Size: Tobias Storch   I-748