Conference Schedule

GECCO-99

1999 Genetic and Evolutionary Computation Conference

Eighth International Conference on Genetic Algorithms (ICGA-99)
Fourth Annual Genetic Programming Conference (GP-99)

July 13 – 17, 1999
Omni Rosen Hotel
Orlando, Florida USA

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Registration Hours

Tuesday	7:30 am - 5:30 pm
Wednesday	8:00 am - 5:30 pm
Thursday	8:00 am - 5:30 pm
Friday	8:00 am - 5:00 pm
Saturday	8:30 am - 2:00 pm

Welcome to GECCO-99

The 1999 Genetic and Evolutionary Computation Conference (GECCO-99) combines the field's longest running conference (ICGA) and the field's two largest conferences (GP and ICGA) to create a unique event that brings together the best in research in the growing field of genetic and evolutionary computation (GEC).

The GECCO conference continues the tradition of the GP and ICGA conferences of bringing together researchers from the entire spectrum of research in genetic and evolutionary computation, including genetic algorithms, classifier systems, genetic programming, evolvable hardware, DNA and molecular computing, evolution strategies, evolutionary programming, artificial life, adaptive behavior, agents, as well as real-world applications in all of these areas.

Each paper submitted to the GECCO conference was peer-reviewed by one of the independent program committees (the "demes") specializing in various aspects of genetic and evolutionary computation, and competition was tough. Of the 447 papers submitted, only 235 were published in the proceedings as full papers. Moreover, there was no easy way into the proceedings through special invitations or sessions. All papers faced the scrutiny of a demanding review process and limited page space.

Having said this, the conference has been designed to encourage an intimacy rarely achieved at conferences this large. Annie Wu organized 15 bird-of-feather workshops and put together an informal workshop proceedings to encourage small groups to discuss pressing problems in a variety of areas. Una-May O'Reilly organized a PhD workshop with research presentations by 23 budding GEC researchers, where new researchers can receive constructive criticism from old hands. A tutorial schedule with 24 tutorials by some of the best names in the field has something for novices and experienced hands across the spectrum of GEC endeavor. And then there is you. As of this writing there are over 550 people registered to attend the conference. The conference is set up with long breaks and lunch periods to encourage discussion among new and old friends alike, and we are expecting great things both in and out of our meeting rooms over the next five days.

Thank you for choosing to come to GECCO-99 and have a terrific conference.

Dave Goldberg
GECCO-99 Conference Chair

Tuesday Program at a Glance

Workshop Session I							
8:30 am - 10:15 am	PhD Workshop I Salon 16	Coevolutionary Algorithms Signature 2	Multicriteria I Salon 11	Foundations of GP Salon 12	Evolutionary Telecom Salon 14	IWLCS I Salon 15	
10:15 am – 10:45 am **Coffee Break**							
Workshop Session II							
10:45 am – 12:30 pm	PhD Workshop II Salon 16	Computational Models Signature 2	Multicriteria II Salon 11	Parallel GEC Salon 12	Advanced Grammars Salon 14	IWLCS II Salon 15	DNA Computing Salon 17
12:30pm – 2:00 pm **Lunch**							
Workshop Session III							
2:00 pm – 3:45 pm	PhD Workshop III Salon 16	Dynamic Optimization I Signature 2	Evolvability I Salon 11	Methodology, Pedagogy, and Philosophy Salon 12	Sensor Evolutioan I Salon 14	IWLCS III Salon 15	
3:45 pm – 4:15 pm **Coffee Break**							
Workshop Session IV							
4:15 pm – 6:00 pm	PhD Workshop III Salon 16	Dynamic Optimization II Signature 2	Evolvability II Salon 11	GEC Visualization Salon 12	Sensor Evolution II Salon 14	IWLCS III Salon 15	
No Conference activities planned in the evening							

Tuesday, July 13, 1999

8:30 am - 10:15 am	**Room**	**Workshop Session I**
	Salon 16	*PhD Workshop I* Conor Ryan, U. of Limerick
	Signature 2	*Coevolutionary algorithms with coevolving agents* Colin G. Johnson, Bjorn Olsson, and Steve Romaniuk
	Salon 11	*Multi-criterion optimization using evolutionary methods I* Kalyanmoy Deb
	Salon 12	*Foundations of genetic programming* Una-May O'Reilly, Thomas Haynes, Riccardo Poli, Bill Langdon, and Justinian Rosca
	Salon 14	*Evolutionary telecommunications: Past, present, and future* Mark C. Sinclair, David Corne, and George D. Smith
	Salon 15	*2nd International Workshop on Learning Classifier Systems I* Pier Luca Lanzi, Wolfgang Stolzmann, and Stewart W. Wilson
10:15 am - 10:45 am		**Coffee Break**
10:45 am - 12:30 pm	**Room**	**Workshop Session II**
	Salon 16	*PhD Workshop II* Conor Ryan, U. of Limerick
	Signature 2	*Computational models in theoretical biology* Carlo C. Maley
	Salon 11	*Multi-criterion optimization using evolutionary methods II* Kalyanmoy Deb
	Salon 12	*Evolutionary computation and parallel processing* Erick Cantu-Paz and Bill Punch
	Salon 14	*Advanced grammar techniques within genetic programming and evolutionary computation* Talib Hussain
	Salon 15	*2nd International Workshop on Learning Classifier Systems II* Pier Luca Lanzi, Wolfgang Stolzmann,

	Salon 17	*Getting our bearings in DNA computing* David Harlan Wood
12:30 pm - 2:00 pm		**Lunch**
2:00 pm - 3:45 pm	**Room**	**Workshop Session III**
	Salon 16	*PhD Workshop III* Conor Ryan, U. of Limerick
	Signature 2	*Evolutionary algorithms for dynamic optimization problems I* Juergen Branke and Thomas Baeck
	Salon 11	*Evolvability I* Paul Marrow, Mark Shackleton, Jose-Luis Fernandez-Villacanas, and Tom Ray
	Salon 12	*The methodology, pedagogy, and philosophy of genetic and evolutionary computation* Jason Daida
	Salon 14	*Evolution of sensors in nature, hardware, and simulation I* Daniel Polani, Thomas Uthmann, and Kerstin Dautenhahn
	Salon 15	*2nd International Workshop on Learning Classifier Systems III* Pier Luca Lanzi, Wolfgang Stolzmann, and Stewart W. Wilson
3:45 pm - 4:15 pm		**Coffee Break**
4:15 pm - 6:00 pm	**Room**	**Workshop Session IV**
	Salon 16	*PhD Workshop IV* Conor Ryan, U. of Limerick
	Signature 2	*Evolutionary algorithms for dynamic optimization problems II* Juergen Branke and Thomas Baeck
	Salon 11	*Evolvability II* Paul Marrow, Mark Shackleton, Jose-Luis Fernandez-Villacanas, and Tom Ray
	Salon 12	*Evolutionary computation visualization* Trevor Collins

Salon 14	*Evolution of sensors in nature, hardware, and simulation II* Daniel Polani, Thomas Uthmann, and Kerstin Dautenhahn
Salon 15	*2nd International Workshop on Learning Classifier Systems IV* Pier Luca Lanzi, Wolfgang Stolzmann, and Stewart W. Wilson

Wednesday Program at a Glance

Tutorial Session I

8:30 am - 10:15 am						
Intro to GP Salon 1	Contrasting Methodologies Salon 4	Intro to DNA Computing Salon 3	Agent-based Computational Economics Salon 9	Real World Applications Salon 10	Ant colony Optimization Salon 2	

10:15 am – 10:45 am **Coffee Break**

Tutorial Session II

10:45 am – 12:30 pm						
Analog Circuit GP Salon 1	GA Theory Salon 4	GP Data Structures Salon 3	Quantum Computing Salon 9	Adaptive Behavior, Alife, and Agents Salon 10		

12:30pm – 2:00 pm **Lunch**

Tutorial Session III

2:00 pm – 3:45 pm						
Tierra Salon 1	Messy GAs & Linkage Salon 4	Evolvable Hardware Salon 3	Intro to ES Salon 9	GEC & Neural Nets Salon 10	Classifier Systems Salon 2	Biases/GP Salon 18

3:45 pm – 4:15 pm **Coffee Break**

Tutorial Session IV

4:15 pm – 6:00 pm						
Machine Code GP Salon 1	Cellular Programming Salon 4	Theory of ES/EP Salon 3	Immune System Models Salon 9	Parallel GEAs Salon 10	GEC in Design Salon 2	

6:30 pm – 7:30 pm **Opening reception**

Ballroom A

Wednesday, July 14, 1999

8:30 am - 10:15 am	**Room**	**Tutorial Session I**
	Salon 1	*Genetic Programming* John R. Koza
	Salon 2	*An Introduction to Ant Algorithms* Marco Dorigo
	Salon 3	*Introduction to DNA Computing* Russell Deaton and Stephen A. Karl
	Salon 4	*Evolutionary Computation: Comparing and Contrasting the Different Methodologies* Kenneth DeJong
	Salon 9	*Agent-Based Computational Economics (ACE)* Leigh Tesfatsion and David McFadzean
	Salon 10	*Commercial Applications of Evolutionary Computation: Some Case Studies* Lawrence "David" Davis
10:15 am - 10:45 am		**Coffee Break**
10:45 am - 12:30 pm	**Room**	**Tutorial Session II**
	Salon 1	*Design of Electrical Circuits Using Genetic Programming* David Andre and Forrest H. Bennett III
	Salon 3	*Genetic Programming + Data Structures = Automatic Programming!* W. B. Langdon
	Salon 4	*Genetic Algorithm Theory* Michael Vose,
	Salon 9	*Quantum Computation* Lee Spector
	Salon 10	*Adaptive Behavior, Alife and Agents* Richard K. Belew and Jean-Arcady Meyer
12:30 pm - 2:00 pm		**Lunch**

2:00 pm - 3:45 pm	**Room**	**Tutorial Session III**
	Salon 1	*Tierra* Thomas Ray
	Salon 2	*Structure and Function of the XCS Classifier System* Stewart W. Wilson
	Salon 3	*Evolvable Hardware* Tetsuya Higuchi
	Salon 4	*Messy Genetic Algorithms and Linkage Learning* Kalyanmoy Deb
	Salon 9	*Introduction to Evolution Strategies* Hans-Paul Schwefel
	Salon 10	*The Evolution of Neural Networks* Darrell Whitley
	Salon 18	*Characteristics and Biases of Evolution in Genetic Programming* Justinian Rosca
3:45 pm - 4:15 pm		**Coffee Break**
4:15 pm - 6:00 pm	**Room**	**Tutorial Session IV**
	Salon 1	*Machine Code Genetic Programming* Peter Nordin
	Salon 2	*Evolutionary Computing for Engineering Design Search, Exploration and Optimisation* I. C. Parmee
	Salon 3	*Theory of Evolution Strategies and Evolutionary Programming* Günter Rudolph
	Salon 4	*Evolution of Parallel Cellular Machines* Moshe Sipper
	Salon 9	*Computer Immunology* Stephanie Forrest
	Salon 10	*Analysis, Design, and Implementation of Parallel Genetic and Evolutionary Algorithms* Erick Cantú-Paz
6:30 pm - 7:30 pm	Ballroom A	**Opening Reception**

Thursday Program at a Glance

8:30 am – 10:00 am **Plenary Session I**

10:00 am – 10:30 am **Coffee Break**

Parallel Session I

10:30 am - 12:00 pm	General Applications I Salon 1	Game/Theory Trading I Salon 2	Design I Salon 3	ES/EP I Salon 4	GA/CS I Salon 9	GP/EH I Ballroom D/E	Alife I Salon 10	MPP I Salon 11	Optimization I Salon 18

12:00 pm – 1:30 pm **Lunch**

Parallel Session II

1:30 pm – 3:00 pm	Control Applications Salon 1	Science Applications Salon 2	Engineering Applications Salon 3	GEC Theory I Salon 4	GA/CS II Salon 9	GP/EH II Ballroom D/E	DNA/MC I Salon 10	GEC Operators I Salon 11	Optimization II Salon 18

3:00pm – 3:30 pm **Coffee Break**

Parallel Session III

3:30 pm –5:30 pm	General Applications II Salon 1	Scheduling I Salon 2	Robotics I Salon 3	Parallel GEAs I Salon 4	GA/CS III Salon 9	Selection I Ballroom D/E	Agents Salon 10	GEC Operators II Salon 11	Optimization III Salon 18

7:15 pm – 8:00 pm **Holland Birthday Party**

8:00 pm – 10:00 pm **Poster Session**

THURSDAY, JULY 15, 1999

8:30 am - 10:00 am **Ballroom D/E** **Plenary Session I**
Chair: W. Banzhaf

8:30 am
Welcoming remarks, announcements

8:50 am
Invited Talk, *The Role of Evolution in Physical Theories*
Lee Smolin, Penn State University

10:00 am - 10:30 am **Coffee Break**

10:30 am - 12:00 pm **Salon 1** **General Applications I**
Chair: L. Davis

10:30 am
Immunity by Design: An Artificial Immune System
Steven A. Hofmeyr and Stephanie Forrest

11:00 am
Variation in EA Performance Characteristics on the Adaptive Distributed Database Management Problem
Martin Oates, David Corne, and Roger Loader

11:30 am
Learning Bayesian Networks from Incomplete Data using Evolutionary Algorithms
James W. Myers, Kathryn B. Laskey, and Kenneth A. DeJong

10:30 am - 12:00 pm **Salon 2** **Game Theory/Trading I**
Chair: R. Marks

10:30 am
Genetic Algorithms, Trading Strategies and Stochastic Processes: Some New Evidence from Monte Carlo Simulations
Shu-Heng Chen, Cheuh-Iong Tsao, and Wei-Yuan Lin

11:00 am
On using ZCS in a Simulated Continuous Double-Auction Market
Larry Bull

11:30 am
Towards an Agent-Based Foundation of Financial Econometrics: An Approach Based on Genetic-Programming Artificial Markets
Shu-Heng Chenand Tzu-Wen Kuo

10:30 am - 12:00 pm **Salon 3** **Design I**
Chair: I. Parmee

10:30 am
Preliminary Airframe Design Using Co-Evolutionary Multiobjective Genetic Algorithms
Ian C. Parmee and Andrew H. Watson

11:00 am
Object-based Design Modeling and Optimization with Genetic Algorithms
David Wallace, Nicola Senin, and Nick Borland

11:30 am
Optimization by Searching a Tree of Populations
Louis Steinberg and Khaled Rasheed

10:30 am - 12:00 pm **Salon 4** **ES/EP I**
Chair: H.-G. Beyer

10:30 am
Extending Evolutionary Programming Methods to the Learning of Dynamic Bayesian Networks
Allan Tucker and Xiaohui Liu

11:00 am
An Efficient Generalized Multiobjective Evolutionary Algorithm
Shinn-Ying Ho and Xiao-I Chang

11:30 am
Training Neural Networks with 3-bit Integer Weights
V.P. Plagianakos and M.N. Vrahatis

10:30 am - 12:00 pm **Salon 9** **GA/CS I**
Chair: R. E. Smith

10:30 am
A Diversity Control Oriented Genetic Algorithm (DCGA): Development and Experimental Results
Hisashi Shimodaira

11:00 am
Swappers: Introns promote flexibility, diversity and invention
James R. Levenick

11:30 am
Terrain-Based Genetic Algorithm (TBGA): Modeling Parameter Space as Terrain
V. Scott Gordon, Rebecca Pirie, Adam Wachter, and Scottie Sharp

10:30 am - 12:00 pm **Ballroom D/E** **GP/EH I**
Chair: J. R. Koza

10:30 am
Bagging, Boosting, and Bloating in Genetic Programming
Hitoshi Iba

11:00 am
The Evolution of Genetic Code in Genetic Programming
Robert Keller and Wolfgang Banzhaf

11:30 am
Under the Hood of Grammatical Evolution
Michael O'Neill and Conor Ryan

10:30 am - 12:00 pm **Salon 10** **Alife I**
Chair: V. Honavar

10:30 am
Persistence, Search and Autopoiesis
Oliver Sharpe

11:00 am
Four Steps Toward Open-Ended Evolution
C.C. Maley

11:30 am
How the immune system generates diversity: Pathogen space coverage with random and evolved antibody libraries
Mihaela Oprea and Stephanie Forrest

10:30 am - 12:00 pm **Salon 11** **MPP I**
Chair: J. Daida

10:30 am
Populations are Multisets - PLATO
Fernando Moura-Pires, Luis Correia, and Joaquim N. Aparicio

11:00 am
Challenges with Verification, Repeatability, and Meaningful Comparison in Genetic Programming: Gibson's Magic
Jason Daida, Derrick Ampy, Michael Ratanasavetavadhana, Hsiaolei Li, and Omar Chaudhri

10:30 am - 12:00 pm **Salon 18** **Optimization I**
Chair: W. Punch

10:30 am
Evolutionary Optimization Through Extinction Dynamics
Jesus Marin and Ricard V. Sole

11:00 am
An Approach to Solving Combinatorial Optimization Problems Using a Population of Reinforcement Learning Agents
Victor Miagkikh and William F. Punch III

11:30 am
Evolving Probabilistic Chromosomes in Genetic Algorithms
P. Palazzari and M. Coli

12:00 pm - 1:30 pm **Lunch**

1:30 pm - 3:00 pm **Salon 1** **Control Applications**
Chair: C. Jacob

1:30 pm
Aircraft Maneuvering via Genetics-Based Adaptive Agent
H. Brown Cribbs III

2:00 pm
Genetic Programming of Full Knowledge Bases for Fuzzy Logic Controllers
Daryl Battle, Abdollah Homaifar, Edward Tunstel, and Gerry Dozier

2:30 pm
Optimal Control of Greenhouse Climate using Real-World Weather Data and Evolutionary Algorithms
Hartmut Pohlheim and Adolf Heibner

1:30 pm - 3:00 pm   Salon 2   Science Applications

Chair: R. Nachbar

1:30 pm
An Immunogenetic Approach to Chemical Spectra Recognition
Dipankar Dasgupta, Yuehua Cao, and Congjun Yang

2:00 pm
Comparing Evolutionary Programs and Evolutionary Pattern Search Algorithms: A Drug Docking Application
William Hart

2:30 pm
Plasma X-Ray Spectra Analysis Using Genetic Algorithms
Igor Golovkin, Roberto Mancini, and Sushil Louis

1:30 pm - 3:00 pm   Salon 3   Engineering Applications
Chair: F. Lohnert

1:30 pm
A Particle Swarm Optimization for Reactive Power and Voltage Control in Electric Power Systems
Yoshikazu Fukuyama, Shinichi Takayama, Yosuke Nakanishi, and Hiritaka Yoshida

2:00 pm
Evolutionary Programming Based Method for Evaluation of Power Flow
Kit Po Wong, Jason Yuryevich, and An Li

2:30 pm
Magnetotelluric Inversion Using Problem-Specific Genetic Operators
Pedro Kantek Garcia Navarro, Pedro P.B. de Oliveira, F.M. Ramos, and H.F. Campos-Velho

1:30 pm - 3:00 pm   Salon 4   GEC Theory I
Chair: K. Deb

1:30 pm
Using Time Efficiently: Genetic-Evolutionary Algorithms and the Continuation Problem
David Goldberg

2:00 pm
Estimating the Significant Non-Linearities in the Genome Problem-Coding
Thierens Dirk

2:30 pm
Function Induction, Gene Expression, and Evolutionary Representation Construction
Hillol Kargupta and Kakali Sarkar

1:30 pm - 3:00 pm **Salon 9** **GA/CS II**
Chair: K. De Jong

1:30 pm
Three Ways to Grow Designs: A Comparison of Embryogenies for an Evolutionary Design Problem
Peter Bentley and Sanjeev Kumar

2:00 pm
Randomness and GA Performance, Revisited
Mark M. Meysenburg and James A. Foster

2:30 pm
The Shifitng Balance Genetic Algorithm: Improving the GA in a Dynamic Environment
Franz Oppacher and Mark Wineberg

1:30 pm - 3:00 pm **Ballroom D/E** **GP/EH II**
Chair: W. Banzhaf

1:30 pm
An Empirical Study of the Efficiency of Learning Boolean Functions using a Cartesian Genetic Programming Approach
Julian Miller

2:00 pm
Analysis of Genetic Diversity through Population History
Nicholas Freitag Mcphee and Nicholas J. Hopper

2:30 pm
Investigating the Influence of Depth and Degree of Genotypic Change on Fitness in Genetic Programming
Christian Igel and Kumar Chellapilla

1:30 pm - 3:00 pm **Salon 10** **DNA/MC I**
Chair: M. Garzon

1:30 pm
A DNA Implementation of the Max 1s Problem
David Wood, Junghuei Chen, Eugene Antipov, Bertrand Lemieux, and Walter Cedeno

2:00 pm
Virtual DNA Simulator and Protocol Design by GA
Akio Nishikawa, Masami Hagiya, and Masayuki Yamamura

2:30 pm
DNA Assembly and Recombination of Edges for Hamiltonian Paths and Binary Words
J. Pazos, A. Pazos, and Alfonso R. Paton

1:30 pm - 3:00 pm **Salon 11** **GEC Operators I**
Chair: TBA

1:*30 pm*
Effect of Mutation and Recombination on the Genotype-Phenotype Map
C.R. Stephens

2:00 pm
Evolutionary Programming using the Levy Probability Distribution
Chang-Yong Lee and Yoonseon Song
2:30 pm
Genetic Programming Operators Applied to Genetic Algorithms
Dana Vrajitoru

1:30 pm - 3:00 pm **Salon 18** **Optimization II**
Chair: TBA
2:00 pm
MOAQ an Ant-Q Algorithm for Multiple Objective Optimization Problems
Carlos Mariano and Eduardo Morales M.

2:00 pm
Extremal Optimization: Methods Derived from Co-Evolution
Stefan Boettcher and Allon G. Percus

2:30 pm
Real-valued Evolutionary Optimization using a Flexible Probability Density Estimator
Marcus Gallagher, Marcus Frean, and Tom Downs

3:00 pm - 3:30 pm **Coffee Break**

3:30 pm - 5:00 pm **Salon 1** **General Applications II**

Chair: E. Goodman
3:30 pm
Timeweaver: a Genetic Algorithm for Identifying Predictive Patterns in Sequences of Events
Gary Weiss

4:00 pm
Neuro-genetic Based Method to the Classification of Acupuncture Needle: A Case Study
Cao Lijuan and Francis Tay Eng Hock

4:30 pm
A Supervisory Simplex-GA Approach for Metabolic Model Optimization
John Yen, and Linyu Yang, Bogju Lee, and James C. Liao

3:30 pm - 5:30 pm **Salon 2** **Scheduling I**
Chair: TBA
3:30 pm
An Immune System Approach to Scheduling in Changing Environments
Emma Hart and Peter Ross

4:00 pm
Evolutionary Algorithm Based Exploration of Software Schedules for Digital Signal Processors
Eckart Zitzler, Jurgen Teich, and Shuvra Bhattacharyya

4:30 pm
Infrastructure Work Order Planning Using Genetic Algorithms
E. William East

5:00 pm
Scalable Search Spaces for Scheduling Problems
Dirk C. Mattfeld

3:30 pm - 5:30 pm **Salon 3** **Robotics I**
Chair: G. Parker

3:30 pm
Autonomous Evolution of Gaits with the Sony Quadruped Robot
S. Takamura G.S. Hornby, M. Fujita, T. Yamamoto, O. Hanagata

4:00 pm
Coupling Morphology and Control in a Simulated Robot
Craig Maunter Richard K. Belew

4:30 pm
Design of a Genetic-Fuzzy System for Planning Optimal Path and Gait Simultaneously of a Six-legged Robot
Kalyanmoy Deb, Dilip Kumar Pratihar, and Amitabha Ghosh

5:00 pm
Cooperative and Competitive Behavior Acquisition for Mobile Robots through Co-evolution
Eiji Uchibe, Masateru Nakamura, and Minoru Asada

3:30 pm - 5:00 pm **Salon 4** **Parallel GEAs I**
Chair: E. Cantu-Paz

3:30 pm
The Outlaw Method for Solving Multimodal Functions with Split Ring Parallel Genetic Algorithms
Chrisila C. Pettey and K. Burton Harvey

4:00 pm
Topologies, Migration Rates, and Multi-Population Parallel Genetic Algorithms
Erick Cantu-Paz

4:30 pm
Two Evolutionary Representations for Automatic Parallelization
Kenneth P. Williams and Shirley A. Williams

3:30 pm - 5:30 pm **Salon 9** **GA/CS III**
Chair: S. Wilson

3:30 pm
Mining the Space of Generality with Uncertainty-Concerned Cooperative Classifiers
Jorge Muruzabal

4:00 pm
Aliasing in XCS and the Consecutive State Problem: 1- Effects
Alwyn Barry

4:30 pm
Aliasing in XCS and the Consecutive State Problem: 2 - Solutions
Alwyn Barry

5:00 pm
Deletion Schemes for Classifier Systems

Tim Kovacs

3:30 pm - 5:30 pm **Ballroom D/E** **Selection I**
Chair: D. Thierens

3:30 pm
Coevolution for Problem Simplification
Gary Haith and Silvano P. Colombano

4:00 pm
A Diversity Study in Genetic Algorithms for Job Shop Scheduling Problems
Nobuo Sannomiya and Carlos A. Brizuela

4:30 pm
Reducing Genetic Drift in Steady State Evolutionary Algorithms
Branke Jurgen, Massimo Cutaia, and Heinrich Dold

5:00 pm
An Analysis of Local Selection in Evolution Strategies
Martina Georges-Schleuter

3:30 pm - 5:30 pm **Salon 10** **Agents**
Chair: L. Tesfatsion

3:30 pm
How Not to Be a Black-Box: Evolution and Genetic-Engineering of High-Level Behaviours
Ik Soo Lim and Daniel Thalmann

4:00 pm
Evolution and Analysis of Dynamical Neural Networks for Agents Integrating Vision, Locomotion, and Short-Term Memory
John Gallagher and Randall Beer

4:30 pm
Evolution of Goal-Directed Behavior using Limited Information in a Complex Environment
Matthew Glickman and Katia Sycara

5:00 pm
How to Design Good Learning Agents in Organization?
Keiki Takadama, Takao Terano, and Katsunori Shimohara

3:30 pm - 5:30 pm **Salon 11** **GEC Operators II**
Chair: H. Kargupta

3:30 pm
On Recombination and Optimal Mutation Rates
Gabriela Ochoa, Inman Harvey, and Hilary Buxton

4:00 pm
Transposition versus Crossover: An Empirical Study
Anabela Borges Simoes and Ernesto Costa

4:30 pm

A Robust Real-Coded Genetic Algorithm using Unimodal Normal Distribution Crossover Augmented by Uniform Crossover: Effects of Self-Adaptation of Crossover Probabilities
Isao Ono, Hajime Kita, and Shigenobu Kobayashi

5:00 pm
Parental and Cyclic-Rate Mutation in Genetic Algorithms: An Initial Investigation
Chrisila Pettey and Theodore Hoehn

3:30 pm - 5:30 pm **Salon 18** **Optimization III**
Chair: V. Miagkikh

3:30 pm
Use of Preferences for GA-based Multi-objective Optimization
Dragan Cvetkovic and Ian C. Parmee

4:00 pm
Approaches Based on Genetic Algorithms for Multiobjective Optimization Problems
Jose Aguilar and Pablo Miranda

4:30 pm
Coevolutionary Genetic Algorithms for Solving Dynamic Satisfaction Problems
Hisashi Handa, Osamu Katai, Tadataka Konishi, and Mitsuru Baba

5:00 pm
A Sequential Similarity Metric for Case Injected Genetic Algorithms Applied to TSP's
Sushil Louis and Yongmian Zhang

7:15 pm - 8:00 pm **HOLLAND BIRTHDAY PARTY**
Cake, Ice Cream, and Award Presentation

8:00 pm - 10:00 pm **POSTER SESSION**
for Poster and Late-Breaking Papers

Poster Papers

Scout Algorithms and Genetic Algorithms: A Comparative Study
Fabio Abbattista and Mario Koppen

Genetic Algorithms as Random Sytems with Complete Connections
Alexandru Agapie

Three Geometric Approaches for Representing Decision Rules in a Supervised Learning System
Jesus Aguilar, Jose Riquelme, and Miguel Toro

Entropic and Real-Time Analysis of the Search with Panmictic, Structured, and Parallel Distributed Genetic Algorithms
Enrique Alba, Carlos Cotta, and Jose M. Troya

Training Hidden Markov Models using Population-Based Learning
Sven Anderson and Bruce Maxwell

Using an Adaptive Agent to Bid in a Simplified Model of the UK Market in Electricity
A.J. Bagnall and G.D. Smith

Constructive Induction of Fuzzy Cartesian Granule Feature Models using Genetic Programming
James Baldwin, Trevor P. Martin, and James G. Shanahan

Evolutionary Multimodel Partitioning Filters for Nonlinear Systems
G.N. Beligiannis, E.N. Demiris, and S.D. Likothanassis

Coevolving Mutualists Guide Simulated Evolution
Michael Best

Behavior-Based Control System in MultiAgent Domain
Stephane Calderoni

Migration Policies and Takeover Times in Parallel Genetic Algorithms
Erick Cantu-Paz

G-Prop-III: Global Optimization of Multilayer Perceptions using an Evolutionary Algorithm
P.A. Castillo, J.J. Merelo, J. Gonzalez, A. Prieto, V. Rivas, and G. Romero

Rule Acquisition with a Genetic Algorithm
Robert Cattral and Franz Oppacher

Java based Distributed Genetic Programming on the Internet
Fuey Sian Chong

Comparing Performance of the Learnable Evolution Model and Genetic Algorithms Applied to Digital Signal Filters
Mark Coletti, Craig Mandsager, Rida Moustafa, Tom Lash, and Ryszard Michalski

Non-stationary Function Optimization using Polygenic inheritance
J.J. Collins and Conor Ryan

Genetic Planner for Mobile Robot Navigation System
J.J. Collins, Lucia Sheehan, Conor Casey

A Critique of Search Space Visualization Techniques
Trevor Collins

N-Dimensional Surface Mapping Using Genetic Programming
David Corney and Ian Parmee

GAs in Global Optimization of Mixed Integer Non-Linear Problems
Lino Costa and Pedro Oliveira

Improving the Scalability of Dynastically Optimal Forma Recombination by Tuning Representation Granularity
Carlos Cotta-Porras, Enrique Alba, and Jose M. Troya

CAM-BRAIN ATR's Artificial Brain Project, An Overview
Hugo De Garis, M. Korkin, F. Gers, N.E. Nawa, and M. Hough

Control System Optimization Using Genetic Algorithms within the SoftLab Toolkit
Lisa Desjarlais, Mohammad-R. Akbarzadeh-T., and Craig W. Wright

Evolving Scheduling Policies through a Genetic Programming Framework
C. Dimopoulos and A.M.S. Zalzala

Real World Application Optimizing the Throughput of a Manufacturing Production Line Using a Genetic Algorithm
R. Dupas, G. Cavory, and G. Goncalves

Efficient Calculation of Compute-Intensive Fitness In Genetic Computations Using A Survival Indicator For Population Members
William Edelson and Michael L. Gargano

Motion Planning using GAs
Craig Eldershaw and Stephen Cameron

Modelling Software Quality with GP
Matthew Evett, Taghi Khoshgoftaar, Pei-der Chien, and Edward Allen

GENIFER: A Nearest Neighbor based Classifier System using GA
Xavier Llora I Fabrega and Josep Maria Garrell i Guiu

Representation of Music in a Learning Classifier System Utilizing Bach Chorales
Francine Federman, Gayle Sparkman, and Stephanie Watt

Evolutionary Algorithm for School Timetabling
Carlos Fernandes, Joao Paulo Caldeira, Fernando Melicio, and Agostinho Rosa

Portfolios of Genetic Algorithms
Alex S. Fukunaga

Distributed Genetic Programming With Mobile Agents
Robert Ghanea-Hercock, Divine T. Ndumu, and Jaron Collis

Evolutionary Algorithms for Multidimensional Knapsack Problems: the Relevance of the Boundary of the Feasible Region
Jens Gottlieb

A Comparison of Some Methods for Evolving Neural Networks
Marko Gronroos

Sequencing Aircraft Landings by Genetic Algorithms
Alexis Guigue, Sofiane Oussedik, and Daniel Delahaye

The Retrieval of Chemical Reaction Rates Using Genetic Algorithms
S.D Harris, L. Elliott, D.B. Ingham, M. Pourkashanian, and C.W. Wilson

Parameter Identification Within Rocks Using Genetic Algorithms
S.D. Harris, R. Mustata, L. Elliott, D.B. Ingham, and D. Lesnic

Towards Byte Code Genetic Programming
Brad Harvey, James A. Foster, and Deborah Frincke

Feature Selection Using a Genetic Algorithm for Intrusion Detection
Guy Helmer, Johnny Wong, Vasant Honavar, and Les Miller

Dynamic Chemical Process Modelling Using a Multiple Basis Function Genetic Programming Algorithm
Mark Hinchliffe, Mark Willis, and Ming Tham

Evaluating Learning Classifier System Performance in Two Choice Decision Tasks an LCS Metric Tool-kit
John Holmes

Simultaneously Applying Multiple Crossover and Mutation Operators
Tzung-Pei Hong, Hong-Shung Wang, and Wei-Chou Chen

Genetic Algorithms for Attribute Synthesis in Large-Scale Data Mining
William H. Hsu, William H. Pottenger, Michael Welge, Jie Wu, and Ting-Hao Yang

An Evolution Strategy to Solve Sports Scheduling Problems
Hsien-Da Huang, Jorng-Tzong Horng, and Ming-Hui Jin

Genetic Algorithm for a Large-Scale Scheduling Problem in an Electric Wire Production Process
Hitoshi Iima and Nobuo Sannomiya

Evolutionary Cellular Automata for Optimal Path Planning of Mobile Robots
Yong-Gun Jo and Hoon Kang

Tell Me Three Times: Encoding Redundancy May Not Be Harmful
Bryant Julstrom

Evolution of the Digital Circuits with Variable Layouts
Tatiana Kalganova, Julian F. Miller, and Terence C. Fogarty

Solutions to Systems of Nonlinear Equations Via Genetic Algorithm
Charles L. Karr and Barry Weck

Modeling A Grinding Circuit Using Genetic Programming
Charles L. Karr and Ken Borgelt

Genetic Algorithm, Avoiding of Deadlocks and Gantt-Chart-Generation for the Job Shop Scheduling Problem
J. Kaschel, Gunnar Kobernik, Bernd Meier, and Tobias Teich

Using Genetic Algorithms to Extract Rules from Trained Neural Networks
Edward Keedwell, Ajit Narayanan, and Dragan Savic

In Real or Artificial Life, Is Evolutionary Progress in a Closed System Possible?
Brig Klyce

A New Evolutionary Approach to the Degree Constrained Minimum Spanning Tree Problem
Joshua Knowles, David Corne, and Martin Oates

Computing Simple GA Expected Waiting Times
Gary Koehler

Generic Evolution Algorithms Programming Library
Gabriella Kokai, Zoltan Toth, and Robert Vanyi

Solving Wood Collection Problem using Genetic Algorithms
Ilkka Kranta, Topi Mikkola, Catherine Bounsayhip, Olli Jokinen, and Juha Savola

Complexity Engineering, Evolution and Optimality of Structures
Sourav Kundu

Incorporating Human Preference into Content-based Image Retrieval Using Interactive Genetic Algorithm
Joo-Young Lee and Sung-Bae Cho

Complexity in Mate Choice
Patricio Lerena and Michele Courant

Multiobjective Genetic Algorithm for Rolling-Horizon Production Planning
Y. Li, K.F. Man, and K.S. Tang

Classification of the Market States Using Neural Network
Cao Lijuan, Tay Eng Hock Francis, Yeong Wai Cheong, and Lawrence Ma

Improving Parallel Ordering of Sparse Matrices using Genetic Algorithms
Wen-Yang Lin

Collaborative Learning Agents with Structural Classifier Systems
Chikara Maezawa and Masayasu Atsumi

The Entropy Evaluation Method for the Therodynamical Selection Rule
Naoki Mori and Hajime Kita

Sequential Dynamical Systems and Simulation
Henning S. Mortveit, Christian M. Reidys, and Stephen Kopp

Applying Genetic Algorithm for Adaptive Function Approximations and Mesh Generation
Rida Moustafa, Kenneth A. De Jong, and Edward J. Wegman

A Motivated Definition of Exploitation and Exploration
Bart Naudts and Adriaan Schippers

Regularization Approach to Inductive Genetic Programming
Nikolai Nikolaev and Hitoshi Iba

Evolutionary Design of a Probabilistic Recurrent Neural Network that Approximates Dynamical Systems
Fernando Nino, German Hernandez, and Dipankar Dasgupta

Parallel Machine Code Genetic Programming
Peter Nordin, Markus Brameier, Frank Hoffmann, Wolfgang Banzhaf, and Frank D. Francone

Evolutionary Computation of Supersonic Wing Shape Optimization
Shigeru Obayashi, Daisuke Sasaki, and Yukihiro Takeguchi

Effects of "Physical Body" on Biased Opponent Selection in the Iterated Prisoner's Dilemma Game
Jae Oh

Analysis of Genetic Algorithms Convergence Applied to Mensuration Problems in Computer Vision
Gustavo Olague

An Evolutionary Approach to Feature Set Selection
David Opitz

Adaptative Aspects of Rhythmic Composition: Genetic Music
Alejandro Pazos, A. Santos del Riego, Julian Dorado, and J.J. Romero Cardalda

Optimization of GA Parameters to Train Recurrent ANN through Weight Adjustment and Selection of Activation Functions
Alejandro Pazos, Julian Dorado, Antonino Santos, and Juan Ramon Rabunal

Road Design by Evolutionary Modelling of Routes
Angela Guimaraes Pereira

A Logarithmic Mutation Operator to Solve Constrained Optimization Problems
A. Petrowski and S. Ben Hamida

Testing the Temporal Behavior of Real-Time Software Modules using Extended Evolutionary Algorithms
Hartmut Pohlheim and Joachim Wagener

Schema Theorems without Expectations
Riccardo Poli

Modelling Antibiotic Production using Standard and Sequential Hybridized Symbolic Annealing
Mark A. Porter, Mark J. Willis, and Gary A. Montague

An Evolutionary Approach to Point-Feature Label Placement
Gunther Raidl

Finding Wavelet Packet Bases with an Estimation Distribution Algorithm
Alberto Ochoa Rodriguez

Logic-based Genetic Programming with Definite Clause Translation Grammars
Brian Ross

Genetic Algorithms in Road Investment Planning and Comparisons with Simulated Annealing and Heuristics
Vivian Salim

A Simulation Study on Adaptive Behavior of Fish Schools under Environmental Variation
Nobuo Sannomiya, Yajie Tian, and Toru Yokokura

XCS and the Monk's Problems
Shaun Saxon and Alwyn Barry

A Fuzzy Neighborhood Based Genetic Algorithm in Fuzzy Engineering Design
Ralf Schleiffer and Hans-Jurgen Sebastian

Evolutionary Algorithm Analysis of the Biological Genetic Codes
William Seffens and David Digby

Fast and Robust Convergence of Chained Classifiers by Generating Operons through Niche Formation
Sotaro Shimada and Yuichiro Anzai

Genetically Programming Networks to Evolve Memory Mechanisms
Arlindo Silva, Ana Neves, and Ernesto Costa

An Application of Genetic Programming to Investment System Optimization
Charles Smith

Adaptive Behavior of Incrementally Evolved Neural Networks Based on Cellular Automata
Geum-Beom Song and Sung-Bae Cho
Evolutionary Algorithms for Optimizing Speech Data Projection
A. Spalanzani, H. Kabre, and S.A. Selouani

Using Voronoi Dissections to Guide Neural Network Construction
Richard Stewart and Paul Rosin

Practical and Theoretical Investigation of a Collective work
Yasuhiro Suzuki and Hiroshi Tanaka

Cooperative Crossover and Mutation Operators in Genetic Algorithms
Kiyoshi Tanaka, Hernan E. Aguirre, and Tatsuo Sugimura

Clique-Based Crossover for Solving the Timetabling Problem with GAs
Hugo Terashima-Marin, Peter Ross, and Manuel Valenzuela-Rendon

Evolving High-Quality Random Number Generators
Marco Tomassini, Moshe Sipper, Mathieu Perrenoud, and Mose Zolla

Further Investigations into the Evolution of Agents with Concurrent Genetic Programming
Adrian Trenaman

Result-Sharing: A Framework For Cooperation in Genetic Programming
Edgar E. Vallejo and Fernando Ramos

The Essential Difference between Individual and Population Learning Genetic Algorithms
Nicolaas Vriend

Solving Combinatorial Optimization Problems with Multi-Step Genetic Algorithms
Hirokazu Watabe and Tsukasa Kawaoka

Application Oriented Routing with Biologically Inspired Agents
Tony White and Bernard Pagurek

Feature Subset Selection for Rule Induction Using RIPPER
Jihoon Yang, Asok Tiyyagura, Fajun Chen, and Vasant Honavar

Adaptive Genetic Algorithm for Multiprocessor Scheduling
Mohamed Zahran, Ashraf H Abdel Wahab, and Samir I Shaheen

Late-Breaking Papers

Three Geometric Approaches for Representing Decision Rules in a Supervised Learning System
Jesus Aguilar, Jose Riquelme, and Miguel Toro

Tackling Epistasis with Panmictic and Structured Genetic Algorithms
Enrique Alba and Jose M. Troya

An Evolutionary Model for Dynamically Controling a Behavior-based Autonomous Agent
John A. Atkinson-Abutridy and Julio R. Carrasco-Leon

A Genetic Algorithm with Dynamic Population: Experimental Results
Marton E. Balazs and Daniel L. Richter

Systemions to Model Alternative Issues in Problem Solving
Christophe Baron and Guy Gouarderes

Evolving Fuzzy Detectives: An Investigation into the Evolution of Fuzzy Rules
Peter J. Bentley

A Persistent Blackboard for Distributed Evolutionary Computation
Alessandro Bollini and Marco Piastra

Using an Optimization Toolkit for Java to Evolve Market Strategies for European Seeds
Joseph L. Breeden and Todd W. Allen

Migration Policies, Selection Pressure, and Parallel Evolutionary Algorithms
Erick Cantu-Paz

A New Method to Resist Premature Convergence: Synchonising Gene-Convergence with Correlated Recombination
Zeke S. H. Chan, H. W. Ngan, and A. B. Rad

Evolutionary Algorithm for Phased Network Topology Design
Salah Elhaggaz, Brian Turton, and John Brown

Solving the Ant and the Even Parity-5 Problems by Means of Parallel Genetic Programming
Francisco Fernandez, Marco Tomassini, and J. M. Sanchez

Element of a Theoretical Model of Tele-Learning using Genetic Algorithms
Marion R. Finley Jr, Haruo Akimaru, and Evelyne B. Hausen-Tropper

Genetic Algorithms; Some Effects of Redundancy in Chromosomes.
Tim Hackworth

Resolution of Quadratic Assignment Problems Using an Evolutionary Algorithm
Jorng-Tzong Horng, Chien-Chin Chen, and Cheng-Yen Kao

Applying Evolutionary Algorithms to Materialized View Selection in a Data Warehouse
Jorng-Tzong Horng, Yu-Jan Chang, and Cheng-Yen Kao

Genetic Design of Electronic Circuits
Eric A. Jones and William T. Joines

Comparing Darwinian, Baldwinian, and Lamarckian Search in a Genetic Algorithm for the 4-Cycle Problem
Bryant A. Julstrom

Fast Construction of Distributed and Decomposed Evolutionary Representation

Hillol Kargupta and B. H. Park

Negative Selection and Niching by an Artificial Immune System for Network Intrusion Detection
Jungwon Kim and Peter Bentley

Visual Auction: A Classifier System Pedagogical & Researcher Tool
Kostyantyn Korovkin and Robert Richards

The ABC's of Evolutionary Design: Investigating the Evolvability of Embryogenies for Morphogenesis
Sanjeev Kumar and Peter Bentley

Generating Hard Satisfiability Problems using Genetic Programming
Kin Lun Law
The Immune Evolutionary Programming and Its Convergence
Wang Lei and Jiao Licheng

A Genetic Algorithm Approach to Improve Production Schedule
Tezuka Masaru and Hiji Masahiro

Finding a Needle in a Haystack using Hints and Evolutionary Computation: The Case of Genetic Mastermind
J. J. Merelo, J. Carpio, P. Castillo, V. M. Rivas, and G. Romero

GP-Based Heart Rate Prediction for Artificial Heart Control
M Numata, I. Yoshihara, M. Yoshizawa, and K. Abe

The Effects of Selection Pressure on Parameter Choice in Evolutionary Search
Martin Oates, David Corne, and Brian C. H. Turton

On the Importance of Phenotypic Duplicate Elimination in Decoder-Based Evolutionary Algorithms

Gunther R. Raidl and Jens Gottlieb

An Evolutionary Computation Scheme Based on Attraction and Repulsion
Denis Robilliard and Cyril Fonlupt

Efficient-Discarding Fitness Functions
Alejandro Rosete-Suarez, Alberto Ochoa-Rodriguez, and Michele Sebag

Probabilistic Pattern Matching and the Evolution of Stochastic Regular Expressions
Brian J. Ross

Tree Network Design with Genetic Algorithms - An Investigation in the Locality of the Pruefernumber Encoding
Franz Rothlauf and David Goldberg

An Evolutionary Approach to Modelling the Behaviours of Financial Traders
Sonia Schulenburg and Peter Ross

Modular Learning With Genetic Aggregation (MOLGA) in Data Prediction
Chris Tseng and Arkady Epshteyn

Schema Propagation in Selective Crossover
Kanta Vekaria and Chris Clack

Friday Program at a Glance

8:30 am – 10:00 am **Plenary Session I**											
10:00 am – 10:30 am **Coffee Break**											
Parallel Session I											
10:30 am - 12:00 pm	General Applications III Salon 1	Game/Theory Trading II Salon 2	Design II Salon 3	GEC Theory II Salon 4	GA/CS IV Ballroom D/E	GP/EH III Signature I	Alife II Salon 10	GEC Operators III Salon 11	Optimization IV Salon 12	PhD Workshop Papers I Salon 9
12:00 pm – 1:30 pm **Lunch**											
Parallel Session II											
1:30 pm – 3:00 pm	General Applications IV Salon 1	Pattern Recognition I Salon 2	Robotics II Salon 3	GEC Theory III Salon 4	GA/CS V Ballroom D/E	GP/EH IV Signature I	GEC as Model I Salon 10	Genetic Programming III The Movie Salon 11	Optimization V Salon 12	PhD Workshop Papers II Salon 9
3:00pm – 3:30 pm **Coffee Break**											
Parallel Session III											
3:30 pm – 5:30 pm	General Applications V Salon 1	Science Applications II Salon 2	Engineering Applications II Salon 3	Parallel GEAs II Salon 4	GA/CS VI Ballroom D/E	Selection II Signature I	DNA/MC II Salon 10	GEC Operators IV Salon 11	Telecommunications Applications Salon 12	Vendor Presentations I Salon 9
No Conference activities planned in the evening											

FRIDAY, JULY 16, 1999

8:30 am - 10:00 am **Ballroom D/E** **Plenary Session I**
Chair: A. Eiben

8:50 am
Welcoming remarks, announcements

9:00 am
Invited Talk, *Artificial Evolution in Action*
Ingo Rechenberg, Technical University of Berlin

10:00 am - 10:30 am **Coffee Break**

10:30 am - 12:00 pm **Salon 1** **General Applications III**

Chair: G. Lamont

10:30 am
Using Genetic Algorithm to Manipulate Polynomial Expressions
Andrze J. Pindor

11:00 am
Modified Gradient Techniques for Normalized Solution Vectors
Kelly D. Crawford, Donald MacAllister, and Michael D. McCormack

11:30 am
Automatic Graph Drawing and Stochastic Hill Climbing
Alejandro Rosete-Suarez, Alberto Ochoa-Rodriguez, and Michele Sebag

10:30 am - 12:00 pm **Salon 2** **Game Theory/Trading II**

Chair: D. McFadzean

10:30 am
India and Pakistan, a Classic Richardson Arms Race - A Genetic Algorithm Approach
Tim Hackworth

11:00 am
Coevolution with the Genetic Algorithm: Repeated, Differentiated Oligopolies
Robert Marks, David F. Midgley, Lee G. Cooper, and G.M. Shiraz

11:30 am
A Tool for Solving Differential Games with Co-evolutionary Algorithms
Francisco Gordillo, Ismael Alcala, and Javier Aracil

10:30 am - 12:00 pm **Salon 3** **Design II**
Chair: S. Kundu

10:30 am
Directed Multiple Objective Search of Design Spaces Using Genetic Algoritms and Neural Networks
David Todd and Pratyush Sen

11:00 am
Frame Design Synthesis Using Implicit Redundant Genetic Algorithms
Anne M. Raich and Jamshid Ghaboussi

11:30 am
Evaluation of Alternative Penalty Function Implementations in a Watershed Management Design Problem
Ranji Ranjithan and Laura J. Harrell

10:30 am - 12:00 pm **Salon 4** **GEC Theory II**
Chair: A. Wright

10:30 am
Polynomial Time Summary Statistics for a Generalization of MAXSAT
Robert B. Heckendorn, Soraya Rana, and Darrell Whitley

11:00 am
What Makes a Problem GP-Hard? Analysis of a Tunably Difficult Problem in Genetic Programming
Jason Daida, John A. Polito, Steven A. Stanhope, Robert R. Bertram, Jonathan C. Khoo, and Shabaz A. Chaudhary

11:30 am
A Free Lunch Proof for Gray versus Binary Encodings
D. Whitley

10:30 am - 12:00 pm **Ballroom D/E** **GA/CS IV**
Chair: K. Deb

10:30 am
BOA: The Bayesian Optimization Algorithm
Martin Pelikan, David E. Goldberg, and Erick Cantu-Paz

11:00 am
Identifying Linkage Groups by Nonlinearity/Non-monotonicity Detection
Masaharu Munetomo and David E. Goldberg

11:30 am
Linkage Information Processing In Distribution Estimation Algorithms
Peter A.N. Bosman and Dirk Thierens

10:30 am - 12:00 pm **Signature 1** **GP/EH III**
Chair: TBA

10:30 am
Declarative Expression of Biases in Genetic Programming
Lionel Martin, Frederic Moal, and Christel Vrain

11:00 am
A Functional Style and Fitness Evaluation Scheme for Inducting High Level Programs
Paul Walsh

11:30 am
Rule induction using a Reverse Polish representation

G.F. Davenport and V.J. Rayward-Smith

10:30 am - 12:00 pm Salon 10 Alife II
Chair: T. Ray

10:30 am
Population Dynamics and Emerging Features in AEGIS
A.E. Eiben, D. Elia, and J.I. van Hemert

11:00 am
Habitat, Communication and Cooperative Strategies
Kyle Wagner

10:30 am - 12:00 pm Salon 11 GEC Operators III
Chair: C. Pettey

10:30 am
Biases Introduced by Adaptive Recombination Operators
Kanta Vekaria and Chris Clack

11:00 am
The Distributional Biases of Crossover Operators
Soraya Rana

11:30 am
Introducing a New Advantage of Crossover: Commonality-Based Selection
Stephen Chen and Stephen F. Smith

10:30 am - 12:00 pm Salon 12 Optimization IV
Chair: TBA

10:30 am
An Efficient Evolutionary Algorithm for Global Optimization
Jinn-Moon Yang and Cheng-Yan Kao

11:00 am
Interactive Genetic Algorithms for the Traveling Salesman Problem
Sushil Louis and Rilun Tang

11:30 am
A Performance Assessment of Modern Niching Methods for Parameter Optimization Problems
Jean-Paul Watson

10:30 am - 12:00 pm Salon 9 PhD Workshop Papers I

Chair: C. Teuscher

Artificial Life Modelling of Downy Mildew of the Grapevine
Joao Carlos Costa

Modified AntNet: Software Application in the evaluation and management of a telecommunication network
Marcos Gallego-Schmid

On Modelling the Evolution of Language and Languages

Daniel Livingstone

Evolutionary Model for Open Source Software: Economic Impact
Asif Khalak

Embodiment asa Situated Structural Coupling
Tom Quick

Romero's Pilgrimage to Santa Fe: A Tale of Robot Evolution
Christof Teuscher

12:00 pm - 1:30 pm **Lunch**

1:30 pm - 3:00 pm **Salon 1** **General Applications IV**
Chair: W. Hsu

1:30 pm
Assessment of the Web Using Genetic Programming
Reginald L. Walker

2:00 pm
PROGEN: A Genetic-based Semi Automatic Hypertext Construction Tool - first steps and experiment
Georges Nault, Vincent Rialle, and Jean Guy Meunier

2:30 pm
Solving Large Knowledge Base Partitioning Problems Using an Intelligent Genetic Algorithm
Shinn-Ying Ho, Hung-Ming Chen, and Li-Sun Shu

1:30 pm - 3:00 pm **Salon 2** **Pattern Recognition I**

Chair: H. Iba

1:30 pm
Independent and Simultaneous Evolution of Sleep Classifiers based in Fuzzy Logic
Mota Cristina, Heitor Ferreira, and Agostinho Rosa

2:00 pm
A Cellular Genetic Programming Approach to Classification
Clara Pizzuti, Gianluigi Folino, and Giandomenico Spezzano

2:30 pm
Discovering Comprehensible Classification Rules by using Genetic Programming: A Case Study in a Medical Domain
Heitor Lopes, Celia Bojarczuk, and Alex Freitas

1:30 pm - 3:00 pm **Salon 3** **Robotics II**
Chair: M. Sipper

1:30 pm
Adaptive Hexapod Gait Control Using Anytime Learning with Fitness Biasing
Gary Parker

2:00 pm

Evolutionary Path Planning for Nonhomolic Robots
Ana Neves, Arlindo Silva, and Ernesto Costa

2:30 pm
Simulating Exploratory Behavior in Evolving Artificial Neural Networks
Orazio Miglino and Richard Walker

1:30 pm - 3:00 pm **Salon 4** **GEC Theory III**
Chair: M. Vose

1:30 pm
Markov Chain Models of Genetic Algorithms
Alden H. Wright and Yong Zhao

2:00 pm
Continuing Beyond NFL
Oliver Sharpe

2:30 pm
Stochastic Differential Models for Evolutionary Algorithms over Continuous Spaces
Jerome Goldstein, German Hernandez, and Fernando Nino

1:30 pm - 3:00 pm **Ballroom D/E** **GA/CS V**
Chair: S. Rana

1:30 pm
Genetic Approach to Feature Selection for Ensemble Creation
Cesar Guerra-Salcedo and Darrell Whitley

2:00 pm
Visualization of Evolutionary Algorithms-set of Standard Techniques and Multidimensional Visualization
Hartmut Pohlheim

2:30 pm
Intelligent Genetic Algorithm with a New Intelligent Crossover Using Orthogonal Arrays
Shinn-Ying Ho, Li-Sun Shu, and Hung-Ming Chen

1:30 pm - 3:00 pm **Signature 1** **GP/EH IV**
Chair: D. Andre

1:30 pm
Random Generator Quality and GP Performance
Mark Meysenburg and James A. Foster

2:00 pm
Emergence of the Cooperative Behavior using ADG; Automatically Defined Groups
Akira Hara and Tomoharu Nagao

2:30 pm
Large Populations Are Not Always the Best Choice In Genetic Programming
Matthias Fuchs

1:30 pm - 3:00 pm **Salon 10** **GEC as Model I**

Chair: J. Levenick

1:30 pm
Non-reciprocal Altruism and the Evolution of Paternal Care
Cathy Key
2:00 pm
A Generic Neutral Model for Measuring Excess Evolutionary Activity of Genotypes
Andreas Rechsteiner and Mark A Bedau

2:30 pm
Heterocrony and Adaptation in Developing Neural Networks
Angelo Cangelosi

1:30 pm - 3:00 pm **Salon 11** **Genetic Programming III, The Movie**

1:30 pm
First showing

2:15
Second Sowing

1:30 pm - 3:00 pm **Salon 12** **Optimization V**
Chair: S. Louis

1:30 pm
Construction of Test Problems for Multi-Objective Optimization
Kalyanmoy Deb

2:00 pm
Stochastic Evolution on the Hierarchical Population
Koji Sugai

2:30 pm
Specification of Local Search Directions in Genetic Local Search Algorithms for Multi-Objective Optimization Problems
Tadahiko Murata, Hisao Ishibuchi, and Mitsuo Gen

1:30 pm - 3:00 pm **Salon 9** **PhD Workshop Papers II**

Chair: E. Lukschandl

Using Genetic Algorithms for Sparse Distributed Memory
Ashraf Anwar

Genetic Programming of Wavelet networks for Time Series Prediction
Stuart W. Card

Jave Based Distributed Genetic Programming on the Internet
Phyllis Chong

Genetic Encoding of Neural Network Processing and Control
Talib Hussain

Evolving the Behavior of Collaborating Entities Using Genetic Programming
Eduard Lukschandl

3:00 pm - 3:30 pm **Coffee Break**

3:30 pm - 5:30 pm **Salon 1** **General Applications V**
Chair: F. Lobo

3:30 pm
A Multilevel k-way Partitioning Algorithm for Finite Element Meshes using Competing Ant Colonies

A.E. Langham and P.W. Grant

4:00 pm
Adaptive Strategies and the Design of Evolutionary Applications
Jose Neves, Miguel Rocha, Hugo Rodrigues, Miguel Biscaia, and Jose Alves

4:30 pm
Modular and Hierarchial Evolutionary Design of Fuzzy Systems
Myriam Delgado, Fernando Von Zuben, and Fernando Gomide

5:00 pm
Genetic Algorithms for Binary Quadratic Programming
Peter Merz and Bernd Freisleben

3:30 pm - 5:30 pm **Salon 2** **Science Applications II**

Chair: B. Buckles

3:30 pm
Protein Structure Prediction with Evolutionary Algorithms
William Hart, Natalio Krasnogor, Jim Smith, and David Pelta

4:00 pm
Using Evolutionary Algorithms in the Design of Protein Fingerprints
Bjorn Olsson

4:30 pm
Forecasting the MagnetoEncephaloGram (MEG) of Epileptic Patients Using Genetically Optimized Neural Networks
Adam V. Adamopoulos, Georgopoulos E.F., Likothanassis S.D., and PA. Anninos

5:00 pm
Modelling and Forecasting of Glaucomatous Visual Fields using Genetic Algorithms
Stephen Swift and Xiaohui Liu

3:30 pm - 5:30 pm **Salon 3** **Engineering Applications II**

Chair: F. Francone

3:30 pm
Evolution by Means of Genetic Programming of Analog Circuits that Perform Digital Functions
Forrest H. Bennett III, John R. Koza, Martin A. Keane, Jessen Yu, William Mydlowec, and Oscar Stiffelman

4:00 pm
An EHW-based Clock Timing Architecture Towards GigaHz Digital Systems

Eiichi Takahashi, Masahiro Murakawa, and Tetsuya Higuchi

4:30 pm
Evolution of CMOS Circuits in Simulations and Directly in Hardware on a Programmable Chip
Adrian Stoica, Carlos-Salazar Lazaro, Didier Keymeulen, and Ken Hayworth

5:00 pm
Building a Parallel Computer System for $18,000 that Performs a Half Peta-Flop per Day
Forrest H. Bennett III, John R. Koza, James Shipman, and Oscar Stiffelman

3:30 pm - 5:00 pm **Salon 4** **Parallel GEAs II**
Chair: M. Georges-Schleuter

3:30 pm
Parallel Distributed Processing of a Parameter-free GA by Using Hierarchical Migration Methods
Hidefumi Sawai and Susumu Adachi

4:00 pm
Metamodeling Techniques for Evolutionary Optimization of Computationally Expensive Problems: Promises and Limitations
Mohammed A. El-Beltagy, Prasanth B. Nair, and Andy J. Keane

4:30 pm
Non-Linear Continuum Regression Using Genetic Programming
Ben Mckay, Mark Willis, Dominic Searson, and Gary Montague

3:30 pm - 5:30 pm **Ballroom D/E** **GA/CS VI**
Chair: J. Holmes

3:30 pm
A Genetic Programming-based Classifier System
Manu Ahluwalia and Larry Bull

4:00 pm
On Corporate Classifier Systems: Increasing the Benefits of Rule Linkage
Andy Tomlinson and Larry Bull

4:30 pm
A Computational Model of a Viewpoint-Forming Process in a Hierarchical Classifier System
Takahiro Yoshimi and Toshiharu Taura

5:00 pm
An Extension to the XCS Classifier System for Stochastic Environments
Pier Luca Lanzi and Marco Colombetti

3:30 pm - 5:00 pm **Signature 1** **Selection II**
Chair: J. Horn

3:30 pm
Evaluation Criteria for Genetically Tuned Problem Solving Experts
David Sturgill and Gautam pant

4:00 pm
Diffuse versus True Coevolution in a Physics-based World
Brian Mirtich and Gergory S. Hornby

4:30 pm

Voting Teams: A Cooperative Approach to Non-typical Problems
Terence Soule

3:30 pm - 6:00 pm **Salon 10** **DNA/MC II**
Chair: R. Deaton

3:30 pm
Reaction Temperature Constraints in DNA Based Computing
Russell Deaton
4:00 pm
A Statistical Mechanical Treatment of Error in the Annealing Biostep of DNA Computation
John A. Rose, R.J. Deaton, D.R. Franceschetti, M. Garzon, and Se. Stevens Jr.

4:30 pm
Relating the Minimum Model for DNA Computation and Boolean Circuits
Mitsunori Ogihara

5:00 pm
Reconstructing Molecular Phylogenetic Tree with Multifurcation by Using Minimum Complexity Principle
Fengrong Ren, Hiroshi Tanaka, Toshitsugu Okayama, and Takashi Gojobori

5:30 pm
On Self-Assembling Graphs in vitro
Max H. Garzon, Russell J. Deaton, and Ken Barnes

3:30 pm - 5:30 pm **Salon 11** **GEC Operators IV**
Chair: TBA

3:30 pm
Size Fair and Homologous Tree Crossovers
W.B. Langdon

4:00 pm
Graph Based Crossover - A Case Study with the Busy Beaver Problem
Francisco Pereira, Penousal Machado, Ernesto Costa, and Amilcar Cardoso

4:30 pm
Homologous Crossover in Genetic Programming
Frank Francone Markus Conrads, Wolfgang Banzhaf, and Peter Nordin

5:00 pm
Perhaps Not a Free Lunch But At Least a Free Appetizer
Stefan Droste, Thomas Jansen, and Ingo Wegener

3:30 pm - 5:00 pm **Salon 12** **Telecommunications Applications**
Chair: M. Munetomo

3:30 pm
Dynamic Degree Constrained Network Design: A Genetic Algorithm Approach
Chao-Hsien Chu, G. Premkumar, Carey Chou, and Jianzhong Sun

4:00 pm
Optical Mesh Network Topology Design using Node-Pair Encoding Genetic Programming
Mark Sinclair

4:30 pm

Saturday Program at a Glance

Parallel Session I

8:30 am - 10:00 am
General Applications VI Salon 1
Scheduling II Salon 2
Engineering Applications III Salon 3
Invited Talk – John H. Holland Salon 4
GA/CS VII Ballroom D
Image Processing Ballroom B
PhD Workshop Papers III Salon 8
ES/EP II Salon 6
Holland overflow room Salon 5

10:00 pm – 10:30 pm **Coffee Break**

Parallel Session II

10:30 am – 12:00 pm
General Applications VII Salon 1
Science Applications III Salon 2
Engineering Applications IV Salon 3
GEC Theory IV Salon 4
GA/CS VIII Ballroom D
GP/EH V Ballroom B
PhD Workshop Papers IV Salon 8
GEC Operators V Salon 6
GEC as Model II Salon 5
Niching/Deming Salon 7

12:00pm – 1:30 pm **Lunch**

Parallel Session III

1:30 pm – 3:00 pm
General Applications VIII Salon 1
Pattern Recognition II Salon 2
Robotics III Salon 3
GEC Theory V Salon 4
GA/CS IX Ballroom D
GP/EH VI Ballroom B
Vendor Presentations II Salon 8
GEC Operators VI Salon 6

3:00 pm – 3:30 pm **Coffee Break**

3:30 pm – 4:30 pm **ISGA Business Meeting, Conference Adjourns**
Ballroom D

Saturday, July 17, 1999

8:30 am -10:00 am **Salon 1** **General Applications VI**

Chair: T. Westerdale

8:30 am
On the Design of Genetic Algorithms for Geographical Applications
S. Van Dijk and D. Thierens, M. de Berg

9:00 am
"Genetic" Programming
Luke Sean, Shugo Hamahashi, and Hiroaki Kitano

9:30 am
A Patchwork Model for Evolutionary Algorithms with Structured and Variable Size Populations
Thiemo Krink, Brian H. Mayoh, and Zbigniew Michalewicz

8:30 am -10:00 am **Salon 2** **Scheduling II**
Chair: C. Janikow

8:30 am
Evolution of Constraint Satisfaction Strategies in Examination Timetabling
Hugo Terashima-Marin, Peter Ross, and Manuel Valenzuela-Rendon

9:00 am
The Job shop problem Solved with Simple, Basic Evolutionary Search Elements
Patrick Van Bael, Dirk Devogelaere, and Marcel Rijckaert

9:30 am
Designing Cellular Automata-based Scheduling Algorithms
Franciszek Seredynski and Cezary Z. Janikow

8:30 am -10:00 am **Salon 3** **Engineering Applications III**
Chair: A. Pereira

8:30 am
Evolutionary Algorithm For Structural Optimization
Mark Voss and Christopher M. Foley

9:00 am
Digital FIR Filter Design at Gate-level using Evolutionary Algorithms
Julian Miller

9:30 am
Prediction of Silicon Content of Hot Metal Using Fuzzy-GA Regression
Punya Sheel and Brahma Deo

8:30 am -10:00 am **Salon 6** **ES/EP II**

Chair: T. Baeck

8:30 am
A Depth Controlling Strategy for STEPS

Claire J. Kennedy and Christophe Giraud-Carrier

9:00 am
An Evolution Strategy with Coordinate System Invariant Adaptation of Arbitrary Normal Mutation Distributions Within the Concept of Mutative Strategy Parameter Control
Andreas Ostermeier Nikolaus Hansen

8:30 am -10:00 am **Ballroom D** **GA/CS VII**
Chair: N. Baba

8:30 am
Probablilistic Crowding: Deterministic Crowding with Probabilisitic Replacement
Ole J. Mengshoel and David E. Goldberg

9:00 am
The Behavior of Spatially Distributed Evolutionary Algorithms in Non Stationary Environments
Jayshree Sarma and Ken De Jong

9:30 am
Controlling the Cooperative-Competitive Boundary in NIched Genetic Algorithms
Jeffrey Horn

8:30 am -10:00 am **Ballroom B** **Image Processing**
Chair: J. Daida

8:30 am
Evolving Effective Visual Tracking through Shaping
Simon Perkins

9:00 am
Staged Genetic Programming for Image Analysis
Daniel Howard and Simon C. Roberts

9:30 pm
A Group Encoding Technique for Set Partitioning Problems
Dipankar Dasgupta, Congjun Yang, and Yuehua Cao

8:30 am -10:00 am **Salon 4** **Invited talk – John H. Holland**
Chair: Robert E. Smith

An intimate Conversation with John Holland
John H. Holland, University of Michigan, (65 tickets awarded by lottery),

8:30 am -10:00 am **Salon 5** **Holland Overflow Room with Audio**

8:30 am - 10:00 am **Salon 8** **Phd Workshop Papers III**
Chair: S. Lucia

Sexual vs. Asexual Recombination for the Graph Coloring Problem with Hybrid Genetic Algorithms
Anna Marino

Discovering Interesting Prediction Rules with a Genetic Algorithm
Edgar Noda

Automatic Programming with Grammatical Evolution
Michael O'Neill

Medical Diagnosis Prediction using Genetic Programming
Vili Polgorelec

On Estimation Distribution Algorithms
Roberto Santana

Self-Tuning Evolutionary System
Lucia Sheehan

10:00 am - 10:30 am **Coffee Break**

10:30 am - 12:00 pm **Salon 1** **General Applications VII**

Chair: N. Baba

10:30 am
A Hybrid Genetic Algorithm for the Vehicle Routing Problem with Time Windows and Itinerary Constraints
Jean Berger, Mourad Sassi, and Martin Salois

11:00 am
A Flipping Genetic Algorithm for Hard 3-SAT Problems
Elena Marchiori and Claudio Rossi

11:30 am
Iterated Local Search Approach using Genetic Transformation to the Traveling Salesman Problem

Kengo Katayama and Hiroyuki Narihisa

10:30 am - 12:00 pm **Salon 2** **Science Applications III**
Chair: V. Babovic

10:30 am
Generating Lemmas for Tableau-based Proof Search Using Genetic Programming
Marc Fuchs, Dirk Fuchs, and Matthias Fuchs

11:00 am
Evolutionary Modeling of Ordinary Differential Equations for Dynamic Systems
Hongqing Cao, Yuping Chen, and Lishan Kang

11:30 am
Parametric L-System Description of the Retina with Combined Evolutionary Operators
Gabriella Kokai, Robert Vanyi, and Zoltan Toth

10:30 am - 12:00 pm **Salon 3** **Engineering Applications IV**
Chair: TBA

10:30 am
Hazard Assessment Modeling: An Evolutionary Ensemble Approach
David Opitz, Subhash Basak, and Brian Gute

11:00 am
Genetic Algorithm for Regional Surveillance
Maria John, David Panton, and Kevin White
11:30 am
Searching for the Impossible using Genetic Programming
John R. Koza, Forrest H Bennett III, Martin A. Keane, Jessen Yu, William Mydlowec, and Oscar Stiffleman

10:30 am - 12:00 pm Salon 4 GEC Theory IV
Chair: G. Rudolph

10:30 am
Finding Attractors for Periodic Fitness Functions
Jonathan Rowe

11:00 am
Optimizing Global-Local Search Hybrids
David Goldberg and Siegfried Voessner

11:30 am
Fitness Noise and Localization Errors of the Optimum in General Quadratic Fitness Models
Hans-Georg Beyer and Dirk V. Arnold

10:30 am - 12:00 pm Ballroom D GA/CS VIII
Chair: O. Mengshoel

10:30 am
A Parameter-less Genetic Algorithm
Fernando G. Lobo and Georges R. Harik

11:00 am
Chance-Constrained Genetic Algorithms
Daniel H. Loughlin and S. Ranji Ranjithan

11:30 am
Incremental Commitment in Genetic Algorithms
Richard Watson and Jordan B. Pollack

10:30 am - 12:00 pm Ballroom B GP/EH V
Chair: W. B. Langdon

10:30 am
An Analysis of Automatic Subroutine Discovery in Genetic Programming
Antonella Giani, Antonello Dessi, and Antonia Starita

11:00 am
Individual GP: an Alternative Viewpoint for the Resolution of Complex Problems
Pierre Collet, Evelyne Lutton, Frederic Raynal, and Marc Schoenauer

11:30 am
Smooth Uniform Crossover, Sub-Machine Code GP and Demes: A Recipe For Solving High-Order

Boolean Parity Problems
Riccardo Poli, Jonathan Page, and W.B. Langdon

10:30 am - 12:00 pm **Salon 5** **GEC as Model II**
Chair: P. Bentley

10:30 am
Modeling of Complex Economic Systems with Agents Nets
Alexei A. Gaivoronski
11:00 am
Evolutionary Behaviors Emerged through Strategic Interactions in the Large
Kimitaka Uno and Akira Namatame

11:30 am
Accuracy-based Fitness Allows Similar Performance to Humans in Static and Dynamic Classification Environments
Adrian R. Hartley

10:30 am - 12:00 pm **Salon 6** **GEC Operators V**
Chair: T. Terano

10:30 am
Self-Adaptation in Real-Parameter Genetic Algorithms with Simulated Binary Crossover
Kalyanmoy Deb and Hans-Georg Beyer

11:00 am
Linkage Crossover for Genetic Algorithms
Kishan Mehrotra, Ayed A. Salman, and Chilukuri K. Mohan

11:30 am
Non-Standard Crossover for a Standard Representation -- Commonality-Based Feature Subset Selection
Stephen Chen, Stephen F. Smith, and Cesar Guerra-Salcedo

10:30 am - 12:00 pm **Salon 7** **Niching/Deming**

Chair: I. Parmee

10:30 am
Evolutionary Divide and Conquer (II) for the TSP
Christine Valenzuela

11:00 am
An Investigation of Exploration and Exploitation Within Cluster Oriented Genetic Algorithms (COGAs)
Christopher R. Bonham and Ian C. Parmee

11:30 am
Extending the bounds of the search space: A Multi-Population Approach
M.A. Beck and I.C. Parmee

10:30 am - 12:00 pm **Salon 8** **PhD Workshop Papers IV**
Chair: P. Reid

Evolutionary Algorithm for Structural Optimization
Mark Voss

Evolution and Problem Decomposition

Richard Watson

A Max 1s Problem in DNA Computing via GAs
Eugene V. Antipov

A New Evolutionary Hardware Approach for Logic Design
Tatiana Kalganova

Implementing GA Accelerators using FPGAs
Reid Porter

12:00 pm - 1:30 pm **Lunch**

1:30 pm - 3:00 pm **Salon 1** **General Applications VIII**
Chair: S. Obayashi

1:30 pm
A Genetic Algorithm without Parameters Tuning and its Application on the Floorplan Design Problem
Hiroshi Someya and Masayuki Yamamura

2:00 pm
Sequence Learning Through PIPE and Automatic Tasks Decomposition
Rafal Salustowicz and Jurgen Schmidhuber

1:30 pm - 3:00 pm **Salon 2** **Pattern Recognition II**
Chair: M. Schoenauer

1:30 pm
Evolutionary Discovery of Learning Rules for Feedforward Neural Networks with step activation function
Amr Radi and Riccardo Poli

2:00 pm
Evolution of Neural networks Using Weight Mapping
Joao Carlos Figueira Pujol and Riccardo Poli

1:30 pm - 3:00 pm **Salon 3** **Robotics III**
Chair: T. Higuchi

1:30 pm
A Biologically Inspired Fitness Function for Robotic Grasping
Jaime Fernandez and Ian Walker

2:00 pm
Evolving a behavior-based control architecture-From simulations to the real world
Marc Ebner and Andreas Zell

2:30 pm
Dymanical Properties of the Fitness Landscape of a GP Controlled Random Morphology Robot
Peter Dittrich, Andre Skusa, Wolfgang Kantschik, and Wolfgang Banzhaf

1:30 pm - 3:00 pm **Salon 4** **GEC Theory V**
Chair: T. Higuchi

1:30 pm
Towards a Simulation of Natural Mutation

I . De Falco, A. Iazzetta, E. Tarantino , A. Della Cioppa, and Iacuelli

2:00 pm
Analytical Solutions for Infinite Population Genetic Algorithms on Multiplicative Landscape
Hiroshi Furutani

2:30 pm
Problem Solving: Search, Exploration and Co-evolution
Josiah Poon

1:30 pm - 3:00 pm **Ballroom D** **GA/CS IX**
Chair: W. Stolzmann

1:30 pm
Extending the Representation of Classifier Conditions Part I: From Binary to Messy Coding
Pier Luca Lanzi

2:00 pm
Extending the Representation of Classifier Conditions Part II: From Messy Coding to S-Expressions
Pier Luca Lanzi and Alessandro Perrucci

2:30 pm
Comparing Reinforcement Learning Algorithms Applied to Crisp and Fuzzy Learning Classifier Systems
Andrea Bonarini

1:30 pm - 3:00 pm **Ballroom B** **GP/EH VI**
Chair: P. Nordin

1:30 pm
Dimensionally Aware Genetic Programming
Maarten Keijzer Vladan Babovic

2:00 pm
Genetic Programming with Incremental Data Inheritance
Byoung-Tak Zhang and Je-Gun Joung

2:30 pm
Coevolving Functions in Genetic Programming: Classification using K-nearest-neighbour
Manu Ahluwalia and Larry Bull

1:30 pm - 3:00 pm **Salon 6** **GEC Operators VI**

Chair: W. Hart

1:30 pm
Multi-parent Recombination with Simplex Crossover in Real Coded Genetic Algorithms
Shigeyoshi Tsutsui

2:00 pm
Minimum-Allele-Reserve-Keeper (MARK): A Fast & Effective Mutation Scheme for GA
Zeke Chan, H.W Ngan, and A.B .Rad

2:30 pm
Improving Genetic Algorithms by Search Space Reductions (with Applications to Flow Shop Scheduling)
Stephen Chen and Stephen F. Smith

GECCO-2000

2000 Genetic and Evolutionary Computation Conference

A recombination of the Fifth Annual Genetic Programming Conference (GP-2000)
and the International Conference on Genetic Algorithms (ICGA-2000)

July 8 - 12 (Saturday - Wednesday), 2000
Las Vegas, Nevada USA
www.genetic-programming.org www.genetic-algorithm.org

The 2000 Genetic and Evolutionary Computation Conference (GECCO-2000) will present the latest high-quality research results in the growing field of genetic and evolutionary computation. Topics include, but are not limited to, genetic algorithms (GA), genetic programming (GP), evolution strategies (ES), evolutionary programming (EP), real-world applications (RWA) of genetic and evolutionary computation, classifier systems (CFS), evolvable hardware (EH), DNA and molecular computing (DNA), artificial life, adaptive behavior, and agents (AAA), Evolutionary Robotics (ER), Ant Colony Optimization (ACO), Methodology, Pedagogy, and Philosophy (MPP), Genetic Scheduling (GS), and other areas to be announced. The conference is organized around independently operating program committees that will establish their own procedures for peer reviewing and will make the final decisions on submitted papers for its area (subject only to conference-wide space limitations and procedures).

Additional information will be periodically posted on the WWW at www.genetic-programming.org and www.genetic-algorithm.org.

GENERAL CHAIR: **Darrell Whitley**

PROGRAM CHAIRS
Genetic Programming and Evolvable Hardware - **Lee Spector**
Genetic Algorithms and Classifier Systems **- Dave Goldberg** and **Eric Cantu-Paz**
Real World Applications - **Ian Parmee**
Evolution Strategies and Evolutionary Programming **- Hans-Georg Beyer**

SPECIAL PROGRAM TRACKS (Others to be announced)
DNA and Molecular Computing, Evolutionary Robotics, Artificial Life, Adaptive Behavior, and Agents, Genetic Scheduling, Ant Colony Optimization, Methodology, Pedagogy, and Philosophy

BUSINESS COMMITTEE: David E. Goldberg and **John R. Koza**

FREE TUTORIALS: All conference participants can attend conference tutorials on Sunday, July 9, 2000, free of charge. There are introductory tutorials as well as tutorials aimed at more advanced audiences.

ADDITIONAL INFORMATION
E-Mail for Technical Matters: contact Darrell Whitley, GECCO-2000 Chair, at whitley@cs.colostate.edu E-Mail for Administrative Matters: gecco@aaai.org.
For information concerning paper submission, hotel reservations, travel discounts, student housing, student travel grants, graduate student workshop, proposals for workshops, proposals for additional tutorials, late-breaking papers, and other matters, visit

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