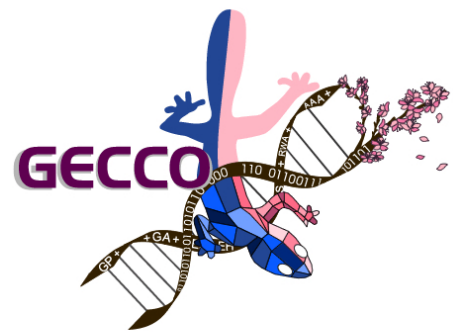


Genetic and Evolutionary Computation Conference 2018

Conference Program (Program Only)



Kyoto, Japan
July 15-19, 2018



Association for
Computing Machinery

Advancing Computing as a Science & Profession



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GECCO is sponsored by the Association for Computing Machinery Special Interest Group for Genetic and Evolutionary Computation (SIGEVO). SIG Services: 2 Penn Plaza, Suite 701, New York, NY, 10121, USA, 1-800-342-6626 (USA and Canada) or +212-626-0500 (global).

Schedule and Floor Plans



Schedule at a Glance

Sunday, July 15	Monday, July 16	Tuesday, July 17	Wednesday, July 18	Thursday, July 19
		Opening 09:00	SparkCognition 09:00	
Tutorials, Workshops, and Competitions 09:30-11:10	Tutorials and Workshops 09:00-10:40	Invited Keynote Kazuo Yano 09:10-10:20	Invited Keynote Tatsuya Okabe 09:10-10:20	Paper Sessions and HOP 09:00-10:40
	Coffee Break	Coffee Break	Coffee Break	Coffee Break
Lunch on Your Own	Tutorials and Workshops 11:00-12:40	Paper Sessions and ECiP 10:40-12:20	Paper Sessions and HOP 10:40-12:20	SIGEVO Keynote David E. Goldberg 11:00-12:10
Tutorials and Workshops 12:50-14:30	Lunch on Your Own	Lunch on Your Own (Job Market)	Lunch on Your Own	SIGEVO Meeting/Awards Closing 12:10-13:40
Coffee Break	Tutorials, Workshops, and LBA 14:00-15:40	Paper Sessions, ECiP and HUMIES 14:00-15:40	Invited Keynote Naoko Yamazaki 14:00-15:10	SIGEVO Summer School Closing 13:40-16:30
Tutorials and Workshops 14:50-16:30	Coffee Break	Coffee Break	Coffee Break	
	Tutorials, Workshops, and LBA 16:00-17:40	Paper Sessions and ECiP 16:00-17:40	Paper Sessions and HOP 15:30-17:10	
Welcome Party 17:45-20:00	Women @ GECCO 18:00-20:00	Poster Session 18:00-20:00	Social Event 18:00-22:00	

Registration desk hours: 9:00-16:00 (closed during lunch)

Coffee breaks: Foyer of Terrsa Hall (1F and 2F)

Keynotes, job market, poster session, and SIGEVO meeting: Terrsa Hall (1F)

Summer School lunch meetings: Sunday, July 15 and Monday, July 16 – Study Room

Student Workshop lunch meeting: Monday, July 16 – Conference Room No. 9

GPEM meeting: Tuesday, July 17 – Conference Room No. 9

ECJ meeting: Wednesday, July 18 – Conference Room No. 9

Welcome party: Terrsa Hall (1F)

Social event: GECCO 2018 banquet will be held at Shunju Hall, in Rihga Royal Hotel Kyoto, on Wednesday, July 18. Rihga Royal Hotel Kyoto (<http://www.rihgaroyalkyoto.com/>) is located on the west side of Kyoto Station, at about a 15 minutes walk from the conference venue.

Workshop and Tutorial Sessions, Sunday, July 15

	09:30-11:10	12:50-14:30	14:50-16:30
Terra Hall (1F)	Shift Your Research & Laboratory into Higher Gear with 3 Shift Skills & 4 Smooth Rules Goldberg	Evolution of Neural Networks Miikkulainen	Neuroevolution for Deep Reinforcement Learning Problems Ha
Training Room 1 (2F)	BBOB — Black Box Optimization Benchmarking p. 18	RWACMO — Real-world Applications of Continuous and Mixed-integer Optimization p. 20	GBEA — Game-Benchmark for Evolutionary Algorithms p. 22
Training Room 2 (2F)	Runtime Analysis of Evolutionary Algorithms: Basic Introduction Lehre, Oliveto	Evolutionary Computation and Games Togelius, Risi, Yannakakis	Hyper-heuristics Woodward, Tauritz
Training Room 3 (2F)	VizGEC/SAEOpt — Visualisation Methods in EC / Surrogate-Assisted Evolutionary Optimisation p. 19	EvoSoft — Evolutionary Computation Software Systems p. 21	
Conference Room Medium (2F)	Introducing Learning Classifier Systems: Rules that Capture Complexity Urbanowicz, Vargas	Evolutionary Reinforcement Learning: General Models and Adaptation Vargas	A Practical Guide to Experimentation Hansen
AV Study Room (2F)	Evolutionary Robotics Doncieux, Bredeche, Mouret	Next Generation Genetic Algorithms Whitley	Search-based Test Optimization for Software Systems Ali
Conference Room A (3F)	EABDMCP — Evolutionary Algorithms for Big Data and Massively Complex Problems p. 18	EiC — Evolution in Cognition p. 19	EIEHSCoEvo — Exploration of Inaccessible Environments through Hardware/Software Co-evolution p. 21
Conference Room B (3F)	Competitions p. 33	Search-Maps: Visualising and Exploiting the Global Structure of Computational Search Spaces Ochoa, Veerapen	LAHS — Landscape-Aware Heuristic Search p. 21
Conference Room C (3F)	IOMES — Intelligent Operations Management in the Energy Sector p. 18	ECHNS — Evolutionary Computation in Health Care and Nursing System p. 20	
Conference Room D (3F)	Introduction to Genetic Programming O'Reilly	Representations for Evolutionary Algorithms Rothlauf	
Conference Room 2 (3F)	Introductory Mathematical Programming for EC Shir	Introductory Statistics for EC: A Visual Approach Wineberg	Theory for Non-Theoreticians Doerr



Tutorials



Workshops



Competitions

Workshop and Tutorial Sessions, Monday, July 16

	09:00-10:40	11:00-12:40	14:00-15:40	16:00-17:40
Terrsa Hall (1F)	Model-Based Evolutionary Algorithms Thierens, Bosman	Evolutionary Multiobjective Optimization Brockhoff	Decomposition Multi-Objective Optimisation Li, Zhang	Visualization in Multi-objective Optimization Filipic, Tusar
Training Room 1 (2F)			NSBECR — New Standards for Benchmarking in Evolutionary Computation Research p. 25	PDEIM — Parallel and Distributed Evolutionary Inspired Methods p. 26
Training Room 2 (2F)	SecDef — Genetic and Evolutionary Computation in Defense, Security and Risk Management p. 23		Late-Breaking Abstracts p. 28	
Training Room 3 (2F)	BB-DOB — Black Box Discrete Optimization Benchmarking p. 22		GI — Genetic Improvement p. 25	
Conference Room Medium (2F)	CMA-ES and Advanced Adaptation Mechanisms Akimoto, Hansen	Particle Swarm Optimization Engelbrecht, Cleghorn	Dynamic Parameter Choices in Evolutionary Computation Doerr	Automated Offline Design of Algorithms López-Ibañez, Stützle
AV Study Room (2F)	Bio-Inspired Approaches to Anomaly and Intrusion Detection Martí, Schoenauer	Evolutionary Computation for Digital Art Neumann, Neumann	Cloudy Distributed Evolutionary Computation Merelo	Expressive Genetic Programming: Concepts and Applications Spector, McPhee
Conference Room A (3F)	IAM/ECADA — Industrial Application / Automated Design of Algorithms p. 22	MedGEC — Medical Applications of Genetic and Evolutionary Computation p. 24	EAPU — Evolutionary Algorithms for Problems with Uncertainty p. 25	DTEO — Decomposition Techniques in Evolutionary Optimization p. 26
Conference Room B (3F)	Promoting Diversity in Evolutionary Optimization: Why and How Squillero, Tonda	Student Workshop p. 27		
Conference Room C (3F)	Medical Applications of Evolutionary Computation Smith	IWLCS — Learning Classifier Systems p. 24		
Conference Room D (3F)	Evolutionary Computation: A Unified Approach De Jong	Simulation Optimization Branke	EC for Feature Selection and Feature Construction Xue, Zhang	EC/DL for Image Analysis, Signal Processing and Pattern Recognition Zhang, Cagnoni
Conference Room 2 (3F)	Theory of Estimation-of-Distribution Algorithms Witt	Sequential Experimentation by Evolutionary Algorithms Shir, Bäck	Constraint-Handling Techniques used with EAs Coello Coello	Solving Complex Problems with Coevolutionary Algorithms Krawiec, Heywood



Tutorials



Workshops



LBA session

Women @ GECCO
Conference Room D (3F)
18:00-20:00

p. 30

Parallel Sessions, Tuesday, July 17 through Thursday, July 19

	Tuesday July 17 10:40-12:20	Tuesday July 17 14:00-15:40	Tuesday July 17 16:00-17:40	Wednesday July 18 10:40-12:20	Wednesday July 18 15:30-17:10	Thursday July 19 09:00-10:40
Terrsa Hall (1F)	EML1 ★ p. 49	Venue Poster Setup	Authors Poster Setup	ECOM4 ★ p. 59	GA4 ★ p. 64	EMO7 ★ p. 67
Training Room 1 (2F)	ENUM1 p. 49	HUMIES p. 32	ENUM2 p. 56	ENUM3 p. 60		
Training Room 2 (2F)	GECH1 p. 50	EML2 p. 52	EML3 p. 55	EML4 p. 59	EML5 p. 64	EML6 p. 67
Training Room 3 (2F)	RWA1 p. 50	GECH2 p. 53	RWA3 p. 57	RWA4 p. 62	RWA5 p. 65	RWA6 p. 69
Conference Room Medium (2F)	DETA1 p. 48	RWA2 ★ p. 54	CS2 ★ p. 55	GP3 ★ p. 61	DETA2 + THEORY3 + GECH4 ★ p. 63	ENUM4 ★ p. 68
AV Study Room (2F)	CS1 p. 48	GP1 p. 53	GP2 p. 57	CS3 p. 59	CS4 p. 63	RWA7 p. 69
Conference Room A (3F)	THEORY1 p. 51	THEORY2 p. 54	GECH3 p. 57	SBSE1 p. 62	SBSE2 p. 66	THEORY4 p. 69
Conference Room B (3F)	GA1 p. 50	ACO-SI1 p. 52	GA2 p. 56	GA3 p. 61	ACO-SI2 p. 63	EML7 p. 67
Conference Room C (3F)	ECiP1 p. 35	ECiP2 p. 35	ECiP3 p. 35	HOP1 p. 61	HOP2 p. 65	HOP3 p. 68
Conference Room D (3F)	EMO1 p. 49	EMO2 p. 53	EMO3 p. 56	EMO4 p. 60	EMO6 p. 64	HOP4 p. 68
Conference Room 2 (3F)	ECOM1 p. 48	ECOM2 p. 52	ECOM3 p. 55	EMO5 p. 60	ECOM5 p. 64	DETA3 p. 67

Sessions with best
paper nominees

HUMIES



ECiP



HOP

Track List and Abbreviations

ACO-SI: Ant Colony Optimization and Swarm Intelligence

CS: Complex Systems (Artificial Life / Artificial Immune Systems / Generative and Developmental Systems / Evolutionary Robotics / Evolvable Hardware)

DETA: Digital Entertainment Technologies and Arts

ECiP: Evolutionary Computation in Practice

ECOM: Evolutionary Combinatorial Optimization and Metaheuristics

EML: Evolutionary Machine Learning

EMO: Evolutionary Multiobjective Optimization

ENUM: Evolutionary Numerical Optimization

GA: Genetic Algorithms

GECH: General Evolutionary Computation and Hybrids

GP: Genetic Programming

HUMIES: Annual “Humies” Awards For Human-Competitive Results

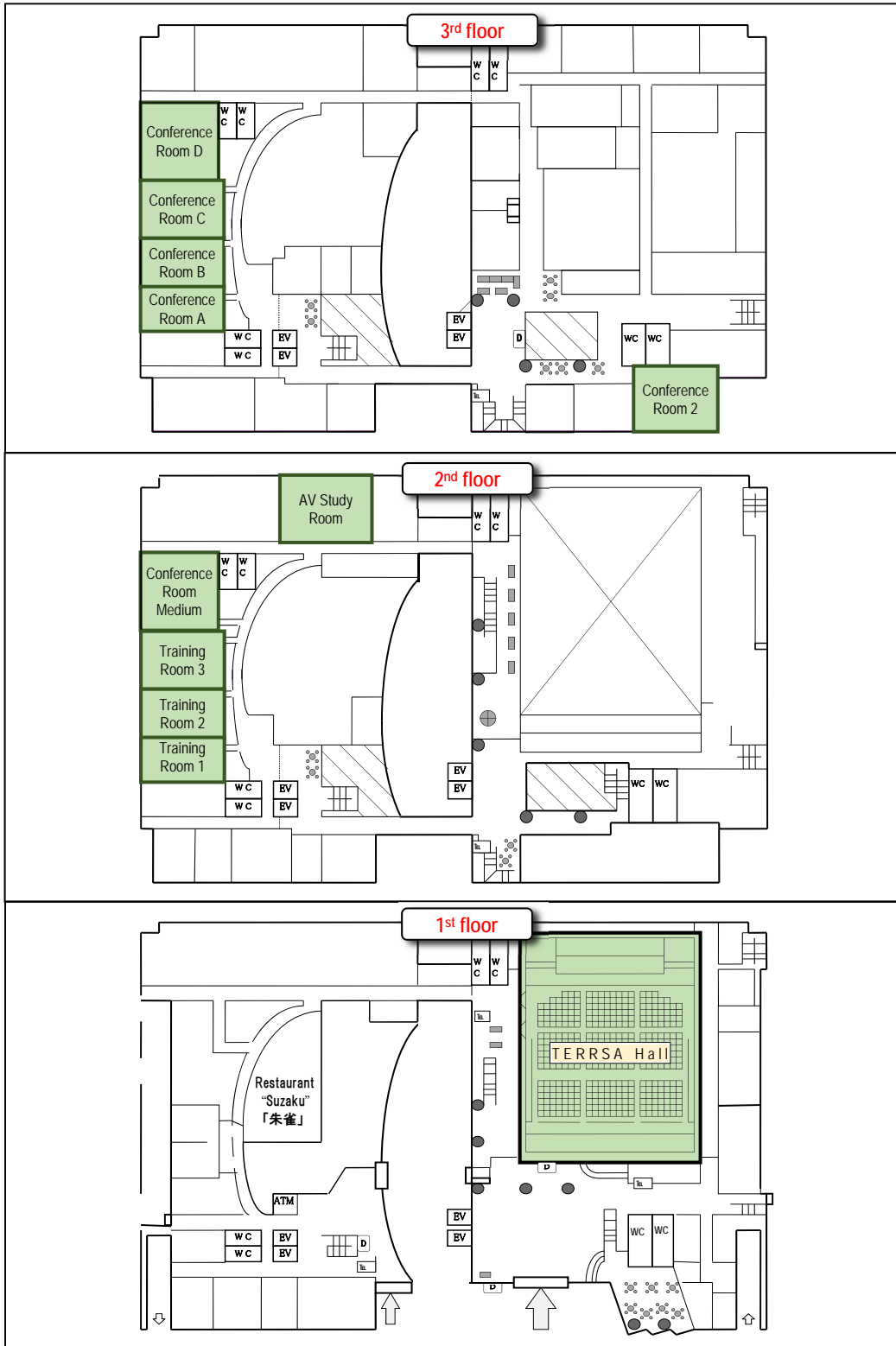
HOP: Hot Off the Press

RWA: Real World Applications

SBSE: Search-Based Software Engineering

THEORY: Theory

Floor Plans



Tutorials



Introductory Tutorials

Shift Your Research & Laboratory into Higher Gear with 3 Shift Skills & 4 Smooth Rules David E. Goldberg, <i>ThreeJoy Associates, Inc.</i>	Sunday, July 15, 09:30-11:10 Terrsa Hall (1F)
Runtime Analysis of Evolutionary Algorithms: Basic Introduction Per Kristian Lehre, <i>University of Birmingham</i> Pietro S. Oliveto, <i>University of Sheffield</i>	Sunday, July 15, 09:30-11:10 Training Room 2 (2F)
Introducing Learning Classifier Systems: Rules that Capture Complexity Ryan Urbanowicz, <i>University of Pennsylvania</i> Danilo Vargas, <i>Kyushu University</i>	Sunday, July 15, 09:30-11:10 Conference Room Medium (2F)
Introduction to Genetic Programming Una-May O'Reilly, <i>MIT</i>	Sunday, July 15, 09:30-11:10 Conference Room D (3F)
Introductory Mathematical Programming for EC Ofer M. Shir, <i>Tel-Hai College</i>	Sunday, July 15, 09:30-11:10 Conference Room 2 (3F)
Evolution of Neural Networks Risto Miikkulainen, <i>The University of Texas at Austin</i>	Sunday, July 15, 12:50-14:30 Terrsa Hall (1F)
Evolutionary Computation and Games Julian Togelius, <i>IT University of Copenhagen</i> Sebastian Risi, <i>IT University of Copenhagen</i> Georgios N. Yannakakis, <i>University of Malta</i>	Sunday, July 15, 12:50-14:30 Training Room 2 (2F)
Search-Maps: Visualising and Exploiting the Global Structure of Computational Search Spaces Gabriela Ochoa, <i>University of Stirling</i> Nadarajen Veerapen, <i>University of Stirling</i>	Sunday, July 15, 12:50-14:30 Conference Room B (3F)
Representations for Evolutionary Algorithms Franz Rothlauf, <i>Universität Mainz</i>	Sunday, July 15, 12:50-14:30 Conference Room D (3F)
Introductory Statistics for EC: A Visual Approach Mark Wineberg, <i>University of Guelph</i>	Sunday, July 15, 12:50-14:30 Conference Room 2 (3F)
Neuroevolution for Deep Reinforcement Learning Problems David Ha, <i>Google Brain</i>	Sunday, July 15, 14:50-16:30 Terrsa Hall (1F)
Hyper-heuristics John R. Woodward, <i>Queen Mary University of London</i> Daniel R. Tauritz, <i>Missouri University of Science and Technology</i>	Sunday, July 15, 14:50-16:30 Training Room 2 (2F)
A Practical Guide to Experimentation Nikolaus Hansen, <i>Inria</i>	Sunday, July 15, 14:50-16:30 Conference Room Medium (2F)
Search-based Test Optimization for Software Systems Shaukat Ali, <i>Simula Research Laboratory</i>	Sunday, July 15, 14:50-16:30 AV Study Room (2F)
Theory for Non-Theoreticians Benjamin Doerr, <i>Ecole Polytechnique</i>	Sunday, July 15, 14:50-16:30 Conference Room 2 (3F)
Model-Based Evolutionary Algorithms Dirk Thierens, <i>Utrecht University</i> Peter A.N. Bosman, <i>Centrum Wiskunde & Informatica (CWI)</i>	Monday, July 16, 09:00-10:40 Terrsa Hall (1F)

Evolutionary Computation: A Unified Approach Kenneth De Jong, <i>Krasnow Institute</i>	Monday, July 16, 09:00-10:40 Conference Room D (3F)
Evolutionary Multiobjective Optimization Dimo Brockhoff, <i>Inria</i>	Monday, July 16, 11:00-12:40 Terrsa Hall (1F)

Advanced Tutorials

Evolutionary Reinforcement Learning: General Models and Adaptation Danilo Vasconcellos Vargas, <i>Kyushu University</i>	Sunday, July 15, 12:50-14:30 Conference Room Medium (2F)
Next Generation Genetic Algorithms Darrell D. Whitley, <i>Colorado State University</i>	Sunday, July 15, 12:50-14:30 AV Study Room (2F)
CMA-ES and Advanced Adaptation Mechanisms Youhei Akimoto, <i>University of Tsukuba</i> Nikolaus Hansen, <i>Inria</i>	Monday, July 16, 09:00-10:40 Conference Room Medium (2F)
Promoting Diversity in Evolutionary Optimization: Why and How Giovanni Squillero, <i>Politecnico di Torino</i> Alberto Tonda, <i>INRA</i>	Monday, July 16, 09:00-10:40 Conference Room B (3F)
Particle Swarm Optimization: A Guide to Effective, Misconception Free, Real World Use Andries Engelbrecht, <i>University of Pretoria</i> Christopher Wesley Cleghorn, <i>University of Pretoria</i>	Monday, July 16, 11:00-12:40 Conference Room Medium (2F)
Evolutionary Computation for Digital Art Aneta Neumann, <i>The University of Adelaide</i> Frank Neumann, <i>The University of Adelaide</i>	Monday, July 16, 11:00-12:40 AV Study Room (2F)
Simulation Optimization Juergen Branke, <i>University of Warwick</i>	Monday, July 16, 11:00-12:40 Conference Room D (3F)
Sequential Experimentation by Evolutionary Algorithms Ofer M. Shir, <i>Tel-Hai College</i> Thomas Bäck, <i>Leiden University</i>	Monday, July 16, 11:00-12:40 Conference Room 2 (3F)
Decomposition Multi-Objective Optimisation: Current Developments and Future Opportunities Ke Li, <i>University of Exeter</i> Qingfu Zhang, <i>City University of Hong Kong</i>	Monday, July 16, 14:00-15:40 Terrsa Hall (1F)
Dynamic Parameter Choices in Evolutionary Computation Carola Doerr, <i>CNRS and Sorbonne University</i>	Monday, July 16, 14:00-15:40 Conference Room Medium (2F)
Constraint-Handling Techniques used with Evolutionary Algorithms Carlos A. Coello Coello, <i>CINVESTAV-IPN</i>	Monday, July 16, 14:00-15:40 Conference Room 2 (3F)
Visualization in Multiobjective Optimization Bogdan Filipic, <i>Jozef Stefan Institute</i> Tea Tusar, <i>Jozef Stefan Institute</i>	Monday, July 16, 16:00-17:40 Terrsa Hall (1F)
Expressive Genetic Programming: Concepts and Applications Lee Spector, <i>Hampshire College</i> Nicholas Freitag McPhee, <i>University of Minnesota, Morris</i>	Monday, July 16, 16:00-17:40 AV Study Room (2F)

Solving Complex Problems with Coevolutionary Algorithms

Krzysztof Krawiec, *Poznan University of Technology*
 Malcolm Heywood, *Dalhousie University*

Monday, July 16, 16:00-17:40
 Conference Room 2 (3F)

Specialized Tutorials**Evolutionary Robotics**

Stephane Doncieux, *Université Pierre et Marie Curie*
 Nicolas Bredeche, *Université Pierre et Marie Curie*
 Jean-Baptiste Mouret, *Inria*

Sunday, July 15, 09:30-11:10
 AV Study Room (2F)

Bio-Inspired Approaches to Anomaly and Intrusion Detection

Luis Martí, *Universidade Federal Fluminense*
 Marc Schoenauer, *Inria*

Monday, July 16, 09:00-10:40
 AV Study Room (2F)

Medical Applications of Evolutionary Computation

Stephen L. Smith, *University of York*

Monday, July 16, 09:00-10:40
 Conference Room C (3F)

Theory of Estimation-of-Distribution Algorithms

Carsten Witt, *Technical University of Denmark*

Monday, July 16, 09:00-10:40
 Conference Room 2 (3F)

Cloudy Distributed Evolutionary Computation

JJ Merelo, *University of Granada*

Monday, July 16, 14:00-15:40
 AV Study Room (2F)

Evolutionary Computation for Feature Selection and Feature Construction

Bing Xue, *Victoria University of Wellington*
 Mengjie Zhang, *Victoria University of Wellington*

Monday, July 16, 14:00-15:40
 Conference Room D (3F)

Automated Offline Design of Algorithms

Manuel López-Ibáñez, *University of Manchester*
 Thomas Stützle, *IRIDIA, Université Libre de Bruxelles*

Monday, July 16, 16:00-17:40
 Conference Room Medium (2F)

Evolutionary Computation and Evolutionary Deep Learning for Image Analysis, Signal Processing and Pattern Recognition

Mengjie Zhang, *Victoria University of Wellington*
 Stefano Cagnoni, *University of Parma*

Monday, July 16, 16:00-17:40
 Conference Room D (3F)

**Workshops,
Late Breaking Abstracts,
and Women@GECCO**



BBOB — Black Box Optimization Benchmarking

Organizers: Anne Auger (INRIA; CMAP, Ecole Polytechnique); Julien Bect (CentraleSupélec); Dimo Brockhoff (INRIA Saclay - Ile-de-France; CMAP, Ecole Polytechnique); Nikolaus Hansen (Inria, research centre Saclay); Rodolphe Le Riche (Ecole Nationale Supérieure des Mines de Saint-Étienne); Victor Picheny (INRA); Tea Tusar (Jozef Stefan Institute)

Time and Location: Sunday, July 15, 09:30-11:10, Training Room 1 (2F)

Benchmarking the PSA-CMA-ES on the BBOB Noiseless Testbed

Kouhei Nishida, Youhei Akimoto

Benchmarking a Variant of the CMAES-APOP on the BBOB Noiseless Testbed

Duc Manh Nguyen

Stopping Criteria, Initialization, and Implementations of BFGS and their Effect on the BBOB Test Suite

Aurore Blelly, Matheus Felipe-Gomes, Anne Auger, Dimo Brockhoff

Comparing Black-Box Differential Evolution and Classic Differential Evolution

Aljosa Vodopija, Tea Tusar, Bogdan Filipic

EABDMCP — Evolutionary Algorithms for Big Data and Massively Complex Problems

Organizers: David Camacho (Universidad Autonoma de Madrid); Pedro Castillo (UGR); Francisco Chávez (University of Extremadura); Antonio J. Fernández Leiva (University of Málaga); JJ Merelo (University of Granada)

Time and Location: Sunday, July 15, 09:30-11:10, Conference Room A (3F)

Multi-objective Feature Selection for EEG Classification with Multi-Level Parallelism on Heterogeneous CPU-GPU Clusters

Juan José Escobar, Julio Ortega, Antonio Francisco Díaz, Jesús González, Miguel Damas

Mapping evolutionary algorithms to a reactive, stateless architecture

JJ Merelo, José-Mario García Valdez

IOMES — Intelligent Operations Management in the Energy Sector

Organizers: Luis Martí (Universidade Federal Fluminense); John McCall (Smart Data Technologies Centre); Nayat Sanchez-Pi (Rio de Janeiro State University (UERJ))

Time and Location: Sunday, July 15, 09:30-11:10, Conference Room C (3F)

Multiobjective Evolutionary Polygonal Approximation for Identifying Crude Oil Reservoirs

José Luis Guerrero, Luis Martí, Nayat Sanchez-Pi, Antonio Berlanga, José Manuel Molina

Crude Oil Refinery Scheduling: Addressing a Real-World Multiobjective Problem through Genetic Programming and Dominance-based Approaches

Cristiane Salgado Pereira, Douglas Mota Dias, Marley Rebuszi Vellasco, Francisco Henrique F. Viana, Luis Martí

Towards Bundling Minimal Trees in Polygonal Maps

Victor Parque, Tomoyuki Miyashita

VizGEC/SAEOpt — Visualisation Methods in Genetic and Evolutionary Computation / Surrogate-Assisted Evolutionary Optimisation

Organizers: Richard Everson (University of Exeter); Jonathan Edward Fieldsend (University of Exeter); Yaochu Jin (University of Surrey); Alma A. M. Rahat (University of Exeter); David Walker (University of Exeter); Handing Wang (University of Surrey)

Time and Location: Sunday, July 15, 09:30-11:10, Training Room 3 (2F)

VINE: An Open Source Interactive Data Visualization Tool for Neuroevolution

Rui Wang, Jeff Clune, Kenneth O. Stanley

Visualizing the tape of life: exploring evolutionary history with virtual reality

Emily L. Dolson, Charles Ofria

Visualising the Search Process for Multi-objective Optimisation

Marde Helbig

Evaluating Surrogate Models for Multi-Objective Influence Maximization in Social Networks

Doina Bucur, Giovanni Iacca, Andrea Marcelli, Giovanni Squillero, Alberto Tonda

Asynchronous Surrogate-assisted Optimization Networks

Johannes Karder, Andreas Beham, Bernhard Werth, Stefan Wagner, Michael Affenzeller

EiC — Evolution in Cognition

Organizers: Joshua Auerbach (Champlain College); Harold de Vladar (Konrad Lorenz Institute, Centre for Parmenides Foundation); Stéphane Doncieux (Sorbonne Université; CNRS, ISIR); Richard Duro (Universidade da Coruña)

Time and Location: Sunday, July 15, 12:50-14:30, Conference Room A (3F)

Invited Talk

Kenji Doya

Invited Talk

Joel Lehman

Invited Talk

Stephane Doncieux

Meta Learning by the Baldwin Effect

Chrisantha Fernando, Jakub Sygnowski, Simon Osindero, Jane Wang, Tom Schaul, Denis Teplyashin, Pablo Sprechmann, Alexander Pritzel, Andrei Rusu

The Flouted Naming Game: Contentions and Conventions in Culture

Harold P. de Vladar

RWACMO — Real-world Applications of Continuous and Mixed-integer Optimization

Organizers: Kazuhisa Chiba (The University of Electro-Communications); Akira Oyama (Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency; Japan Aerospace Exploration Agency); Pramudita Palar (Tohoku University); Koji Shimoyama (Tohoku University); Hemant Kumar Singh (University of New South Wales at Australian Defence Force Academy (UNSW@ADFA), Canberra ACT, Australia)

Time and Location: Sunday, July 15, 12:50-14:30, Training Room 1 (2F)

Invited Talk: Algorithms for Optimization Under Budget Constraints, with Application Examples

Thomas Bäck

Invited Talk: Memetic and Bayesian Perspectives on Transfer Optimization: From Algorithms to Applications

Abhishek Gupta

Well Placement Optimization for Carbon dioxide Capture and Storage via CMA-ES with Mixed Integer Support

Atsuhiko Miyagi, Hajime Yamamoto, Youhei Akimoto

On Vehicle Surrogate Learning with Genetic Programming Ensembles

Victor Parque, Tomoyuki Miyashita

ECHNS — Evolutionary Computation in Health Care and Nursing System

Organizers: Koichi Nakayama (Saga University); Chika Oshima (Saga University)

Time and Location: Sunday, July 15, 12:50-16:30, Conference Room C (3F)

Can evolutionary computing be applied to dementia care?

Taro Sugihara

Sustainable Sensor Network Architecture for Monitoring Human Activities

Ren Ohmura

CATARO: A Robot that Tells Caregivers a Patient's Current Non-Critical Condition Indirectly

Patrick Hock, Chika Oshima, Koichi Nakayama

Classifier Generalization for Comprehensive Classifiers Subsumption in XCS

Caili Zhang, Takato Tatsumi, Hiroyuki Sato, Tim Kovacs, Keiki Takadama

Framework for planning the training sessions in triathlon

Iztok Fister, Janez Brest, Andres Iglesias, Iztok Jr. Fister

Development of an Evaluation System for Upper Limb Function Using AR Technology

Yunan He, Ikushi Sawada, Osamu Fukuda, Ryusei Shima, Nobuhiko Yamaguchi, Hiroshi Okumura

Envy based Fairness in Hedonic Games

Suguru Ueda

EvoSoft — Evolutionary Computation Software Systems

Organizers: Michael Affenzeller (Upper Austrian University of Applied Sciences; Institute for Formal Models and Verification, Johannes Kepler University Linz); Stefan Wagner (University of Applied Sciences Upper Austria, Johannes Kepler University)

Time and Location: Sunday, July 15, 12:50-16:30, Training Room 3 (2F)

Performance Assessment of Multi-Objective Evolutionary Algorithms With the R Package ecr

Jakob Bossek

Performance improvements of evolutionary algorithms in Perl 6

JJ Merelo, José-Mario García Valdez

A Generic Distributed Microservices and Container based Framework for Metaheuristic Optimization

Hatem Khallouf, Wilfried Jakob, Jianlei Liu, Eric Braun, Shadi Shahoud, Clemens Duepmeier, Veit Hagenmeyer

Evo-ROS: Integrating Evolution and the Robot Operating System

Glen A. Simon, Jared M. Moore, Anthony J. Clark, Philip K. McKinley

Review: A Web-Based Simulation Viewer for Sharing Evolutionary Robotics Results

Anthony J. Clark, Jared M. Moore

Plushi: An Embeddable, Language Agnostic, Push Interpreter

Edward R. Pantridge, Lee Spector

EIEHSCoEvo — Exploration of Inaccessible Environments through Hardware/Software Co-evolution

Organizers: Gerd Ascheid (RWTH Aachen); Peter Baltus (Eindhoven University of Technology); Ahmed Hallawa (RWTH Aachen); Giovanni Iacca (University of Trento); Anil Yaman (Eindhoven University of Technology)

Time and Location: Sunday, July 15, 14:50-16:30, Conference Room A (3F)

Invited Talk: Evolutionary Robotics and Collective Behaviours: From Understanding Nature to Designing Robot Swarms

Nicolas Bredeche

Evolving Hardware Instinctive Behaviors in Resource-scarce Agent Swarms Exploring Hard-to-reach Environments

Martin Andraud, Ahmed Hallawa, Jaro De Roosa, Eugenio Cantatore, Gerd Ascheid, Marian Verhelst

A Distributed Epigenetic Shape Formation and Regeneration Algorithm for a Swarm of Robots

Rahul Shivnarayan Mishra, Tushar Semwal, Shivashankar B. Nair

LAHS — Landscape-Aware Heuristic Search

Organizers: Arnaud Liefoghe (Univ. Lille, Inria Lille - Nord Europe); Gabriela Ochoa (University of Stirling); Nadarajen Veerapen (University of Stirling); Sebastien Verel (Université du Littoral Côte d'Opale)

Time and Location: Sunday, July 15, 14:50-16:30, Conference Room B (3F)

Progressive Gradient Walk for Neural Network Fitness Landscape Analysis

Anna Sergeevna Bosman, Andries Engelbrecht, Marde Helbig

Computationally Efficient Local Optima Network Construction

Jonathan E. Fieldsend

Filter versus Wrapper Feature Selection based on Problem Landscape Features

Werner Mostert, Katherine Malan, Andries Engelbrecht

GBEA — Game-Benchmark for Evolutionary Algorithms

Organizers: Pascal Kerschke (University of Münster); Boris Naujoks (TH Köln - University of Applied Sciences); Tea Tusar (Jozef Stefan Institute); Vanessa Volz (TU Dortmund University)

Time and Location: Sunday, July 15, 14:50-16:30, Training Room 1 (2F)

Short presentation of a new benchmarking suite from game-based problems. Then, extensive discussions on what characteristics benchmarking problems should have and which ones are typical for games.

https://ls11-www.cs.tu-dortmund.de/people/volz/gamesbench_sched.html

IAM/ECADA — Industrial Application of Metaheuristics / Evolutionary Computation for the Automated Design of Algorithms

Organizers: Silvino Fernandez Alzueta (ArcelorMittal); Manuel López-Ibáñez (Decision and Cognitive Sciences Research Centre, University of Manchester); Thomas Stützle (Université Libre de Bruxelles); Daniel R. Tauritz (Missouri University of Science and Technology); Pablo Valledor (ArcelorMittal); John Woodward (Queen Mary, University of London)

Time and Location: Monday, July 16, 09:00-10:40, Conference Room A (3F)

Invited Talk: Optimization when the Evaluation Budget is very Limited: Algorithms and Applications

Thomas Bäck

Generating Interpretable Fuzzy Controllers using Particle Swarm Optimization and Genetic Programming

Daniel Hein, Steffen Udluft, Thomas A. Runkler

The Automated Design of Probabilistic Selection Methods for Evolutionary Algorithms

Samuel N. Richter, Daniel R. Tauritz

Invited Talk: Lifelong Learning Methods in Heuristic Optimisation for Continual Problem Solving

Emma Hart

BB-DOB — Black Box Discrete Optimization Benchmarking

Organizers: Pietro S. Oliveto (The University of Sheffield); Markus Wagner (School of Computer Science, The University of Adelaide); Thomas Weise (University of Science and Technology of China (USTC), School of Computer Science and Technology); Borys Wrobel (Adam Mickiewicz University); Ales Zamuda (University of Maribor)

Time and Location: Monday, July 16, 09:00-12:40, Training Room 3 (2F)

Compiling a Benchmarking Test-Suite for Combinatorial Black-Box Optimization: A Position Paper

Ofer M. Shir, Carola Doerr, Thomas Bäck

Discrete Real-world Problems in a Black-box Optimization Benchmark

Sebastian Raggl, Andreas Beham, Viktoria Hauder, Stefan Wagner, Michael Affenzeller

Difficult Features of Combinatorial Optimization Problems and the Tunable W-Model Benchmark Problem for Simulating them

Thomas Weise, Zijun Wu

A Generic Problem Instance Generator for Discrete Optimization Problems

Markus Ullrich, Thomas Weise, Abhishek Awasthi, Jörg Lässig

Parameterization of State-of-the-Art Performance Indicators: A Robustness Study Based on Inexact TSP Solvers

Pascal Kerschke, Jakob Bossek, Heike Trautmann

A Black-Box Discrete Optimization Benchmarking (BB-DOB) Pipeline Survey: Taxonomy, Evaluation, and Ranking

Ales Zamuda, Christine Zarges, Miguel Nicolau

SecDef — Genetic and Evolutionary Computation in Defense, Security and Risk Management

Organizers: Riyadh Alshammari (King Saud bin Abdulaziz University for Health Sciences); Tokunbo Makanju (KDDI Research)

Time and Location: Monday, July 16, 09:00-12:40, Training Room 2 (2F)

Invited Talk: GA-Based User Identity Management

Dipankar Dasgupta

Machine Learning – Based Detection of Water Contamination in Water Distribution Systems

Hadi Mohammed, Ibrahim Abdul Hameed, Razak Seidu

Using Evolutionary Dynamic Optimization for Monitor Selection in Highly Dynamic Communication Infrastructures

Robin Mueller-Bady, Martin Kappes, Francisco Palomo-Lozano, Inmaculada Medina-Bulo

A Genetic Algorithm for Dynamic Controller Placement in Software Defined Networking

Samuel Champagne, Tokunbo Makanju, Chengchao Yao, Nur Zincir-Heywood, Malcolm Heywood

Genetic Algorithms for Role Mining in Critical Infrastructure Data Spaces

Igor Saenko, Igor Kotenko

Adversarial Co-evolution of Attack and Defense in a Segmented Computer Network Environment

Erik Hemberg, Joseph R. Zipkin, Richard W. Skowyra, Neal Wagner, Una-May O'Reilly

Real-Time Strategy Game Micro for Tactical Training Simulations

Sushil J. Louis, Siming Liu, Tianyi Jiang

Automated Design of Network Security Metrics

Aaron Scott Pope, Robert Morning, Daniel R. Tauritz, Alexander Kent

Evolution of Network Enumeration Strategies in Emulated Computer Networks

Sean Harris, Eric Michalak, Kevin Schoonover, Adam Gausmann, Hannah Reinbolt, Joshua Herman, Daniel R. Tauritz, Chris Rawlings, Aaron Scott Pope

MedGEC — Medical Applications of Genetic and Evolutionary Computation

Organizers: Stefano Cagnoni (University of Parma, Italy); Robert M. Patton (Oak Ridge National Laboratory); Stephen L. Smith (University of York)

Time and Location: Monday, July 16, 11:00-12:40, Conference Room A (3F)

Design of HIFU Treatment Plans using an Evolutionary Strategy

Marta Cudova, Bradley E. Treeby, Jiri Jaros

Coevolving Behavior and Morphology of Simple Agents that Model Small-scale Robots

Milen Georgiev, Ivan Tanev, Katsunori Shimohara

Solution Exploration using Multi-Objective Genetic Algorithm for Determining Experiment Candidate

Lorenzo Perino, Akihiro Fujii, Tsuyoshi Waku, Akira Kobayashi, Satoru Hiwa, Tomoyuki Hiroyasu

IWLCS — Learning Classifier Systems

Organizers: Masaya Nakata (Yokohama National University); Anthony Stein (University of Augsburg); Danilo Vasconcellos Vargas (Kyushu University)

Time and Location: Monday, July 16, 11:00-17:40, Conference Room C (3F)

Generalizing Rules by Random Forest-based Learning Classifier Systems for High-Dimensional Data Mining

Fumito Uwano, Koji Dobashi, Keiki Takadama, Tim Kovacs

Applying Accuracy-based LCS to Detecting Anomalous Database Access

Suin Seo, Sung-Bae Cho

Invited Talk: How Learning Classifier Systems Can Conquer Important Modern AI Problems

Will Neil Browne

EvoNN - A Customizable Evolutionary Neural Network with Heterogenous Activation Functions

Boris Shabash, Kay Wiese

XCSR Based on Compressed Input by Deep Neural Network for High Dimensional Data

Kazuma Matsumoto, Ryo Takano, Takato Tatsumi, Hiroyuki Sato, Tim Kovacs, Keiki Takadama

Optimizing clustering to promote data diversity when generating an ensemble classifier

Zohaib Muhammad Jan, Brijesh Verma, Sam Fletcher

An Algebraic Description of XCS

David Pätzel, Jörg Hähner

Modulated Clustering Using Integrated Rough Sets and Scatter Search Attribute Reduction

Abdel-Rahman Hedar, Abdel-Monem Ibrahim, Alaa Abdel-Hakim, Adel Sewisy

XCS-CR: Determining Accuracy of Classifier by its Collective Reward in Action Set toward Environment with Action Noise

Takato Tatsumi, Tim Kovacs, Keiki Takadama

Model Parameter Adaptive Instance-Based Policy Optimization for Episodic Control Tasks of Nonholonomic Systems

Kyotaro Ohashi, Natsuki Fujiyoshi, Naoki Sakamoto, Youhei Akimoto

Integrating Anticipatory Classifier Systems with OpenAI Gym

Norbert Kozłowski, Olgierd Unold

EAPU — Evolutionary Algorithms for Problems with Uncertainty

Organizers: Ozgur Akman (University of Exeter); Khulood Alyahya (Exeter University); Juergen Branke (University of Warwick); Kevin Doherty (University of Exeter); Jonathan Edward Fieldsend (University of Exeter)

Time and Location: Monday, July 16, 14:00-15:40, Conference Room A (3F)

Exploration of the Effect of Uncertainty in Homogeneous and Heterogeneous Multi-agent Societies With Regard to their Average Characteristics

Milen Georgiev, Ivan Tanev, Katsunori Shimohara

A Framework for High-Dimensional Robust Evolutionary Multi-Objective Optimization

Wei Du, Le Tong, Yang Tang

Robust Multi-Modal Optimisation

Khulood Alyahya, Kevin Doherty, Ozgur E. Akman, Jonathan E. Fieldsend

Invited Talk: Enhancing Evolutionary Optimization in Uncertain Environments by Allocating Evaluations via Multi-armed Bandit Algorithms

Xin Qiu, Risto Miikkulainen

Invited Talk: A Hyper-Heuristic Framework for Real-Valued Dynamic Optimization

Andries Engelbrecht

NSBECR — New Standards for Benchmarking in Evolutionary Computation Research

Organizers: William LaCava (University of Massachusetts Amherst); Randal S. Olson (University of Pennsylvania); Patryk Orzechowski (University of Pennsylvania); Ryan Urbanowicz (University of Pennsylvania)

Time and Location: Monday, July 16, 14:00-15:40, Training Room 1 (2F)

Analysing Symbolic Regression Benchmarks under a Meta-Learning Approach

Luiz Otavio Vilas Boas Oliveira, Joao Francisco Barreto da Silva Martins, Luis Fernando Miranda, Gisele Lobo Pappa

The Impact of Statistics for Benchmarking in Evolutionary Computation Research

Tome Eftimov, Peter Korošec

Maze Benchmark for Testing Evolutionary Algorithms

Camilo Alejandro Alaguna Córdoba, Jonatan Gómez Perdomo

Evolving Benchmark Functions Using Kruskal-Wallis Test

Yang Lou, Shiu Yin Yuen, Guanrong Ron Chen

GI — Genetic Improvement

Organizers: Brad Alexander (University of Adelaide); Saemundur Haraldsson (University of Stirling); Markus Wagner (School of Computer Science, The University of Adelaide); John Woodward (Queen Mary, University of London); Shin Yoo (Korea Advanced Institute of Science and Technology)

Time and Location: Monday, July 16, 14:00-17:40, Training Room 3 (2F)

Invited Talk: Quantum Genetic Programming

David R. White

Synthesizing Customized Network Protocols using Genetic Programming

Mohammad Roohitavaf, Ling Zhu, Sandeep Kulkarni, Subir Biswas

Towards Modular Large-Scale Darwinian Software Improvement

Michael Orlov

Novelty Search for software improvement of a SLAM system

Victor R. López-López, Leonardo Trujillo, Pierrick Legrand

Genetic Configuration Sampling: Learning a Sampling Strategy for Fault Detection of Configurable Systems

Jifeng Xuan, Yongfeng Gu, Zhilei Ren, Xiangyang Jia, Qingna Fan

Assessing Single-Objective Performance Convergence and Time Complexity for Refactoring Detection

David Nader-Palacio, Daniel Rodríguez-Cárdenas, Jonatan Gomez Perdomo

Dynamic Fitness Functions for Genetic Improvement in Compilers and Interpreters

Oliver Krauss, Hanspeter Mössenböck, Michael Affenzeller

DTEO — Decomposition Techniques in Evolutionary Optimization

Organizers: Bilel Derbel (Univ. Lille, Inria Lille - Nord Europe); Hui Li (Xi'an Jiaotong University, China); Ke Li (University of Exeter); Xiaodong Li (RMIT University); Saúl Zapotecas Martínez (CINVESTAV-IPN); Qingfu Zhang (City University of Hong Kong, Hong Kong Shenzhen Research Institute)

Time and Location: Monday, July 16, 16:00-17:40, Conference Room A (3F)

A Historical Interdependency based Differential Grouping Algorithm for Large Scale Global Optimization

An Chen, Zhigang Ren, Yang Yang, Yongsheng Liang, Bei Pang

A Cooperative Co-evolutionary Algorithm for Large-Scale Multi-Objective Optimization Problems

Minghan Li, Jingxuan Wei

Decomposition-Based Multiobjective Particle Swarm Optimization for Change Detection in SAR Images

Tao Zhan, Zedong Tang, Maoguo Gong, Xiangming Jiang, Jiao Shi

Selfish vs. Global Behavior Promotion in Car Controller Evolution

Jacopo Talamini, Giovanni Scaini, Eric Medvet, Alberto Bartoli

PDEIM — Parallel and Distributed Evolutionary Inspired Methods

Organizers: Ivano De Falco (ICAR-CNR); Antonio Della Cioppa (Natural Computation Lab - DIEM, University of Salerno); Umberto Scafuri (ICAR-CNR); Ernesto Tarantino (ICAR - CNR)

Time and Location: Monday, July 16, 16:00-17:40, Training Room 1 (2F)

An Actor Model Implementation of Distributed Factored Evolutionary Algorithms

Stephyn G. W. Butcher, John Sheppard

A Parallel Island Model for Biogeography-Based Classification Rule Mining in Julia

Samuel Ebert, Effat Farhana, Steffen Heber

Vectorized Candidate Set Selection for Parallel Ant Colony Optimization

Joshua Peake, Huw Lloyd, Martyn Amos, Paraskevas Yiapanis

Effective Processor Load Balancing using Multi-Objective Parallel Extremal Optimization

Ivano De Falco, Eryk Laskowski, Richard Olejnik, Umberto Scafuri, Ernesto Tarantino, Marek Tudruj

Student Workshop

(Best Student Paper nominees are marked with a star)

Organizers: Youhei Akimoto (University of Tsukuba); Vanessa Volz (TU Dortmund University)

Time and Location: Monday, July 16, 11:00-17:40, Conference Room B (3F)

Specialization and Elitism in Lexicase and Tournament Selection

Edward R. Pantridge, Thomas Helmuth, Nicholas Freitag McPhee, Lee Spector

A Comparison of Semantic-Based Initialization Methods for Genetic Programming

Hammad Ahmad, Thomas Helmuth

Improved Efficiency Of MOPSO With Adaptive Inertia Weight And Dynamic Search Space

Lee Ping Pang, Sin Chun Ng

Using A One-Class Compound Classifier To Detect In-Vehicle Network Attacks

Andrew Tomlinson, Jeremy Bryans, Siraj Ahmed Shaikh

From Fitness Landscape Analysis to Designing Evolutionary Algorithms: The Case Study in Automatic Generation of Function Block Applications ★

Vladimir Mironovich, Maxim Buzdalov, Valeriy Vyatkin

Runtime Analysis of a Population-based Evolutionary Algorithm with Auxiliary Objectives Selected by Reinforcement Learning ★

Denis Antipov, Arina Buzdalova, Andrew Stankevich

Embedded Feature Selection Using Probabilistic Model-Based Optimization ★

Shota Saito, Shinichi Shirakawa, Youhei Akimoto

A Multi-objective Optimization Design Framework for Ensemble Generation ★

Victor Henrique Alves Ribeiro, Gilberto Reynoso Meza

Towards a More General Many-Objective Evolutionary Optimizer using Multi-Indicator Density Estimation ★

Jesús Guillermo Falcón-Cardona, Carlos A. Coello Coello

Diploidy for Evolving Neural Networks

Cara L. Reedy

Analysis of Evolutionary Multi-Tasking as an Island Model

Ryuichi Hashimoto, Hisao Ishibuchi, Naoki Masuyama, Yusuke Nojima

Incorporation of a decision space diversity maintenance mechanism into MOEA/D for multi-modal multi-objective optimization

Chenxu Hu, Hisao Ishibuchi

Weight Vector Grid with New Archive Update Mechanism for Multi-Objective Optimization

Xizi Ni, Hisao Ishibuchi, Kanzhen Wan, Ke Shang, Chukun Zhuang

LBA — Late-Breaking Abstracts

Organizers: Masaharu Munetomo (Hokkaido University)

Time and Location: Monday, July 16, 14:00-17:40, Training Room 2 (2F)

Accelerating Genetic Programming using PyCuda

Keiko Ono, Yoshiko Hanada

Forecasting Soybean Futures Price Using Dynamic Model Averaging and Particle Swarm Optimization

Tao Xiong

A Self-Replication Basis For Designing Complex Agents

Thommen Karimpanal George

Genetically-Trained Deep Neural Networks

Krzysztof Pawełczyk, Michal Kawulok, Jakub Nalepa

The Human-based Evolutionary Computation System Enabling Us to Follow the Solution Evolution

Kousuke Fujimoto, Kei Ohnishi, Tomohiro Yoshikawa

Configuring the Parameters of Artificial Neural Networks using NeuroEvolution and Automatic Algorithm Configuration

Evgenia Papavasileiou, Bart Jansen

Optimization Based Adaptive Tagged Visual Cryptography

Pei-Ling Chiu, Kai-Hui Lee

A Geometric Evolutionary Search for Melody Composition

Yong-Wook Nam, Yong-Hyuk Kim

Distributed NSGA-II Sharing Extreme Non-dominated Solutions

Yuji Sato, Mikiko Sato, Minami Miyakawa

Parameter Space Analysis of Genetic Algorithm Using Support Vector Regression

Hwi-Yeon Cho, Hye-Jin Kim, Yong-Hyuk Kim

Evolutionary Algorithm Using Surrogate Assisted Model for Simultaneous Design Optimization Benchmark Problem of Multiple Car Structures

Hiro Ohtsuka, Misaki Kaidan, Tomohiro Harada, Ruck Thawonmas

On the Hardness of Parameter Optimization of Convolution Neural Networks Using Genetic Algorithm and Machine Learning

Hyeon-Chang Lee, Dong-Pil Yu, Yong-Hyuk Kim

Infeasible Solution Repair and MOEA/D Sharing Weight Vectors for Solving Multi-objective Set Packing Problems

Mariko Tanaka, Yuki Yamagishi, Hidetoshi Nagai, Hiroyuki Sato

Is It Worth to Approximate Fitness by Machine Learning?: Investigation on the Extensibility According to Problem Size

Dong-Pil Yu, Yong-Hyuk Kim

Importance of Finding a Good Basis in Binary Representation

Junghwan Lee, Yong-Hyuk Kim

Hybrid Swarm of Particle Swarm with Firefly for Complex Function Optimization

Heng Xiao, Toshiharu Hatanaka

Deterministic and Stochastic Precipitation Downscaling using Multi-Objective Genetic Programming

Tanja Zerenner, Victor Venema, Petra Friederichs, Clemens Simmer

EBIC: a Next-Generation Evolutionary-Based Parallel Biclustering Method

Patryk Orzechowski, Moshe Sipper, Xiuzhen Huang, Jason H. Moore

Digital Investigations on the Evolution of Prokaryote Photosynthesis Regulation

Anselmo Pontes, Charles Ofria

Syllabification by Phone Categorization

Jacob Krantz, Maxwell Dulin, Paul De Palma, Mark VanDam

Evolving Modular Neural Sequence Architectures with Genetic Programming

David Dohan, David So, Quoc Le

Investigation of Kernel Functions in EDA-GK

Ryoichi Hasegawa, Hisashi Handa

GA and Entropy Objective Function for Solving Sudoku Puzzle

Katya Rodriguez-Vazquez

A Surrogate-assisted Selection Scheme for Genetic Algorithms Employing Multi-layer Neural Networks

Masaki Fujiwara, Masaharu Munetomo

Women@GECCO

Organizers: Khulood Alyahya (Exeter University); Bing Xue (Victoria University of Wellington)

Time and Location: Monday, July 16, 18:00-20:00, Conference Room D (3F)

History of Women@GECCO

Gabriela Ochoa, *University of Stirling*

From a PhD student to an independent researcher: Challenges and Opportunities

Minami Miyakawa, *Hosei University*

An ongoing pathway to become a leading researcher

Rong Qu, *University of Nottingham*

Academic career? Dream big, start small and grow gradually

Sanaz Mostaghim, *Otto von Guericke University Magdeburg*

Speed Dating

Panel Discussion Session

**Humies, Competitions,
Evolutionary Computation in Practice,
Hot off the Press, and Job Market**



15th Annual Humies Awards for Human Competitive Results

Presentations: Tuesday, July 17, 14:00-15:40
Training Room 1 (2F)

Announcement of Awards: Thursday, July 19, 12:20-13:50
Terrsa Hall (1F)

On-location chair: Erik D. Goodman

Judging Panel: Erik D. Goodman, Una-May O'Reilly,
Wolfgang Banzhaf, Darrell D. Whitley, Lee Spector

Publicity Chair: William Langdon

Prizes: prizes totaling \$10,000 to be awarded

Detailed Information: www.human-competitive.org



Techniques of genetic and evolutionary computation are being increasingly applied to difficult real-world problems — often yielding results that are not merely academically interesting, but competitive with the work done by creative and inventive humans. Starting at the *Genetic and Evolutionary Computation Conference* (GECCO) in 2004, cash prizes have been awarded for human competitive results that had been produced by some form of genetic and evolutionary computation in the previous year.

The total prize money for the Humies awards is \$10,000 US dollars. As a result of detailed consideration of the fifteen entries in this year's Humies competition, eight finalists have been invited to each give a short presentation to the Humies judges at GECCO. Each presentation will be 10 minutes. This presentation session is open to all GECCO attendees. After the session the judges will confer and select winners for Bronze (either one prize of \$2,000 or two prizes of \$1,000) Silver (\$3,000) and Gold (\$5,000) awards. The awards will be announced and presented to their winners during the GECCO closing ceremony on Thursday.

Competitions

Black Box Optimization Competition

Organizers: Ilya Loshchilov, Tobias Glasmachers

Time and Location: Sunday, July 15, 09:30-11:10, Conference Room B (3F)

The Black Box Optimization Competition is the first competition platform in the continuous domain where test problems are truly black boxes to participants. The only information known to optimizer and participant is the dimension of the problem, bounds on all variables, and a budget of black box queries. The competition covers single- and multi-objective optimization. We have five competition tracks.

Competition on Niching Methods for Multimodal Optimization

Organizers: Michael Epitropakis, Mike Preuss, Xiaodong Li, Andries Engelbrecht

Time and Location: Sunday, July 15, 09:30-11:10, Conference Room B (3F)

The aim of the competition is to provide a common platform that encourages fair and easy comparisons across different niching algorithms. The competition allows participants to run their own niching algorithms on 20 benchmark multimodal functions with different characteristics and levels of difficulty.

General Video Game AI Competition

Organizers: Diego Perez-Liebana, Julian Togelius, Simon M. Lucas, Ahmed Khalifa, Michael C. Green

Time and Location: Sunday, July 15, 09:30-11:10, Conference Room B (3F)

The GVG-AI Competition explores the problems within general video game playing. How would you create a level generator that can generate a level for any given game? How could you program an AI that creates new rules for existing games or entirely new games altogether? The level generation track explores the ability of level generators to generalize and work on multiple games described in Video Game Description Language (VGDL). Competitors submit level generators that are tasked to generate levels for any set of game rules. The rule generation track explores the ability to generate game rules and winning conditions for a fixed level of a game described in Video Game Description Language (VGDL).

Internet of Things: Online Anomaly Detection for Drinking Water Quality

Organizers: Frederik Rehbach, Margarita Rebolledo, Steffen Moritz, Sowmya Chandrasekaran, Thomas Bartz-Beielstein

Time and Location: Sunday, July 15, 09:30-11:10, Conference Room B (3F)

For the 7th time in GECCO history, the SPOTSeven Lab is hosting an industrial challenge in cooperation with various industry partners. This year's challenge, based on the 2017 challenge, is held in cooperation with "Thüringer Fernwasserversorgung" that provides their real-world data set. The task of this year's competition is to develop an anomaly detection algorithm for the water- and environmental data set. Early identification of anomalies in water quality data is a challenging task. It is important to identify true undesirable variations in the water quality. At the same time, false alarm rates have to be very low.

Virtual Creatures Competition

Organizers: Sam Kriegman, Nick Cheney, Sebastian Risi, Joel Lehman

Time and Location: Sunday, July 15, 09:30-11:10, Conference Room B (3F)

The Virtual Creatures Competition will be held in the competition session at the Genetic and Evolutionary Computation Conference. The contest's purpose is to highlight progress in virtual creatures research and showcase evolutionary computation's ability to craft interesting well-adapted creatures with evolved morphologies and controllers. Video entries demonstrating evolved virtual creatures are judged by technical achievement, aesthetic appeal, innovation, and perceptual animacy (perceived aliveness).

Evolutionary Computation in Practice

Organizers: Thomas Bartz-Beielstein, *Institute for Data Science, Engineering, and Analytics, TH Köln*
Bogdan Filipic, *Jozef Stefan Institute*
Shigeru Obayashi, *Tohoku University*

In the Evolutionary Computation in Practice (ECiP) track, well-known speakers with outstanding reputation in academia and industry present background and insider information on how to establish reliable cooperation with industrial partners. They actually run companies or are involved in cooperations between academia and industry. If you attend, you will learn multiple ways to extend EC practice beyond the approaches found in textbooks. Experts in real-world optimization with decades of experience share their approaches to creating successful projects for real-world clients. Some of what they do is based on sound project management principles, and some is specific to our type of optimization projects. A panel of experts describes a range of techniques you can use to identify, design, manage, and successfully complete an EA project for a client. If you are working in academia and are interested in managing industrial projects, you will receive valuable hints for your own research projects.

Session 1: Bridging the Gap between Academia and Industry

Tuesday, July 17, 10:40-12:20, Conference Room C (3F)

Chair: Bogdan Filipic, *Jozef Stefan Institute*

Data-Based Modeling and Optimization in Industrial Processes

Michael Affenzeller, *Heuristic and Evolutionary Algorithms Lab, University of Applied Sciences Upper Austria*

Automated Scheduling of Material Tests in a Chemical Research Lab—Challenges, Pitfalls and Final Implementation

Roland Braune, *Department of Business Administration, Faculty of Business, Economics and Statistics, University of Vienna*

What they Want and What we Can

Akira Oyama, *Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency*

Session 2: “Real” Real-World Optimization

Tuesday, July 17, 14:00-15:40, Conference Room C (3F)

Chair: Tomoyuki Hiroyasu, *Doshisha University*

Weight Reduction of Car-Body Structure using Evolutionary Computation and Data-mining

Takehisa Kohira, *Technical Research Center, Mazda Motor Corporation*

Material Design of Filled Rubbers based on Materials Informatics

Koishi Masataka and Naoya Kowatari, *Yokohama Rubber Company*

Design Optimization of the Zao Ski Jumping Hill

Seo Kazuya, *Department of Science, Yamagata University*

Session 3: Ask the Experts / Getting a Job

Tuesday, July 17, 16:00-17:40, Conference Room C (3F)

Chair: Thomas Bartz-Beielstein, *Institute for Data Science, Engineering, and Analytics, TH Köln*

From University Know-How to a Commercial Product—a Hazardous Journey

Erik D. Goodman, *BEACON Center for the Study of Evolution in Action, Michigan State University*

Publishing Your Research Work

Ronan Nugent, *Springer*

Panel Discussion

Hot off the Press

Organizer: Grant Dick, *University of Otago*

Time and Location: – **HOP1:** Wednesday, July 18, 10:40-12:20, Conference Room C (3F)
– **HOP2:** Wednesday, July 18, 15:30-17:10, Conference Room C (3F)
– **HOP3:** Thursday July 19, 09:00-10:40, Conference Room C (3F)
– **HOP4:** Thursday, July 19, 09:00-10:40, Conference Room D (3F)

The HOP (Hot Off the Press) track offers authors of recent papers the opportunity to present their work to the GECCO community, both by giving a talk on one of the three main days of the conference and by having a 2-page abstract appear in the Proceedings Companion, in which also the workshop papers, late-breaking abstracts, and tutorials appear. We invite researchers to submit summaries of their own work recently published in top-tier conferences and journals. Contributions are selected based on their scientific quality and their relevance to the GECCO community. Typical contributions include (but are not limited to) evolutionary computation papers appeared at venues different from GECCO, papers comparing different heuristics and optimization methods that appeared at a general heuristics or optimization venue, papers describing applications of evolutionary methods that appeared at venues of this application domain, or papers describing methods with relevance to the GECCO community that appeared at a venue centered around this methods domain. In any case, it is the authors responsibility to make clear why this work is relevant for the GECCO community, and to present the results in a language accessible to the GECCO community.

Job Market

Organizers: Boris Naujoks, *TH Köln - Cologne University of Applied Sciences*
Tea Tušar, *Jozef Stefan Institute*

Time and Location: Tuesday, July 17, 12:20-14:00, Terrsa Hall (1F)

The Job Market is a rather new GECCO event where people offering jobs in Evolutionary Computation can advertise open positions and meet with potential candidates. Any kind of positions are of interest (PhD, Postdoc, Professor, Engineer, etc.) — from the academia as well as the industry. After brief presentations of the available jobs, participants have the possibility to set up face-to-face meetings for further discussions.

The collection of positions presented at the job market can be found at the SIGEVO web site:
<http://sig.sigevo.org/index.html/tiki-index.php?page=Job+Ads+Listing>

SIGEVO Summer School



SIGEVO Summer School: S3 2018

Organizer: JJ Merelo, *University of Granada*

Participants: S3 students and mentors

Dates: July 13-14 (School activities in Osaka)

July 15-19 (Soft merged activities with GECCO), with exclusive S3 activities on July 19

Venue: July 13-14: Blossom Cafe building, Kindai University, Osaka

July 15-19: GECCO venue

Mentors: Dr. Anna Esparcia Alcázar

Dr. Juan Julián Merelo Guervós

Dr. Francisco Fernández de la Vega

Dr. José Mario García Valdez

Dr. Marc Schoenauer

SIGEVO is a special interest group of ACM always looking for new ways to enlarge the community of researchers working in different biologically inspired metaheuristics. The second SigEvo Summer School (S3) will be held in conjunction with GECCO 2018 in Kyoto. The core of the second S3 will take place in Osaka in the days previous to the conference, and will continue in daily interactions during the conference proper in Kyoto, finishing in the same day of the conference later in the afternoon. That way, students will be able to enjoy and learn during the conference proper at the same time they meet researchers and advance in their learning tasks. GECCO tutorials, workshops, and papers will be an integral part of the S3.

During the S3, the students will first decide on a problem to tackle, and then work on it to produce, by the end of the school, an interactive presentation including a report, data, interactive notebooks and free software. This will be done through teamwork and online cooperation, with an open science approach.

After the two initial sessions (in Osaka) where the students will get to meet each other and create work teams, the mentors will design an itinerary for every student through the tutorials, workshops and sessions, which they will then comment on during daily checkpoints.

By the end of the summer school, they will have created an interactive notebook that will be presented and defended in front their peers.

Important comments:

- Mentors will consider at all times the high variety of students in terms of research maturity, culture, and research preferences (i.e., will offer assorted assignments).
- Students will participate in every activity of the school to the extent of their availability.



Blossom Café in Osaka, were the first sessions of S3 will take place

Friday, July 13**(before GECCO)**

Presentation, group dynamics and presentation of group tools, scientific programming and visualization tools. Team building and design thinking session for elaboration of projects.

Saturday, July 14**(before GECCO)**

Team presentation and mentoring choice and assignment. Mentors working with teams for on-demand talks and tutorials. Short presentations in the afternoon, and personal tutoring sessions.

Sunday, July 15 — Thursday, July 19**(during GECCO)**

Attending tutorials and workshops. Lunchtime meetings with tutors, after-work meeting for scheduling the next days and choose tracks and papers to attend. Most interaction will take place in the online collaboration tools that will be set up for the participants.

Thursday, July 19 (Afternoon)**(after GECCO)**

Lunchtime general meeting, and afternoon hackathon, presentation editing and delivery.

Best Paper Nominations



Best Paper Nominations

Voting Instructions

Beware: In contrast to previous years, GECCO attendees can only vote for one best paper session this year. This means that one needs to choose beforehand in which session to vote.

Procedure: Each track, or group of small tracks, has designated a few nominees (see the lists below). The papers in competition for the same Award are presented in the same session, and the vote for this Award takes place at the end of the session. The votes are nominative, and cannot be delegated to another attendee.

To be allowed to vote one needs to:

- Attend the entire corresponding best paper session;
- Handle the nominative voting voucher distributed with the registration material.

Voting procedure:

- At the beginning of the session, the voting ballots are distributed in the audience by the session chair;
- At the end of the session, the session chair collects the voting ballots and the nominative voting vouchers, checking the badge/voucher match.

CS — Complex Systems

Safe Mutations for Deep and Recurrent Neural Networks through Output Gradients

Joel Lehman, Jay Chen, Jeff Clune, Kenneth O. Stanley
Tuesday, July 17, 16:00-16:25, Conference Room Medium (2F)

Data-efficient Neuroevolution with Kernel-Based Surrogate Models

Adam Gaier, Alexander Asteroth, Jean-Baptiste Mouret
Tuesday, July 17, 16:25-16:50, Conference Room Medium (2F)

Evolution of a Functionally Diverse Swarm via a Novel Decentralised QD Algorithm

Emma Hart, Andreas Siegfried Wilhelm Steyven, Ben Paechter
Tuesday, July 17, 16:50-17:15, Conference Room Medium (2F)

DETA — Digital Entertainment Technologies and Arts

Evolving Mario Levels in the Latent Space of a Deep Convolutional Generative Adversarial Network

Vanessa Volz, Jacob Schrum, Jialin Liu, Simon M. Lucas, Adam M. Smith, Sebastian Risi
Wednesday, July 18, 15:30-15:55, Conference Room Medium (2F)

ECOM — Evolutionary Combinatorial Optimization and Metaheuristics

One-Class Constraint Acquisition with Local Search

Daniel Sroka, Tomasz P. Pawlak
Wednesday, July 18, 11:05-11:30, Terrsa Hall (1F)

Enhancing Partition Crossover with Articulation Points Analysis

Francisco Chicano, Gabriela Ochoa, Darrell D. Whitley, Renato Tinós
Wednesday, July 18, 10:40-11:05, Terrsa Hall (1F)

EML — Evolutionary Machine Learning**Evolved GANs for generating Pareto set approximations**

Unai Garciarena, Alexander Mendiburu, Roberto Santana

*Tuesday, July 17, 10:40-11:05, Terrsa Hall (1F)***Evolving Bagging Ensembles Using a Spatially-Structured Niching Method**

Grant Dick, Caitlin A. Owen, Peter A. Whigham

*Tuesday, July 17, 11:30-11:55, Terrsa Hall (1F)***What About Interpolation? A Radial Basis Function Approach to Classifier Prediction Modeling in XCSF**

Anthony Stein, Simon Menssen, Jörg Hähner

*Tuesday, July 17, 11:05-11:30, Terrsa Hall (1F)***EMO — Evolutionary Multiobjective Optimization****Data-Driven Analysis of Pareto Set Topology**

Naoki Hamada, Keisuke Goto

*Thursday, July 19, 10:15-10:40, Terrsa Hall (1F)***Multi-Objective Evolutionary Hyper-heuristic based on Multiple Indicator-based Density Estimators**

Jesús Guillermo Falcón-Cardona, Carlos A. Coello Coello

*Thursday, July 19, 09:25-09:50, Terrsa Hall (1F)***A new R2 indicator for better hypervolume approximation**

Ke Shang, Hisao Ishibuchi, Min-Ling Zhang, Yiping Liu

*Thursday, July 19, 09:50-10:15, Terrsa Hall (1F)***ENUM — Evolutionary Numerical Optimization****An Empirical Comparison of Metamodeling Strategies in Noisy Environments**

Sunith Bandaru, Amos H.C. Ng

*Thursday, July 19, 09:25-09:50, Conference Room Medium (2F)***PSA-CMA-ES: CMA-ES with Population Size Adaptation**

Kouhei Nishida, Youhei Akimoto

*Thursday, July 19, 09:00-09:25, Conference Room Medium (2F)***GA — Genetic Algorithms****Runtime Analysis of Probabilistic Crowding and Restricted Tournament Selection for Bimodal Optimisation**

Edgar Covantes Osuna, Dirk Sudholt

*Wednesday, July 18, 15:30-15:55, Terrsa Hall (1F)***Tunneling Between Plateaus: Improving on a State-of-the-Art MAXSAT Solver using Partition Crossover**

Wenxiang Chen, Darrell D. Whitley, Francisco Chicano, Renato Tinós

*Wednesday, July 18, 15:55-16:20, Terrsa Hall (1F)***Learning Bayesian Network Structures with GOMEA**

Kalia Orphanou, Dirk Thierens, Peter A.N. Bosman

Wednesday, July 18, 16:20-16:45, Terrsa Hall (1F)

GECH — General Evolutionary-, Computation and Hybrids

Working Principles of Binary Differential Evolution

Weijie Zheng, Guangwen Yang, Benjamin Doerr

Wednesday, July 18, 16:20-16:45, Conference Room Medium (2F)

GP — Genetic Programming

Program Synthesis using Uniform Mutation by Addition and Deletion

Thomas Helmuth, Nicholas Freitag McPhee, Lee Spector

Wednesday, July 18, 11:30-11:55, Conference Room Medium (2F)

Solving the Exponential Growth of Symbolic Regression Trees in Geometric Semantic Genetic Programming

Joao Francisco Barreto da Silva Martins, Luiz Otavio Vilas Boas Oliveira, Luis Fernando Miranda, Felipe Casadei, Gisele Lobo Pappa

Wednesday, July 18, 10:40-11:05, Conference Room Medium (2F)

Where are we now? A large benchmark study of recent symbolic regression methods

Patryk Orzechowski, William La Cava, Jason H. Moore

Wednesday, July 18, 11:05-11:30, Conference Room Medium (2F)

RWA — Real World Applications

Genetic Programming for Tuberculosis Screening from Raw X-ray Images

Armand Rashad Burks, William Fitzgerald Punch

Tuesday, July 17, 14:25-14:50, Conference Room Medium (2F)

Benchmarking Evolutionary Computation Approaches to Insider Threat Detection

Duc C. Le, Sara Khanchi, Nur Zincir-Heywood, Malcolm Heywood

Tuesday, July 17, 14:50-15:15, Conference Room Medium (2F)

THEORY — Theory

Domino Convergence: Why One Should Hill-Climb on Linear Functions

Carsten Witt

Wednesday, July 18, 15:55-16:20, Conference Room Medium (2F)

Papers and Posters



CS1

Tuesday, July 17, 10:40-12:20, AV Study Room (2F)

Chair: Joel Lehman (Uber Technologies Inc.)

Fusing Novelty and Surprise for Evolving Robot Morphologies

Daniele Gravina, Antonios Liapis, Georgios N. Yannakakis

10:40-11:05

Real-World Evolution Adapts Robot Morphology and Control to Hardware Limitations

Tønnes F. Nygaard, Charles Patrick Martin, Eivind Samuelsen, Jim Torresen, Kyrre Glette

11:05-11:30

Interceptive robustness through environment-mediated morphological development

Sam Kriegman, Nick Cheney, Francesco Corucci, Josh C. Bongard

11:30-11:55

Towards the Targeted Environment-Specific Evolution of Robot Components

Jack Collins, Wade Geles, Gerard Howard, Frederic Maire

11:55-12:20

DETA1

Tuesday, July 17, 10:40-12:20, Conference Room Medium (2F)

Chair: Julian Togelius (IT University of Copenhagen)

Evolving Indirectly Encoded Convolutional Neural Networks to Play Tetris With Low-Level Features

Jacob Schrum

10:40-11:05

Evolving simple programs for playing Atari games

Dennis Wilson, Sylvain Cussat-Blanc, Hervé Luga, Julian F. Miller

11:05-11:30

Opponent Modeling and Exploitation in Poker Using Evolved Recurrent Neural Networks

Xun Li, Risto Miikkulainen

11:30-11:55

Generating Beginner Heuristics for Simple Texas Hold'em

Fernando De Mesentier Silva, Julian Togelius, Frank Lantz, Andy Nealen

11:55-12:20

ECOM1

Tuesday, July 17, 10:40-12:20, Conference Room 2 (3F)

Chair: Thomas Stützle (Université Libre de Bruxelles)

A heuristic algorithm based on Tabu Search for the solution of Flexible Job Shop Scheduling Problems with Lot Streaming

Miguel Ángel Fernández Romero, Eric Alfredo Rincón García, Antonin Ponsich, Roman Anselmo Mora Gutiérrez

10:40-11:05

Iterated Greedy Algorithms for the Hybrid Flowshop Scheduling with Total Flow Time Minimization

Hande Öztop, M. Fatih Tasgetiren, Deniz Türsel Eliyi, Quan-Ke Pan

11:05-11:30

An effective hybrid meta-heuristic for a heterogeneous flow shop scheduling problem

Matheus de Freitas Araujo, Jose Elias Claudio Arroyo, Ricardo Goncalves Tavares

11:30-11:55

Min-Conflicts Heuristic for Multi-Mode Resource-Constrained Projects Scheduling

Arben Ahmeti, Nysret Musliu

11:55-12:20

EML1: Best Papers

Tuesday, July 17, 10:40-12:20, Terrsa Hall (1F)

Chair: Will Neil Browne (Victoria University of Wellington); Yusuke Nojima (Osaka Prefecture University)
(Best Paper nominees are marked with a star)**Evolved GANs for generating Pareto set approximations** ★

Unai Garciarena, Alexander Mendiburu, Roberto Santana

10:40-11:05

What About Interpolation? A Radial Basis Function Approach to Classifier Prediction Modeling in XCSF ★

Anthony Stein, Simon Menssen, Jörg Hähner

11:05-11:30

Evolving Bagging Ensembles Using a Spatially-Structured Niching Method ★

Grant Dick, Caitlin A. Owen, Peter A. Whigham

11:30-11:55

Attribute Tracking: Strategies Towards Improved Detection and Characterization of Complex Associations

Ryan Urbanowicz, Christopher Lo, John Holmes, Jason H. Moore

11:55-12:20

EMO1

Tuesday, July 17, 10:40-12:20, Conference Room D (3F)

Chair: Boris Naujoks (TH Köln - University of Applied Sciences)

An Improved Version of a Reference-Based Multi-Objective Evolutionary Algorithm based on IGD+

Edgar Manóatl López, Carlos A. Coello Coello

10:40-11:05

Two Enhancements for Improving the Convergence Speed of a Robust Multi-Objective Coevolutionary Algorithm

Alexandru-Ciprian Zavoianu, Susanne Saminger-Platz, Edwin Lughofer, Wolfgang Amrhein

11:05-11:30

Evolutionary Computation plus Dynamic Programming for the Bi-Objective Travelling Thief Problem

Junhua Wu, Sergey Polyakovskiy, Markus Wagner, Frank Neumann

11:30-11:55

Parallel Pareto Local Search Revisited - First experimental results on Bi-objective UBQP

Jialong Shi, Qingfu Zhang, Bilel Derbel, Arnaud Liefoghe, Jianyong Sun

11:55-12:20

ENUM1

Tuesday, July 17, 10:40-12:20, Training Room 1 (2F)

Chair: Jose A. Lozano (University of the Basque Country)

Drift Theory in Continuous Search Spaces: Expected Hitting Time of the (1+1)-ES with 1/5 Success Rule

Youhei Akimoto, Anne Auger, Tobias Glasmachers

10:40-11:05

Real-Valued Evolutionary Multi-Modal Optimization driven by Hill-Valley Clustering

Stef C. Maree, Tanja Alderliesten, Dirk Thierens, Peter A.N. Bosman

11:05-11:30

Adaptive Threshold Parameter Estimation with Recursive Differential Grouping for Problem Decomposition

Yuan Sun, Mohammad Nabi Omidvar, Michael Kirley, Xiaodong Li 11:30-11:55

GA1

Tuesday, July 17, 10:40-12:20, Conference Room B (3F)

Chair: Darrell Whitley (Colorado State University)

Analysis of the Use of Genetic Algorithms for Indoor Localisation via Cloud Point Matching

Miguel d'Arcangues Boland, Leandro Soares Indrusiak 10:40-11:05

Shaper-GA: Automatic Shape Generation for Modular House Design

Ana Maria Carvalho de Almeida, Bruno Taborda, Filipe Santos, Krystian Kwiecinski, Sara Eloy 11:05-11:30

Towards a Theory-Guided Benchmarking Suite for Discrete Black-Box Optimization: Profiling (1+ λ) EA Variants on OneMax and LeadingOnes

Carola Doerr, Furong Ye, Sander van Rijn, Hao Wang, Thomas Bäck 11:30-11:55

GECH1

Tuesday, July 17, 10:40-12:20, Training Room 2 (2F)

Chair: Juergen Branke (University of Warwick)

Adaptive Asynchrony in Semi-Asynchronous Evolutionary Algorithm Based on Performance Prediction Using Search History

Tomohiro Harada 10:40-11:05

Memetic Algorithms Beat Evolutionary Algorithms on the Class of Hurdle Problems

Phan Trung Hai Nguyen, Dirk Sudholt 11:05-11:30

Termination Detection Strategies in Evolutionary Algorithms: A Survey

Yanfeng Liu, Aimin Zhou, Hu Zhang 11:30-11:55

RWA1

Tuesday, July 17, 10:40-12:20, Training Room 3 (2F)

Chair: Una-May O'Reilly (CSAIL, Massachusetts Institute of Technology)

Multi-Objective Journey Planning Under Uncertainty: A Genetic Approach

Mohammad Haqqani, Xiaodong Li, Xinghuo Yu 10:40-11:05

A Genetic Programming based Iterated Local Search for Software Project Scheduling

Nasser R. Sabar, Ayad Turkey, Andy Song 11:05-11:30

Estimating Cement Compressive Strength from Microstructural Images using GEP with Probabilistic Polarized Similarity Weight Tournament Selection

Liangliang Zhang, Xinya Yue, Lin Wang, Bo Yang 11:30-11:55

Evolving Boolean Functions for Fast and Efficient Randomness Testing

Vojtech Mrazek, Marek Sýs, Zdenek Vasicek, Lukas Sekanina, Vashek Matyas 11:55-12:20

THEORY1

Tuesday, July 17, 10:40-12:20, Conference Room A (3F)

Chair: Andrei Lissovoi (University of Sheffield)

Runtime Analysis for Self-adaptive Mutation Rates

Benjamin Doerr, Carsten Witt, Jing Yang

10:40-11:05

The linear hidden subset problem for the (1+1) EA with scheduled and adaptive mutation rates

Hafsteinn Einarsson, Marcelo Matheus Gauy, Johannes Lengler, Florian Meier, Asier Mujika, Angelika Steger, Felix Weissenberger

11:05-11:30

A Tight Runtime Analysis for the $(\mu + \lambda)$ EA

Denis Antipov, Benjamin Doerr, Jiefeng Fang, Tangi Hetet

11:30-11:55

ACO-SI1

Tuesday, July 17, 14:00-15:40, Conference Room B (3F)

Chair: Andries P. Engelbrecht (University of Pretoria)

A New Foraging-Based Algorithm for Online Scheduling

Koen van der Blom, Thomas Bäck

14:00-14:25

Information Sharing and Conflict Resolution in Distributed Factored Evolutionary Algorithms

Stephyn G. W. Butcher, John Sheppard, Shane Strasser

14:25-14:50

Recurrent Neural Network-Predictions for PSO in Dynamic Optimization

Almuth Meier, Oliver Kramer

14:50-15:15

A Model of Artificial Emotions for Behavior-Modulation and Implicit Coordination in Multi-robot Systems

Jerome Guzzi, Alessandro Giusti, Luca Maria Gambardella, Gianni A. Di Caro

15:15-15:40

ECOM2

Tuesday, July 17, 14:00-15:40, Conference Room 2 (3F)

Chair: Frank Neumann (The University of Adelaide)

Memetic Multilevel Hypergraph Partitioning

Sebastian Schlag, Christian Schulz, Robin Andre

14:00-14:25

Randomized Greedy Algorithms for Covering Problems

Wanru Gao, Tobias Friedrich, Frank Neumann, Christian Hercher

14:25-14:50

Evolutionary Multi-Level Acyclic Graph Partitioning

Orlando Moreira, Merten Popp, Christian Schulz

14:50-15:15

A Multi-objective Formulation of the Team Formation Problem in Social Networks: Preliminary Results

Carlos Brizuela, Julio Juarez

15:15-15:40

EML2

Tuesday, July 17, 14:00-15:40, Training Room 2 (2F)

Chair: Jeff Clune (Uber Technologies Inc., University of Wyoming)

Autostacker: A Compositional Evolutionary Learning System

Boyuan Chen, Harvey Wu, Warren Mo, Ishanu Chattopadhyay, Hod Lipson

14:00-14:25

Cooperative Multi-Objective Evolutionary Support Vector Machines for Multiclass Problems

Alejandro Rosales-Pérez, Andres Eduardo Gutierrez-Rodríguez, Salvador García, Hugo Terashima-Marín, Carlos A. Coello Coello, Francisco Herrera

14:25-14:50

Evolutionary Feature Subspaces Generation for Ensemble Classification

Boyu Zhang, A. K. Qin, Timos Sellis

14:50-15:15

ES Is More Than Just a Traditional Finite-Difference Approximator

Joel Lehman, Jay Chen, Jeff Clune, Kenneth O. Stanley

15:15-15:40

EMO2

Tuesday, July 17, 14:00-15:40, Conference Room D (3F)
 Chair: Arnaud Liefooghe (Univ. Lille, Inria Lille - Nord Europe)

A Taxonomy of Methods for Visualizing Pareto Front Approximations

Bogdan Filipic, Tea Tusar 14:00-14:25

mQAPViz: A divide-and-conquer multi-objective optimization algorithm to compute large data visualizations

Claudio Sanhueza, Francia Jiménez, Regina Berretta, Pablo Moscato 14:25-14:50

Surrogate-assisted Evolutionary Biobjective Optimization for Objectives with Non-uniform Latencies

Tinkle Chugh, Richard Allmendinger, Vesa Ojalehto, Kaisa Miettinen 14:50-15:15

A set-oriented MOEA/D

Bilel Derbel, Arnaud Liefooghe, Qingfu Zhang, Sébastien Verel, Hernán Aguirre, Kiyoshi Tanaka 15:15-15:40

GECH2

Tuesday, July 17, 14:00-15:40, Training Room 3 (2F)
 Chair: Yaochu Jin (University of Surrey)

Expected Improvement of Constraint Violation for Expensive Constrained Optimization

Ruwang Jiao, Sanyou Zeng, Changhe Li, Yuhong Jiang, Junchen Wang 14:00-14:25

Talakat: Bullet Hell Generation through Constrained Map-Elites

Ahmed Khalifa, Scott Lee, Andy Nealen, Julian Togelius 14:25-14:50

Neural Estimation of Interaction Outcomes

Paweł Liskowski, Bartosz Wieloch, Krzysztof Krawiec 14:50-15:15

Cooperative Co-evolution with Online Optimizer Selection for Large-Scale Optimization

Yuan Sun, Michael Kirley, Xiaodong Li 15:15-15:40

GP1

Tuesday, July 17, 14:00-15:40, AV Study Room (2F)
 Chair: Lee Spector (Hampshire College, University of Massachusetts Amherst)

Evolving Event-driven Programs with SignalGP

Alexander Lalejini, Charles Ofria 14:00-14:25

An Analysis of the Bias of Variation Operators of Estimation of Distribution Programming

Dirk Schweim, Franz Rothlauf 14:25-14:50

Schema-based Diversification in Genetic Programming

Bogdan Burlacu, Michael Affenzeller 14:50-15:15

Towards Effective Semantic Operators for Program Synthesis in Genetic Programming

Stefan Forstenlechner, David Fagan, Miguel Nicolau, Michael O'Neill 15:15-15:40

RWA2: Best Papers

Tuesday, July 17, 14:00-15:40, Conference Room Medium (2F)

Chair: Anna Isabel Esparcia-Alcazar (Universitat Politècnica de València)

*(Best Paper nominees are**marked with a star)*

A Detailed Comparison of Meta-Heuristic Methods for Optimising Wave Energy Converter Positions

Mehdi Neshat, Bradley Alexander, Markus Wagner, Yuanzhong Xia

14:00-14:25

Genetic Programming for Tuberculosis Screening from Raw X-ray Images ★

Armand Rashad Burks, William Fitzgerald Punch

14:25-14:50

Benchmarking Evolutionary Computation Approaches to Insider Threat Detection ★

Duc C. Le, Sara Khanchi, Nur Zincir-Heywood, Malcolm Heywood

14:50-15:15

THEORY2

Tuesday, July 17, 14:00-15:40, Conference Room A (3F)

Chair: Martin S. Krejca (Hasso Plattner Institute)

Significance-based Estimation-of-Distribution Algorithms

Benjamin Doerr, Martin S. Krejca

14:00-14:25

Medium Step Sizes are Harmful for the Compact Genetic Algorithm

Johannes Lengler, Dirk Sudholt, Carsten Witt

14:25-14:50

Crossover Can Simulate Bounded Tree Search on a Fixed-Parameter Tractable Optimization Problem

Andrew M. Sutton

14:50-15:15

CS2: Best Papers

Tuesday, July 17, 16:00-17:40, Conference Room Medium (2F)

Chair: Sebastian Risi (IT University of Copenhagen) *(Best Paper nominees are marked with a star)*

-
- Safe Mutations for Deep and Recurrent Neural Networks through Output Gradients** ★
Joel Lehman, Jay Chen, Jeff Clune, Kenneth O. Stanley 16:00-16:25
- Data-efficient Neuroevolution with Kernel-Based Surrogate Models** ★
Adam Gaier, Alexander Asteroth, Jean-Baptiste Mouret 16:25-16:50
- Evolution of a Functionally Diverse Swarm via a Novel Decentralised QD Algorithm** ★
Emma Hart, Andreas Siegfried Wilhelm Steyven, Ben Paechter 16:50-17:15
-

ECOM3

Tuesday, July 17, 16:00-17:40, Conference Room 2 (3F)

Chair: Bilel Derbel (Univ. Lille, Inria Lille - Nord Europe)

-
- Escaping Large Deceptive Basins of Attraction with Heavy-Tailed Mutation Operators**
Tobias Friedrich, Francesco Quinzan, Markus Wagner 16:00-16:25
- Improving the Run Time of the (1+1) Evolutionary Algorithm with Luby Sequences**
Tobias Friedrich, Timo Kötzing, Francesco Quinzan, Andrew M. Sutton 16:25-16:50
- Dominance, Epsilon, and Hypervolume Local Optimal Sets in Multi-objective Optimization, and How to Tell the Difference**
Arnaud Liefooghe, Manuel López-Ibáñez, Luís Paquete, Sébastien Verel 16:50-17:15
- A two-level diploid genetic based algorithm for solving the family traveling salesman problem**
Petrica Claudiu Pop, Oliviu Matei, Camelia Pintea 17:15-17:40
-

EML3

Tuesday, July 17, 16:00-17:40, Training Room 2 (2F)

Chair: Ryan Urbanowicz (University of Pennsylvania)

-
- Theoretical Adaptation of Multiple Rule-Generation in XCS**
Masaya Nakata, Will Neil Browne, Tomoki Hamagami 16:00-16:25
- Divide and Conquer: Neuroevolution for Multiclass Classification**
Tyler McDonnell, Sari Andoni, Elmira Bonab, Sheila Cheng, Jun-Hwan Choi, Jimmie Goode, Keith Moore, Gavin Sellers, Jacob Schrum 16:25-16:50
- Towards an Adaptive Encoding for Evolutionary Data Clustering**
Cameron Shand, Richard Allmendinger, Julia Handl, John Keane 16:50-17:15
- A Genetic Algorithm for Finding an Optimal Curing Strategy for Epidemic Spreading in Weighted Networks**
Clara Pizzuti, Annalisa Socievole 17:15-17:40

EMO3

Tuesday, July 17, 16:00-17:40, Conference Room D (3F)

Chair: Qingfu Zhang (City University of Hong Kong, Shenzhen Research Institute)

MOEA/D with Uniformly Randomly Adaptive Weights

Lucas Rodolfo Celestino Farias, Pedro Henrique Magalhães Braga, Hansenclever França Bassani, Aluizio Fausto Ribeiro Araújo 16:00-16:25

Dual-Grid Model of MOEA/D for Evolutionary Constrained Multiobjective Optimization

Hisao Ishibuchi, Takafumi Fukase, Naoki Masuyama, Yusuke Nojima 16:25-16:50

Directed Mating in Decomposition-based MOEA for Constrained Many-objective Optimization

Minami Miyakawa, Hiroyuki Sato, Yuji Sato 16:50-17:15

Component-level study of a decomposition-based multi-objective optimizer on a limited evaluation budget

Oliver P. H. Jones, Jeremy E. Oakley, Robin C. Purshouse 17:15-17:40

ENUM2

Tuesday, July 17, 16:00-17:40, Training Room 1 (2F)

Chair: Alexander Mendiburu (University of the Basque Country UPV/EHU)

Learning-Based Topology Variation in Evolutionary Level Set Topology Optimization

Mariusz Bujny, Nikola Aulig, Markus Olhofer, Fabian Duddeck 16:00-16:25

Analysis of Evolution Strategies with the Optimal Weighted Recombination

Chun-kit Au, Ho-fung Leung 16:25-16:50

A Global Information Based Adaptive Threshold for Grouping Large Scale Global Optimization Problems

An Chen, Yipeng Zhang, Yang Yang, Zhigang Ren, Yongsheng Liang, Bei Pang 16:50-17:15

GA2

Tuesday, July 17, 16:00-17:40, Conference Room B (3F)

Chair: Dirk Thierens (Utrecht University)

Grammatical Evolution Algorithm for Evolution of Swarm Behaviors

Aadesh Neupane, Michael A. Goodrich, Eric G. Mercer 16:00-16:25

Learning an Evolvable Genotype-Phenotype Mapping

Matthew Andres Moreno, Banzhaf Wolfgang, Charles Ofria 16:25-16:50

Serendipitous Scaffolding to improve a Genetic Algorithm's Speed and Quality

Heather J. Goldsby, Rebecca L. Young, Jory Schossau, Hans A. Hofmann, Arend Hintze 16:50-17:15

GECH3

Tuesday, July 17, 16:00-17:40, Conference Room A (3F)

Chair: Jonathan Edward Fieldsend (University of Exeter)

Quasi-Bistability of Walk-Based Landscape Measures in Stochastic Fitness Landscapes

Bernhard Werth, Erik Pitzer, Gerald Ostermayer, Michael Affenzeller

16:00-16:25

Changing or Keeping Solutions in Dynamic Optimization Problems with Switching Costs

Danial Yazdani, Juergen Branke, Mohammad Nabi Omidvar, Trung Thanh Nguyen, Xin Yao

16:25-16:50

Sequential Sampling for Noisy Optimisation with CMA-ES

Matthew Groves, Juergen Branke

16:50-17:15

GP2

Tuesday, July 17, 16:00-17:40, AV Study Room (2F)

Chair: Wolfgang Banzhaf (Memorial University of Newfoundland, NSF Beacon Center for the Study of Evolution in Action)

Genetic Programming Approach to Learning Multi-pass Heuristics for Resource Constrained Job Scheduling

Su Nguyen, Dhananjay Thiruvady, Andreas T. Ernst, Damminda Alahakoon

16:00-16:25

Adaptive Charting Genetic Programming for Dynamic Flexible Job Shop Scheduling

Su Nguyen, Mengjie Zhang, Kay Chen Tan, Damminda Alahakoon

16:25-16:50

Measuring Evolvability and Accessibility using the Hyperlink-Induced Topic Search Algorithm

Kyle Nickerson, Yuanzhu Chen, Feng Wang, Ting Hu

16:50-17:15

Neuro-Guided Genetic Programming: Prioritizing Evolutionary Search with Neural Networks

Paweł Liskowski, Iwo Bładek, Krzysztof Krawiec

17:15-17:40

RWA3

Tuesday, July 17, 16:00-17:40, Training Room 3 (2F)

Chair: Peter Bosman (Centrum Wiskunde & Informatica (CWI))

Informed Mutation Operator using Machine Learning for Optimization in Epidemics Prevention

Krzysztof Michalak

16:00-16:25

Symbolic Regression and Feature Construction with GP-GOMEA applied to Radiotherapy Dose Reconstruction of Childhood Cancer Survivors

Marco Virgolin, Tanja Alderliesten, Arjan Bel, Cees Witteveen, Peter A.N. Bosman

16:25-16:50

Better and Faster Catheter Position Optimization in HDR Brachytherapy for Prostate Cancer using Multi-Objective Real-Valued GOMEA

Marjolein C. van der Meer, Bradley R. Pieters, Yury Niatsetski, Tanja Alderliesten, Arjan Bel, Peter A.N. Bosman

16:50-17:15

Large-Scale Parallelization of Partial Evaluations in Evolutionary Algorithms for Real-World Problems

Anton Bouter, Tanja Alderliesten, Arjan Bel, Cees Witteveen, Peter A.N. Bosman

17:15-17:40

CS3

Wednesday, July 18, 10:40-12:20, AV Study Room (2F)

Chair: Nicolas Bredeche (Sorbonne Université, CNRS)

-
- Robotic Snake Simulation using Ensembles of Artificial Neural Networks in Evolutionary Robotics**
Grant Warren Woodford, Mathys Cornelius du Plessis 10:40-11:05
- Discovering the Elite Hypervolume by Leveraging Interspecies Correlation**
Vassilis Vassiliades, Jean-Baptiste Mouret 11:05-11:30
- A Robot to Shape your Natural Plant: The Machine Learning Approach to Model and Control Bio-Hybrid Systems**
Mostafa Wahby, Mary Katherine Heinrich, Daniel Nicolas Hofstadler, Payam Zahadat, Sebastian Risi, Phil Ayres, Thomas Schmickl, Heiko Hamann 11:30-11:55
- Evolution of Fin Undulation on a Physical Knifefish-inspired Soft Robot**
Frank Veenstra, Jonas Jørgensen, Sebastian Risi 11:55-12:20
-

ECOM4: Best Papers

Wednesday, July 18, 10:40-12:20, Terrsa Hall (1F)

Chair: Sebastien Verel (Université du Littoral Côte d'Opale) (*Best Paper nominees are marked with a star*)

-
- Enhancing Partition Crossover with Articulation Points Analysis** ★
Francisco Chicano, Gabriela Ochoa, Darrell D. Whitley, Renato Tinós 10:40-11:05
- One-Class Constraint Acquisition with Local Search** ★
Daniel Sroka, Tomasz P. Pawlak 11:05-11:30
- A Merge Search Algorithm and its Application to the Constrained Pit Problem in Mining**
Angus Kenny, Xiaodong Li, Andreas T. Ernst 11:30-11:55
-

EML4

Wednesday, July 18, 10:40-12:20, Training Room 2 (2F)

Chair: Kenneth Stanley (Uber Technologies Inc., University of Central Florida)

-
- NEAT for Large-Scale Reinforcement Learning through Evolutionary Feature Learning and Policy Gradient Search**
Yiming Peng, Gang Chen, Harman Singh, Mengjie Zhang 10:40-11:05
- Combating catastrophic forgetting with developmental compression.**
Shawn L. Beaulieu, Sam Kriegman, Josh C. Bongard 11:05-11:30
- Neuroevolution of Hierarchical Reservoir Computers**
Matthew Dale 11:30-11:55

EMO4

Wednesday, July 18, 10:40-12:20, Conference Room D (3F)

Chair: Dimo Brockhoff (INRIA Saclay - Ile-de-France; CMAP, Ecole Polytechnique)

Collaborative Multi-Objective Optimization for Distributed Design of Complex Products

Joao Antonio Fialho Vilas Boas Duro, Yiming Yan, Robin C. Purshouse, Peter J. Fleming 10:40-11:05

Transfer Strategies from Single- to Multi-objective Grouping Mechanisms

Frederick Sander, Heiner Zille, Sanaz Mostaghim 11:05-11:30

Generalized Offline Orthant Search: One Code for Many Problems in Multiobjective Optimization

Maxim Buzdalov 11:30-11:55

Improving the Performance of MO-RV-GOMEA on Problems with Many Objectives using Tchebycheff Scalarizations

Ngoc Hoang Luong, Tanja Alderliesten, Peter A.N. Bosman 11:55-12:20

EMO5

Wednesday, July 18, 10:40-12:20, Conference Room 2 (3F)

Chair: Ke Li (University of Exeter)

A Differential Prediction Model for Evolutionary Dynamic Multiobjective Optimization

Leilei Cao, Lihong Xu, Erik D. Goodman, Shuwei Zhu, Hui Li 10:40-11:05

Less Detectable Environmental Changes in Dynamic Multiobjective Optimisation

Shouyong Jiang, Marcus Kaiser, Jinglei Guo, Shengxiang Yang, Natalio Krasnogor 11:05-11:30

A Steady-State NSGA-II based Multi-objective Multicast Routing Algorithm for Optical Networks

Ying Xu, Yan Zhou 11:30-11:55

Multiobjective Sparse Unmixing Approach with Noise Removal

Xiangming Jiang, Maoguo Gong, Tao Zhan, Zedong Tang 11:55-12:20

ENUM3

Wednesday, July 18, 10:40-12:20, Training Room 1 (2F)

Chair: Anne Auger (INRIA; CMAP, Ecole Polytechnique)

A Novel Similarity-based Mutant Vector Generation Strategy for Differential Evolution

Eduardo Segredo, Eduardo Lalla-Ruiz, Emma Hart 10:40-11:05

Expanding variational autoencoders for learning and exploiting latent representations in search distributions

Unai Garciarena, Roberto Santana, Alexander Mendiburu 11:05-11:30

Analysis of Information Geometric Optimization with Isotropic Gaussian Distribution Under Finite Samples

Kento Uchida, Youhei Akimoto, Shinichi Shirakawa 11:30-11:55

Inheritance-Based Diversity Measures for Explicit Convergence Control in Evolutionary Algorithms

Thomas Gabor, Lenz Belzner, Claudia Linnhoff-Popien 11:55-12:20

GA3

Wednesday, July 18, 10:40-12:20, Conference Room B (3F)

Chair: Peter Bosman (Centrum Wiskunde & Informatica (CWI))

Simple On-the-Fly Parameter Selection Mechanisms for Two Classical Discrete Black-Box Optimization Benchmark Problems

Carola Doerr, Markus Wagner

10:40-11:05

Investigation of the Exponential Population Scheme for Genetic Algorithms

Yuen-Jen Lin, Tian-Li Yu

11:05-11:30

On the Runtime Dynamics of the Compact Genetic Algorithm on Jump Functions

Václav Hasenöhrl, Andrew M. Sutton

11:30-11:55

Discrepancy-Based Evolutionary Diversity Optimization

Aneta Neumann, Wanru Gao, Carola Doerr, Frank Neumann, Markus Wagner

11:55-12:20

GP3: Best Papers

Wednesday, July 18, 10:40-12:20, Conference Room Medium (2F)

Chair: Hitoshi Iba (University of Tokyo)

*(Best Paper nominees are marked with a star)***Solving the Exponential Growth of Symbolic Regression Trees in Geometric Semantic Genetic Programming** ★

Joao Francisco Barreto da Silva Martins, Luiz Otavio Vilas Boas Oliveira, Luis Fernando Miranda, Felipe Casadei, Gisele Lobo Pappa

10:40-11:05

Where are we now? A large benchmark study of recent symbolic regression methods ★

Patrik Orzechowski, William La Cava, Jason H. Moore

11:05-11:30

Program Synthesis using Uniform Mutation by Addition and Deletion ★

Thomas Helmuth, Nicholas Freitag McPhee, Lee Spector

11:30-11:55

HOP1

Wednesday, July 18, 10:40-12:20, Conference Room C (3F)

Chair: Grant Dick (University of Otago, Information Science Dept.)

Towards Automation & Augmentation of the Design of Schedulers for Cellular Communications Networks

Michael Fenton, David Fagan

10:40-11:05

Parameter-less (Meta)heuristics for Vehicle Routing Problems

Jakub Nalepa, Miroslaw Blocho

11:05-11:30

Summary of Evolutionary Computation for Wind Farm Layout Optimization

Dennis Wilson, Silvio Rodrigues, Carlos Segura, Ilya Loshchilov, Frank Hutter, Guillermo López Buenfil, Ahmed Kheiri, Ed Keedwell, Mario Ocampo Pineda, Ender Ozcan, Sergio Iván Valdez Peña, Brian Goldman, Salvador Botello Rionda, Arturo Hernández Aguirre, Kalyan Veeramachaneni, Sylvain Cussat-Blanc

11:30-11:55

Better Runtime Guarantees Via Stochastic Domination (Hot-off-the-Press Track at GECCO 2018)

Benjamin Doerr

11:55-12:20

RWA4

Wednesday, July 18, 10:40-12:20, Training Room 3 (2F)

Chair: Thomas Bartz-Beielstein (TH Köln, SPOTSeven Lab)

A Rolling Window with Genetic Algorithm Approach to Sorting Aircraft for Automated Taxi Routing

Alexander Edward Ian Brownlee, John R. Woodward, Michal Weiszer, Jun Chen

10:40-11:05

Comparison of Parallel Surrogate-Assisted Optimization Approaches

Frederik Rehbach, Martin Zaefferer, Jörg Stork, Thomas Bartz-Beielstein

11:05-11:30

Surrogate assisted optimization of particle reinforced metal matrix composites

Lorenzo Gentile, Martin Zaefferer, Dario Giugliano, Haofeng Chen, Thomas Bartz-Beielstein

11:30-11:55

Rate-Setter : Roadmap for Faster, Safer, and Better Platform Train Interface Design and Operation using Evolutionary Optimization

David Fletcher, Rob Harrison, Twin Karmakharm, Paul Richmond, Samadhi Nallaperuma

11:55-12:20

SBSE1

Wednesday, July 18, 10:40-12:20, Conference Room A (3F)

Chair: Houari Sahraoui (DIRO, Univ. de Montreal)

Multi-Objective Black-Box Test Case Selection for Cost-Effectively Testing Simulation Models

Aitor Arrieta, Shuai Wang, Ainhoa Arruabarrena, Urtzi Markiegi, Goiuria Sagardui, Leire Etxeberria

10:40-11:05

Dependent Input Sampling Strategies: Using Metaheuristics for Generating Parameterised Random Sampling Regimes

Komsan Srivisut, John Andrew Clark, Richard Freeman Paige

11:05-11:30

Test suite minimization for mutation testing of WS-BPEL compositions

Francisco Palomo-Lozano, Inmaculada Medina-Bulo, Antonia Estero-Botaro, Manuel Núñez

11:30-11:55

ACO-SI2

Wednesday, July 18, 15:30-17:10, Conference Room B (3F)

Chair: Andries P. Engelbrecht (University of Pretoria)

A Particle Swarm Optimization based Feature Selection Approach to Transfer Learning in Classification

Bach Hoai Nguyen, Bing Xue, Peter Andreae 15:30-15:55

Using Ant Colony Optimization to Optimize Long Short-Term Memory Recurrent Neural Networks

AbdElRahman ElSaid, Fatima El Jamiy, James Higgins, Brandon Wild, Travis Desell 15:55-16:20

Semi-supervised Learning Assisted Particle Swarm Optimization of Computationally Expensive Problems

Chaoli Sun, Yaochu Jin, Ying Tan 16:20-16:45

CS4

Wednesday, July 18, 15:30-17:10, AV Study Room (2F)

Chair: Emma Hart (Napier University)

Hierarchical Behavioral Repertoires with Unsupervised Descriptors

Antoine Cully, Yiannis Demiris 15:30-15:55

How swarm size during evolution impacts the behavior, generalizability, and brain complexity of animats performing a spatial navigation task

Dominik Fischer, Sanaz Mostaghim, Larissa Albantakis 15:55-16:20

Automatic Synthesis of Swarm Behavioural Rules from their Atomic Components

Dilini Samarasinghe, Erandi Lakshika, Michael Barlow, Kathryn Kasmarik 16:20-16:45

On an Immuno-inspired Distributed, Embodied Action-Evolution cum Selection Algorithm

Tushar Semwal, Divya D. Kulkarni, Shivashankar B. Nair 16:45-17:10

DETA2+THEORY3+GECH4: Best Papers

Wednesday, July 18, 15:30-17:10, Conference Room Medium (2F)

Chair: Per Kristian Lehre (University of Birmingham) *(Best Paper nominees are marked with a star)***Evolving Mario Levels in the Latent Space of a Deep Convolutional Generative Adversarial Network ★**

Vanessa Volz, Jacob Schrum, Jialin Liu, Simon M. Lucas, Adam M. Smith, Sebastian Risi 15:30-15:55

Domino Convergence: Why One Should Hill-Climb on Linear Functions ★

Carsten Witt 15:55-16:20

Working Principles of Binary Differential Evolution ★

Weijie Zheng, Guangwen Yang, Benjamin Doerr 16:20-16:45

On the Runtime Analysis of Selection Hyper-Heuristics with Adaptive Learning Periods

Benjamin Doerr, Andrei Lissovoi, Pietro S. Oliveto, John Alasdair Warwicker 16:45-17:10

ECOM5

Wednesday, July 18, 15:30-17:10, Conference Room 2 (3F)

Chair: Gabriela Ochoa (University of Stirling)

A fitness landscape analysis of the Travelling Thief Problem

Mohamed El Yafrani, Marcella Scoczynski Ribeiro Martins, Mehdi El Krari, Markus Wagner, Myriam Delgado, Belaïd Ahiod, Ricardo Lüders 15:30-15:55

Algorithm Selection on Generalized Quadratic Assignment Problem Landscapes

Andreas Beham, Stefan Wagner, Michael Affenzeller 15:55-16:20

Fitness Landscape Analysis around the Optimum in Computational Protein Design

David Simoncini, Sophie Barbe, Thomas Schiex, Sébastien Verel 16:20-16:45

Multifractality and Dimensional Determinism in Local Optima Networks

Sarah Louise Thomson, Sébastien Verel, Gabriela Ochoa, Nadarajen Veerapen, David Cairns 16:45-17:10

EML5

Wednesday, July 18, 15:30-17:10, Training Room 2 (2F)

Chair: Satoshi Ono (Kagoshima University)

Evolutionary Architecture Search for Deep Multitask Networks

Jason Zhi Liang, Elliot Meyerson, Risto Miikkulainen 15:30-15:55

Memetic Evolution of Deep Neural Networks

Pablo Ribalta Lorenzo, Jakub Nalepa 15:55-16:20

Optimizing Floating Centroids Method Neural Network Classifier Using Dynamic Multilayer Particle Swarm Optimization

Changwei Cai, Shuangrong Liu, Lin Wang, Bo Yang, Zhenxiang Chen, Jin Zhou 16:20-16:45

EMO6

Wednesday, July 18, 15:30-17:10, Conference Room D (3F)

Chair: Bogdan Filipic (Jozef Stefan Institute, Jozef Stefan International Postgraduate School)

Local Search Effects in Bi-Objective Orienteering

Jakob Bossek, Christian Grimme, Stephan Meisel, Günter Rudolph, Heike Trautmann 15:30-15:55

Interactive Multiobjective Optimisation: Preference Changes And Algorithm Responsiveness

Kendall Peter Taylor, Xiaodong Li 15:55-16:20

Preference-based 3-Dimensional En-route Airspace Sectorization

Cheryl Sze Yin Wong, Suresh Sundaram 16:20-16:45

GA4: Best Papers

Wednesday, July 18, 15:30-17:10, Terrsa Hall (1F)

Chair: Tian-Li Yu (Department of Electrical Engineering, National Taiwan University; National Taiwan Uni-

versity)

(Best Paper nominees are marked with a star)

Runtime Analysis of Probabilistic Crowding and Restricted Tournament Selection for Bimodal Optimisation ★

Edgar Covantes Osuna, Dirk Sudholt 15:30-15:55

Tunneling Between Plateaus: Improving on a State-of-the-Art MAXSAT Solver using Partition Crossover ★

Wenxiang Chen, Darrell D. Whitley, Francisco Chicano, Renato Tinós 15:55-16:20

Learning Bayesian Network Structures with GOMEA ★

Kalia Orphanou, Dirk Thierens, Peter A.N. Bosman 16:20-16:45

Fast Algorithm for Fair Comparison of Genetic Algorithms

Chia-Sheng Chen, Hung-Wei Hsu, Tian-Li Yu 16:45-17:10

HOP2

Wednesday, July 18, 15:30-17:10, Conference Room C (3F)

Chair: Grant Dick (University of Otago, Information Science Dept.)

Approximating Complex Arithmetic Circuits with Formal Error Guarantees: 32-bit Multipliers Accomplished

Milan Češka, Jiří Matyáš, Vojtech Mrazek, Lukas Sekanina, Zdenek Vasicek, Tomas Vojnar 15:30-15:55

Energy-consumption prediction of Genetic Programming Algorithms using a Fuzzy Rule-Based System

Francisco Chavez de la O, Francisco Fernandez de Vega, Josefa Diaz-Alvarez, Juan A. Garcia, Francisco J. Rodriguez, Pedro A. Castillo 15:55-16:20

Evolutionary Computation: An Investigation of Parameter Space

Moshe Sipper, Weixuan Fu, Karuna Ahuja, Jason H. Moore 16:20-16:45

Deep Statistical Comparison of Meta-heuristic Stochastic Optimization Algorithms

Tome Eftimov, Peter Korošec, Barbara Koroušić Seljak 16:45-17:10

RWA5

Wednesday, July 18, 15:30-17:10, Training Room 3 (2F)

Chair: Carlos Antunes (DEEC-UC)

Investigation of the Latent Space of Stock Market Patterns with Genetic Programming

Sungjoo Ha, Sangyeop Lee, Byung-Ro Moon 15:30-15:55

Value-Based Manufacturing Optimisation in Serverless Clouds for Industry 4.0

Piotr Dziurzanski, Jerry Swan, Leandro Soares Indrusiak 15:55-16:20

Impacts of Constraints and Constraint Handling Strategies for Multi-Objective Mechanical Design Problems

Cyril Picard, Jürg Schiffmann 16:20-16:45

Optimizing Residential Energy Resources with an Improved Multi-Objective Genetic Algorithm based on Greedy Mutations

Ivo Gonçalves, Álvaro Gomes, Carlos Henggeler Antunes

16:45-17:10

SBSE2

Wednesday, July 18, 15:30-17:10, Conference Room A (3F)

Chair: Giuliano Antoniol (Ecole Polytechnique de Montreal)

On the Effects of Seeding Strategies: A Case for Search-based Multi-Objective Service Composition

Tao Chen, Miqing Li, Xin Yao

15:30-15:55

A Novel Fitness Function for Automated Program Repair Based on Source Code Checkpoints

Eduardo Faria de Souza, Celso Gonçalves Camilo-Junior, Claire Le Goues

15:55-16:20

Towards the Automated Recovery of Complex Temporal API-Usage Patterns

Mohamed Aymen Saied, Houari Sahraoui, Edouard Batot, Michalis Famelis, Pierre-Olivier Talbot

16:20-16:45

DETA3

Thursday, July 19, 09:00-10:40, Conference Room 2 (3F)

Chair: Jacob Schrum (Department of Mathematics and Computer Science, Southwestern University)

Querying Across Time to Interactively Evolve Animations

Isabel Tweraser, Lauren E. Gillespie, Jacob Schrum

09:00-09:25

Generating a Melody Based on Symbiotic Evolution for Musicians' Creative Activities

Noriko Otani, Daisuke Okabe, Masayuki Numao

09:25-09:50

EML6

Thursday, July 19, 09:00-10:40, Training Room 2 (2F)

Chair: Josh Bongard (University of Vermont)

Ensembles of Evolved Nested Dichotomies for Classification

Marcel Wever, Felix Mohr, Eyke Hüllermeier

09:00-09:25

Efficient Sample Reuse in Policy Search by Multiple Importance Sampling

Eiji Uchibe

09:25-09:50

Online Meta-Learning by Parallel Algorithm Competition

Stefan Elfving, Eiji Uchibe, Kenji Doya

09:50-10:15

Evolutionary Expectation Maximization

Enrico Guiraud, Jakob Drefs, Jörg Lücke

10:15-10:40

EML7

Thursday, July 19, 09:00-10:40, Conference Room B (3F)

Chair: Grant Dick (University of Otago, Information Science Dept.)

Automatically Evolving Difficult Benchmark Feature Selection Datasets with Genetic Programming

Andrew Lensen, Bing Xue, Mengjie Zhang

09:00-09:25

CovSel: A New Approach for Ensemble Selection Applied to Symbolic Regression Problems

Dominik Sobania, Franz Rothlauf

09:25-09:50

Limited Evaluation Cooperative Co-evolutionary Differential Evolution for Large-scale Neuroevolution

Anil Yaman, Decebal Constantin Mocanu, Giovanni Iacca, George Fletcher, Mykola Pechenizkiy

09:50-10:15

EMO7: Best Papers

Thursday, July 19, 09:00-10:40, Terrsa Hall (1F)

Chair: Tea Tusar (Jozef Stefan Institute)

(Best Paper nominees are marked with a star)

Efficient Search Techniques Using Adaptive Discretization of Design Variables on Real-Coded Evolutionary Computations

Toshiki Kondo, Tomoaki Tatsukawa 09:00-09:25

Multi-Objective Evolutionary Hyper-heuristic based on Multiple Indicator-based Density Estimators ★

Jesús Guillermo Falcón-Cardona, Carlos A. Coello Coello 09:25-09:50

A new R2 indicator for better hypervolume approximation ★

Ke Shang, Hisao Ishibuchi, Min-Ling Zhang, Yiping Liu 09:50-10:15

Data-Driven Analysis of Pareto Set Topology ★

Naoki Hamada, Keisuke Goto 10:15-10:40

ENUM4: Best Papers

Thursday, July 19, 09:00-10:40, Conference Room Medium (2F)

Chair: Nikolaus Hansen (Inria, research centre Saclay) *(Best Paper nominees are marked with a star)*

PSA-CMA-ES: CMA-ES with Population Size Adaptation ★

Kouhei Nishida, Youhei Akimoto 09:00-09:25

An Empirical Comparison of Metamodeling Strategies in Noisy Environments ★

Sunith Bandaru, Amos H.C. Ng 09:25-09:50

Performance Improvements for Evolutionary Strategy-based One-Class Constraint Synthesis

Tomasz P. Pawlak 09:50-10:15

HOP3

Thursday, July 19, 09:00-10:40, Conference Room C (3F)

Chair: William LaCava (University of Massachusetts Amherst)

Constraint Handling Guided by Landscape Analysis in Combinatorial and Continuous Search Spaces

Katherine Malan, Irene Moser 09:00-09:25

A multidimensional genetic programming approach for identifying epistatic gene interactions

William La Cava, Sara Silva, Kourosh Danai, Leonardo Vanneschi, Jason H. Moore, Lee Spector 09:25-09:50

On Botnet Detection with Genetic Programming under Streaming Data, Label Budgets and Class Imbalance

Sara Khanchi, Ali Vahdat, Malcolm Heywood, Nur Zincir-Heywood 09:50-10:15

Standard Steady State Genetic Algorithms Can Hillclimb Faster than Evolutionary Algorithms using Standard Bit Mutation

Dogan Corus, Pietro S. Oliveto 10:15-10:40

HOP4

Thursday, July 19, 09:00-10:40, Conference Room D (3F)

Chair: Krzysztof Michalak (Wroclaw University of Economics)

Employing Multi-Objective Search to Enhance Reactive Test Generation and Prioritization for Testing Industrial Cyber-Physical Systems

Aitor Arrieta, Shuai Wang, Urtzi Markiegi, Goiuria Sagardui, Leire Etxeberria 09:00-09:25

Detection of Minimum Biomarker Features via Bi-level Optimization Framework by Nested Hybrid Differential Evolution

Kai-Cheng Hsu, Feng-Sheng Wang 09:25-09:50

ED-LS - A Heuristic Local Search for the Firefighter Problem

Krzysztof Michalak 09:50-10:15

RWA6

Thursday, July 19, 09:00-10:40, Training Room 3 (2F)

Chair: Risto Miikkulainen (The University of Texas at Austin, University of Texas at Austin)

A GA based Network Optimization Tool for Passive In-Building Distributed Antenna Systems

Siddhartha Shakya, Kin Poon, Anis Ouali 09:00-09:25

Genetic Algorithm to Study Practical Quantum Adversaries

Walter O. Krawec, Sam A. Markelon 09:25-09:50

Functional Generative Design: An Evolutionary Approach to 3D-Printing

Cem C. Tutum, Supawit Chockchowwat, Etienne Vouga, Risto Miikkulainen 09:50-10:15

Estimation of the Heterogeneous Strategies from Action Log

Keiichi Namikoshi, Sachiyo Arai 10:15-10:40

RWA7

Thursday, July 19, 09:00-10:40, AV Study Room (2F)

Chair: Thomas Bäck (Leiden University)

Evolving the Autosteering of a Car Featuring a Realistically Simulated Steering Response

Vsevolod Nikulin, Albert Podusenko, Ivan Tanev, Katsunori Shimohara 09:00-09:25

Orthogonalization of Linear Representations for Efficient Evolutionary Design Optimization

Andreas Richter, Stefan Dresselhaus, Stefan Menzel, Mario Botsch 09:25-09:50

Predicting Friction System Performance with Symbolic Regression and Genetic Programming with Factor Variables

Gabriel Kronberger, Michael Kommenda, Andreas Promberger, Falk Nickel 09:50-10:15

Multi-Objective Aerodynamic Design with User Preference using Truncated Expected Hypervolume Improvement

Pramudita Satria Palar, Kaifeng Yang, Koji Shimoyama, Michael Emmerich, Thomas Bäck 10:15-10:40

THEORY4

Thursday, July 19, 09:00-10:40, Conference Room A (3F)

Chair: Anne Auger (INRIA; CMAP, Ecole Polytechnique)

Analysis of Noisy Evolutionary Optimization When Sampling Fails

Chao Qian, Chao Bian, Yang Yu, Ke Tang, Xin Yao

09:00-09:25

On the Robustness of Evolutionary Algorithms to Noise: Refined Results and an Example Where Noise Helps

Dirk Sudholt

09:25-09:50

Runtime Analysis of Randomized Search Heuristics for the Dynamic Weighted Vertex Cover Problem

Feng Shi, Frank Neumann, Jianxin Wang

09:50-10:15

A New Analysis Method for Evolutionary Optimization of Dynamic and Noisy Objective Functions

Raphaël Dang-Nhu, Thibault Dardinier, Benjamin Doerr, Gautier Izacard, Dorian Nogneng 10:15-10:40

Poster SessionTuesday, July 17, 18:00-20:00, Terrsa Hall (1F)

ACO-SI — Ant Colony Optimization and Swarm Intelligence**Multiple Swarm Intelligence Methods based on Multiple Population with Sharing Best Solution for Drastic Environmental Change**

Yuta Umenai, Fumito Uwano, Hiroyuki Sato, Keiki Takadama

Particle Swarm and Population Structure

Carlos M. Fernandes, Nuno Fachada, Juan L.J. Laredo, Agostinho C. Rosa, JJ Merelo

Artificial Bee Colony Algorithm based on Adaptive Local Information Sharing: Approach for several dynamic changes

Ryo Takano, Hiroyuki Sato, Keiki Takadama

Comparative Performance and Scaling for the Pareto Improving Particle Swarm Algorithm

Stephyn G. W. Butcher, John Sheppard, Brian Haberman

Improving the Accuracy of 2D-3D Registration of Femur Bone for Bone Fracture Reduction Robot using Particle Swarm Optimization

Asaduz Zaman, Seong Young Ko

Gaussian Bare-bones Cuckoo Search Algorithm

Hu Peng, Changshou Deng, Hui Wang, Wenjun Wang, Xinyu Zhou, Zhijian Wu

Scouting Strategy for Biasing Fireworks Algorithm Search to Promising Directions

Jun Yu, Ying Tan, Hideyuki Takagi

Multimodal Optimization of Traveling Salesman Problem: A Niche Ant Colony System

Xing-Chi Han, Hao-Wen Ke, Yue-Jiao Gong, Ying Lin, Wei-Li Liu, Jun Zhang

Comparative Study on Discrete SI Approaches to the Graph Coloring Problem

Claus Aranha, Jair Pereira Junior, Hitoshi Kanoh

An Efficient Ant Colony System For Coverage Based Test Case Prioritization

Chengyu Lu, Jinghui Zhong

Inverted Ant Colony Optimization for Search and Rescue in an Unknown Maze-like Indoor Environment

Zainab Husain, Dymitr Ruta, Fabrice Saffre, Yousof Al-Hammadi, Abdel F. Isakovic

CompoT — Competition Entries**Anomaly Detection for Drinking Water Quality via Deep BiLSTM Ensemble**

Xingguo Chen, Fan Feng, Jikai Wu, Wenyu Liu

Online Anomaly Detection for Drinking Water Quality Using a Multi-objective Machine Learning Approach

Victor Henrique Alves Ribeiro, Gilberto Reynoso Meza

Automatic vs. Manual Feature Engineering for Anomaly Detection of Drinking-Water Quality

Valerie Aenne Nicola Fehst, Huu Chuong La, Tri-Duc Nghiem, Ben E. Mayer, Paul Englert, Karl-Heinz Fiebig

CS — Complex Systems**Open-Ended Evolution with Multi-Containers QD**

Stephane Doncieux, Alexandre Coninx

The Dynamics of Cooperation versus Competition

Geoff Nitschke, Olaf Witkowski

Toward Learning Neural Network Encodings for Continuous Optimization Problems

Eric O. Scott, Kenneth De Jong

Evolutionary Hexapod Robot Gait Control Using A New Recurrent Neural Network Learned Through Group-based Hybrid Metaheuristic Algorithm

Chia-Feng Juang, Yu-Cheng Chang, I-Fang Chung

Policy Transfer Methods in RoboCup Keep-Away

Geoff Nitschke

Meta-Learning by the Baldwin Effect

Chrisantha Fernando, Jakub Sygnowski, Simon Osindero, Jane Wang, Tom Schaul, Denis Teplyashin, Pablo Sprechmann, Alexander Pritzel, Andrei Rusu

Embodiment can combat catastrophic forgetting

Joshua P. Powers, Josh C. Bongard, Sam Kriegman

A Distributed Dendritic Cell Algorithm for Big Data

Zaineb Chelly Dagdia

Bend and Flex: Passive Flexibility or Active Control in a Quadruped Animat

Jared M. Moore, Anthony J. Clark

Ecological Theory Provides Insights about Evolutionary Computation

Emily L. Dolson, Charles Ofria

Why Don't the Modules Dominate?

Zhenyue Qin, Robert McKay, Tom Gedeon

DETA — Digital Entertainment Technologies and Arts**Silhouette-based Three Dimensional Image Registration Using CMA-ES with Joint Scheme of Partial Restart and Variable Fixing**

Takuto Shigenobu, Takuya Ushinohama, Hiroshi Kawasaki, Satoshi Ono

Hybrid Fighting Game AI using Genetic Algorithm and Monte Carlo Tree Search

Man-Je Kim, Chang Wook Ahn

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