## in this issue

EDITORIAL

In this newsletter we take a look back to EvoSTAR in Amsterdam and a look forward to GECCO coming up in July. A large number of people enjoyed the Dutch sunshine and hospitality in April at EvoSTAR with a varied programme of talks, posters and activities – **Ben Paechter** reports on some of the highlights inside. There is still time to enter one of the GECCO competitions, most of which have deadlines around the end of June, and you can whet your appetite for Berlin with a preview of the keynote speakers, and list of best paper nominees.

As ever, if you would like to see your work featured in the SIGEVO newsletter, please let me know and I look forward to seeing many of you in Berlin soon.

Emma Hart

Evolutionary Computation Summer 2017, Vol. 25, No. 2

· *Extending XCS with Cyclic Graphs for Scalability on Complex Boolean Problems* (Muhammad Iqbal, Will N. Browne, and Mengjie Zhang)

· *Principled Design and Runtime Analysis of Abstract Convex Evolutionary Search* (Alberto Moraglio, and Dirk Sudholt)

· *How Crossover Speeds up Building Block Assembly in Genetic Algorithms* (Dirk Sudholt)

· *Novelty-Driven Cooperative Coevolution* (Jorge Gomes, Pedro Mariano, and Anders Lyhne Christensen)
 *** Free Access ***

· *Global WASF-GA: An Evolutionary Algorithm in Multiobjective Optimization to Approximate the Whole Pareto Optimal Front* (Rubén Saborido, Ana B. Ruiz, and Mariano Luque)
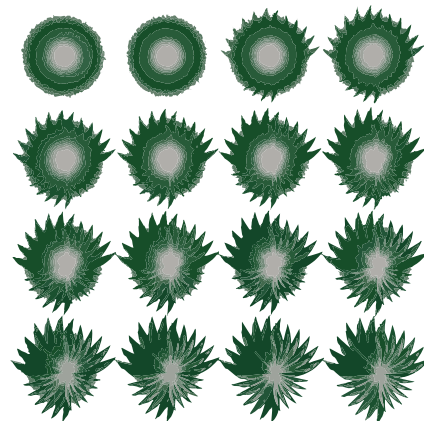
"Front cover art-work supplied by **Miri Weiss-Cohen**: Evolving Mondrian-Style Artworks, Miri Weiss Cohen, Leticia Cherchiglia, Rachel Costa . In: Correia J., Ciesielski V., Liapis A. (eds) Computational Intelligence in Music, Sound, Art and Design. EvoMUSART 2017. Lecture Notes in Computer Science, vol 10198. Springer, Cham

TV tower and Bode-Museum in Berlin-Mitte at dawn: Ansgar Koreng

ORGANISERS

General Chair: Peter A.N. Bosman | **Editor-in-Chief**: Gabriela Ochoa | **Local Chair**: Tobias Friedrich
Proceedings Chair: Francisco Chicano | **Publicity Chair**: Javier Ferrer | **Electronic Media Chair**: Anton
Bouter | **Electronic Media Chair**: Marco Virgolin

The waiting is nearly over! GECCO 2017 in Berlin is just over a month away! 181 papers have been accepted as full papers. They will be published in the Proceedings (and hence in the Digital Library) and presented during one of the sessions of the conference.

The deadlines for late-breaking abstracts and hot-off-the-press papers and the Humies have now passed, and the inaugural Summer School is full with some students on a waiting list. There is still time however to enter one of the competitions, and start planning which workshops and tutorials you want to attend over the opening weekend.

GECCO COMPETITIONS

In 2017, there are a number of competitions ranging from different types of optimization problems to games and computational creativity. Details of individual competitions with entry deadlines can be accessed via the links below.

Black Box Optimization   (30th June)

Industrial Challenge (30th June)

Niching Methods for Multimodal Optimization (30th June)

EVOLUTIONARY COMPUTATION IN PRACTICE

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. The ECiP track will be on Monday, July 17th.

Sessions
S-1: Bridging the gap between academia and industry

S-2: "Real" real-world optimization

S-3: Ask the experts / Getting a job

Please check http://www.spotseven.de/gecco/evolutionary-computation-in-practice/ for further information.

BEST PAPER NOMINATIONS

Congratulations to all the nominees for the best-paper awards. The winners will be decided by audience voting following the paper presentations during special sessions during the conference.

CO-SI

Analysis of Independent Roulette Selection in Parallel Ant Colony Optimization
Huw Lloyd (Manchester Metropolitan University), **Martyn Amo** (Manchester Metropolitan University)

CS

Evolutionary Optimization of Self-Assembly in a Swarm of Bio-microrobots
Nathanael Aubert-Kato (Tokyo Institute of Tech./UPMC), **Charles Fosseprez** (CRI), **Guillaume Gines** (ESPCI), **Ibuki Kawamata** (Tohoku University), **Huy Dinh** (The University of Tokyo), **Leo Cazenille** (UPMC/UPD), **Andre Estevez-Torres** (UPMC), **Masami Hagiya** (The University of Tokyo), **Yannick Rondelez** (ESPCI), **Nicolas Bredeche** (UPMC

On Self-Adaptive Mutation Restarts for Evolutionary Robotics with Real Rotorcraft
Gerard Howard (CSIRO)

Discovering Evolutionary Stepping Stones through Behavior Domination
Elliot Meyerson (The University of Texas at Austin; and Sentient Technologies, Inc.), **Risto Miikkulainen** (The University of Texas at Austin; and Sentient Technologies, Inc.)

Data-Efficient Exploration, Optimization, and Modeling of Diverse Designs through Surrogate Illumination
Adam Gaier (Bonn-Rhein-Sieg University of Applied Sciences / CNRS / Université de Lorraine) **Alexander Asteroth** (Bonn-Rhein-Sieg University of Applied Sciences), Jean-Baptiste Mouret (Inria / CNRS / Université de Lorraine

DETA

Multi-Task Learning in Atari Video Games with Emergent Tangled Program Graphs
Stephen Kelly (Dalhousie University), **Malcolm Heywood** (Dalhousie University)

ECOM

Automatic Design of Multi-Objective Local Search Algorithms
Aymeric Blot (Université de Lille, CRIStAL), **Laetitia Jourdan** (Université de Lille, CRIStAL), **Marie-Éléonore Kessaci-Marmion** (Université de Lille, CRIStAL)

Configuring irace using surrogate configuration benchmarks
Nguyen Dang (KU Leuven, CODeS, imec-ITEC), **Leslie Cáceres** (IRIDIA, CoDE, Universite libre de Bruxelles), **Thomas Stützle** (IRIDIA, CoDE, Universite libre de Bruxelles), **Patrick De Causmaecker** (KU Leuven, CODeS, imec-ITEC)

ECOM Distributed Evolutionary k-way Node Separators
Peter Sanders (Karlsruhe Institute of Technology), **Christian Schulz** (University of Vienna), **Darren Strash** (Colgate University), **Robert Williger** (Karlsruhe Institute of Technology)

EML

Accelerating Coevolution with Adaptive Matrix Factorization-based Interaction Scheme
Paweł Liskowski (Poznan University of Technology/Laboratory of Intelligent Decision Support Systems), **Wojciech Jakowski** (Poznan University of Technology/Laboratory of Intelligent Decision Support Systems)

A Genetic Programming Approach to Designing Convolutional Neural Network Architectures
Masanori Suganuma, Shinichi Shirakawa,Tomoharu Nagao (Graduate school of Environment and Information Sciences, Yokohama National University

Evolving Memory-Augmented Neural Architecture for Deep Memory Problems
Shauharda Khadka, Jen Jen Chung, Kagan Tumer (Oregon State University)

Toward the automated analysis of complex diseases in genome-wide association studies using genetic programming
Andrew Sohn, Randal Olson, Jason Moore (Institute for Biomedical Informatics at the Perelman School of Medicine of the University of Pennsylvania)

EMO

Improved Incremental Non-dominated Sorting for Steady-State Evolutionary Multiobjective Optimization
Ilya Yakupov, Maxim Buzdalov (ITMO University)

Reference Point Specification in Hypervolume Calculation for Fair Comparison and Efficient Search
Hisao Ishibuchi (Southern University of Science and Technology), Ryo Imada, Yu Setoguchi (Osaka Prefecture University), Yusuke Nojima (Osaka Prefecture University)

Progressively Adding Objectives: A Case Study in Anomaly Detection
Luis Martí (INRIA/Saclay and Universidade Federal Fluminense), Arsene Fansi-Tchango (Thales Research), Marc Schoenauer (INRIA/Saclay)

ENUM

Deriving and Improving CMA-ES with Information Geometric Trust Regions
Abbas Abdolmaleki (PARC), Bob Price (PARC), Gerhard Neumann (University of Darmstadt)

Exploiting Linkage Information in Real-Valued Optimization with the Real-Valued Gene-Pool Optimal Mixing Evolutionary Algorithm
Anton Bouter (Centrum Wiskunde & Informatica), Tanja Alderliesten (Academic Medical Center), Cees Witteveen (Delft University of Technology), Peter Bosman (Centrum Wiskunde & Informatica)

TPAM: A Simulation-Based Model for Quantitatively Analyzing Parameter Adaptation Methods
Ryoji Tanabe (Southern University of Science and Technology), Alex Fukunaga (The University of Tokyo)

GA

Fast Genetic Algorithms
Benjamin Doerr (Ecole Polytechnique), Huu Phuoc Le (Ecole Polytechnique), Regis Makhmara (Ecole Polytechnique), Ta Duy Nguyen (Ecole Polytechnique)

Optimizing One Million Variables NK Landscapes by Hybridizing Deterministic Recombination and Local Search
Francisco Chicano (University of Malaga), Darrell Whitley (Colorado State University), Gabriela Ochoa (University of Stirling), Renato Tinós (University of Sao Paulo)

GECH

Investigating Uncertainty Propagation in Surrogate-Assisted Evolutionary Algorithms
Vanessa Volz (TU Dortmund University), Günter Rudolph (TU Dortmund University), Boris Naujoks (TH Köln - University of Applied Sciences)

GP

How Noisy Data Affects Geometric Semantic Genetic Programming
Luis Fernando Miranda, Luiz Otavio Oliveira, Joao Francisco Martins, Gisele Pappa (Federal University of Minas Gerais)

Improving Generalization of Evolved Programs through Automatic Simplification
Thomas Helmuth (Washington and Lee University), Nicholas McPhee (University of Minnesota, Morris), Edward Pantridge (MassMutual Financial Group), Lee Spector (Hampshire College)

Counterexample-Driven Genetic Programming
Krzysztof Krawiec (Poznan University of Technology), Iwo Błądek (Poznan University of Technology), Jerry Swan (University of York)

RWA

An improved Genetic Algorithm for the loop machine layout problem with shortcuts
Ghaith Manita (Unité de recherche Mars), Ouajdi Korbaa (ISITCom)

Evolutionary Decomposition for 3D Printing
Eric Yu (University of Texas at Austin), Jin Yeom (University of Texas at Austin), Cem Tutum (University of Texas at Austin), Etienne Vouga (University of Texas at Austin), Risto Miikkulainen (University of Texas at Austin)

Heuristic Allocation of Computational Resources
Silviu Tofan (University of Manchester), Richard Allmendinger (University of Manchester), Manuela Zanda (ARM), Olly Stephens (ARM)

SBSE
Active Coevolutionary Learning of Requirements Specifications from Examples
Marcel Wever (Heinz Nixdorf Institute, University of Paderborn), Lorijn van Rooijen (Heinz Nixdorf Institute, University of Paderborn), Heiko Hamann (Heinz Nixdorf Institute, University of Paderborn)

THEORY
Runtime Analysis of the (1 + (λ, λ)) Genetic Algorithm on Random Satisfiable 3-CNF Formulas
Maxim Buzdalov (ITMO University), Benjamin Doerr (Ecole Polytechnique)

KEYNOTES

Computational approaches in cancer genomics
by Francesca Ciccarelli from King's College, London, UK

Abstract

Large-scale cancer genome projects provide an extraordinary mine of molecular information on a vast range of cancer types and samples and offer the exciting potential of understanding the molecular mechanisms of cancer. Much knowledge is however still hidden in the data and this significantly reduces the effective contribution of cancer molecular profiling to the personalised medicine agenda. In my lecture I will review some of the technical, analytical and scientific challenges in cancer genomic data analysis. I will also provide examples of how this type of analysis can contribute effectively to unravel cancer driver mechanisms and potential targets for anti-cancer therapy.

Evolving brains in evolving environments
by Drew Purves & Chrisantha Fernando from Google DeepMind, London, UK

Abstract:

The spectacular and headline-grabbing recent successes in deep learning have made little or no use of evolutionary algorithms. Has this left Darwin turning in his grave, like one of the Earthworms he was so fond of studying? Or is he flying high, like a Galapagos Finch, safe in the knowledge that the inferior land-borne creatures below him will soon reach the edge of their harsh island and realize that, to go any further without drowning, they will need evolution?

Curious and Creative Machines
by Hod Lipson from Columbia University, New York, US

Abstract

Can machines ask questions and generate hypotheses? Despite the prevalence of big data, the process of distilling data into scientific laws has resisted automation. Particularly challenging are situations with small amounts of data that is difficult or expensive to collect, such as in robotics and other physical sciences. This talk will outline a series of recent research projects, starting with self-reflecting robotic systems, and ending with machines that can formulate hypotheses, design experiments, and interpret the results, to discover new scientific laws. We will see examples from geology to cosmology, from classical physics to modern physics, from big science to small science.

Website:
http://hodlipson.com

REPORT FROM EVOSTAR 2017

by **Ben Paechter**, Edinburgh Napier University

The 20th Edition of the EvoStar series of conferences took place in Amsterdam between 19th and 21st April 2017. This conference series, which is famous for its friendly community atmosphere, has evolved over the years, and this year combined:

Kenneth De Jong

- EuroGP, the 20th European Conference on Genetic Programming
- EvoAPPLICATIONS, 20th European Conference on the Applications of Evolutionary Computation – comprising 14 different application tracks
- EvoCOP, the 17th European Conference on Evolutionary Computation in Combinatorial Optimisation
- EvoMUSART, the 6th International Conference on Evolutionary and Biologically Inspired Music, Sound, Art and Design

The conference opened with an excellent invited talk from **Kenneth De Jong**, who was able to offer delegates the wisdom gained from more than forty years in the field. He described the (mainly) successful efforts made over the years to unify evolutionary computing both at a scientific and community level. For the future, he was able to offer key pointers to further expansion, unification and collaboration to encompass the broader areas of natural computing and computational intelligence.

There were a total of 25 conference sessions with 134 papers, as well as cultural and entertainment programme organised by local organisers **Jacqueline Heinerman** & **Evert Haasdijk** from VU Amsterdam.

Jacqueline Heinerman & Evert Haasdijk

Each year the conference makes a very special award to a person or people that have made an Outstanding Contribution to Evolutionary Computing in Europe [most outstanding photo]. This year the award was shared. The first winner was **Gusz Eiben** from VU Amsterdam who, as well as writing hundreds of papers over nearly 30 years has been involved in leading many successful European research projects, as well as co-authoring a very successful text book. The second winner was **James Foster**, from the University of Idaho, showing that you don't need to be European to make the most outstanding contribution in Europe. Prof Foster is a computer scientist who is also a Professor of Biological Sciences and has been instrumental in ensuring that Evolutionary Computing continues to be inspired by biological evolution. Prof Foster has lead numerous funded projects and has been a leading figure in EuroGP and other conferences, workshops and journals over very many years, giving considerable service to the community.

One of the areas that EvoStar wishes to develop is student mentoring. Twenty students were supported this year including 12 who received travel bursaries. Activities included both scientific and fun elements with the student mentors being **Jaume Bacardit**, **Aniko Ekart**, **Anna Esparcia-Alcázar**, **James Foster**, **Penousal Machado** and **Neil Urquhart**. Winners of the student "scavenger hunt" were **Thomas D Griffiths** & **Uriel Lopez**. Neil Urquhart hopes to further the develop the scheme in future years with sponsorship from his institution Edinburgh Napier University. Dr Urquhart said "EvoStar has always been a community. I came to my first EvoStar in 2000 as a student and collaborations with those I met at the time have continued. It's great to see how my own students have also now benefitted from the support of others".

Student scavenger hunt winners 2017: Thomas D Griffiths & Uriel Lopez (middle) with Aniko Ekart, Anna Esparcia and Neil Urquhart

The conference concluded with a wonderfully entertaining and highly useful invited talk from **Arthur Kordon** who used his 20 years' experience of applying evolutionary systems in several large global corporations to give advice to researchers on how to get their work used by industry. The talk was full of pragmatic guidance, ranging from the kind of optimisation that industrialists are really interested in, to the ways to present your research in order to gain a contract. Dr Kordon was also able to provide an analysis about likely future directions for the use of computational intelligence in commercial organisations.

EvoStar arose out of workshops originally developed by EvoNet, the Network of Excellence in Evolutionary Computing, established by the European Commission and coordinated at Edinburgh Napier University in the UK. Edinburgh Napier continued to support the events through their 20 years - especially in employing coordinator **Jennifer Willies**, who won the first award for Outstanding Contribution to Evolutionary Computing in 2006 and who is widely credited with being responsible for the family atmosphere of EvoStar which is so valued by the community. In 2014 a new organisation was set up provide an appropriate legal structure for future organisation and support of the EvoStar Conferences, after the retirement of Jennifer Willies from Edinburgh Napier. SPECIES stands for the Society for the Promotion of Evolutionary Computation in Europe and its Surroundings, and its goal is to promote evolutionary algorithmic thinking. At the conclusion of the conference SPECIES held its annual general meeting and an Executive was elected based on the practical contributions that the executive members could make to the continuation and further development of EvoStar.

Marc Schoenauer, Jennifer Willies, Anna I Esparcia-Alcazar, Wolfgang Banzhaf

The new Executive is:
- **Marc Schoenauer** (President)- INRIA Saclay, Paris
- **Anna I Esparcia-Alcázar** (Vice-President), Universitat Politècnica de València, Spain
- **Wolfgang Banzhaf** (Treasurer), Michigan State University, USA
- **Ernesto Costa**, University of Coimbra, Portugal
- **Jose Ignacio Hidalgo Perez**, Universidad Complutense de Madrid, Spain
- **Penousal Machado**, University of Coimbra, Portugal
- **Gabriela Ochoa**, University of Stirling, UK
- **Neil Urquhart**, Edinburgh Napier University, UK

The executive is delighted that Jennifer Willies will continue to act as EvoStar coordinator. Organisation of the 2018 event to take place in Parma from 4-6 April is already underway with local organiser Stefano Cagnoni.

EMPLOYMENT OPPORTUNITIES

Research engineer in academia

18-months engineer position in Paris to work on the COCO platform
Where: Inria Saclay, Paris, France

Description

We offer a one-year engineering position (with a possible extension by six months) at Inria Saclay - Ile-de-France, south of Paris, to work on the open source COCO platform. The potential candidate will integrate in an international team of scientists and engineers and is expected to contribute to redesigning the postprocressing and/or develop an online visualization.

Besides actual coding, the documentation of the software and its maintenance are important aspects of the work proposed. COCO is hosted at Github (github.com/numbbo/coco) where also our issue tracker is available as a first means to reporting bugs, proposing and discussing feature-requests, and getting in touch with the main developers in general. Providing accurate documentation and prompt responses on this web page are therefore important aspects of our working ethics and of the continuing success of COCO. A minor, yet very important aspect is education which is why the to-be-hired engineer is expected to interact with (PhD) students and postdocs and to contribute to our regular code reviewing sessions and scientific meetings.

Benefits

- Reimbursement of 50% of public transport subscription. Possibility to use sport equipment within the campus of Ecole Polytechnique and access to canteen and cafeteria.
- Possibility of paid French classes.

Start and duration of the contract: 12 to 18 months.

Email: Dimo Brockhoff - dimo.brockhoff@inria.fr (closing date: 21.07.2017 (6pm))

GECCO JOB MARKET
http://gecco-2017.sigevo.org/index.html/Job+Market

The GECCO Job Market will be an event where people offering jobs can advertise open positions and meet with potential candidates. Any kind of positions are eligible (PhD, Postdoc, Professor, Engineer, etc.) - from the academia as well as the industry.

The job market will be organized as a short session at the beginning of the lunch break on Monday, July 17. After brief presentations of the available positions, participants will have the possibility to set up face-to-face meetings for further discussions.

To participate with a job offer, create a new ad at the SIGEVO web site (http://sig.sigevo.org/index.html/tiki-index.php?page= Job%20Ads). Make sure to check the "GECCO availability" option that confirms your attendance at the job market. In addition, prepare one slide describing the job (in PDF) and send it to tea.tusar[at]ijs.si by Friday, July 7.

IMPORTANT DATES
Friday, July 7: Deadline for submitting the ad and sending the slide
Monday, July 17: Job Market at GECCO 2017

About this newsletter

SIGEVOlution is the newsletter of SIGEVO, the ACM Special Interest Group on Genetic and Evolutionary Computation. To join SIGEVO, please follow this link: [WWW]

Contributing to SIGEVOlution

We solicit contributions in the following categories:

Art: Are you working with Evolutionary Art? We are always looking for nice evolutionary art for the cover page of the newsletter.

Short surveys and position papers: We invite short surveys and position papers in EC and EC related areas. We are also interested in applications of EC technologies that have solved interesting and important problems.

Software: Are you are a developer of an EC software and you wish to tell us about it? Then, send us a short summary or a short tutorial of your software.

Lost Gems: Did you read an interesting EC paper that, in your opinion, did not receive enough attention or should be rediscovered? Then send us a page about it.

Dissertations: We invite short summaries, around a page, of theses in EC-related areas that have been recently discussed and are available online.

Meetings Reports: Did you participate to an interesting EC-related event? Would you be willing to tell us about it? Then, send us a short summary, around half a page, about the event.

Forthcoming Events: If you have an EC event you wish to announce, this is the place.

News and Announcements: Is there anything you wish to announce, such as an employment vacancy? This is the place.

Letters: If you want to ask or to say something to SIGEVO members, please write us a letter!

Suggestions: If you have a suggestion about how to improve the newsletter, please send us an email.

Contributions will be reviewed by members of the newsletter board.

We accept contributions in LATEX, MS Word, and plain text.

Enquiries about submissions and contributions can be emailed to editor@sigevolution.org

All the issues of SIGEVOlution are also available online at: www.sigevolution.org

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