

# SIGEVolution

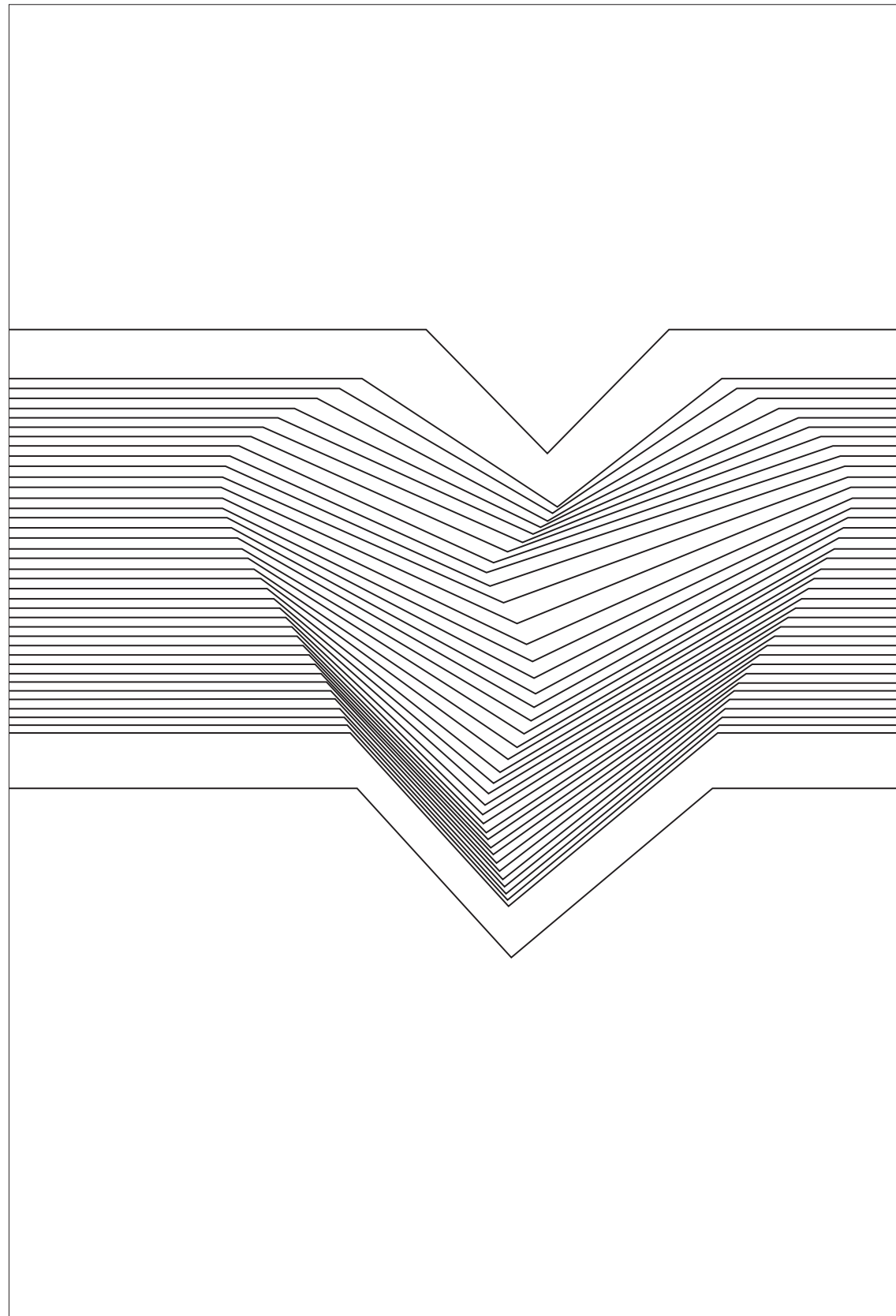
newsletter of the ACM Special Interest Group on Genetic and Evolutionary Computation

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## EDITORIAL

Welcome to the last newsletter of 2017. We report on the Artificial Evolution Conference that took place in Paris in October and in particular, a private viewing of the “Art&Science in Evolutionary Computation” art exhibition at Galerie Louchard in Paris that the lucky attendees of the conference were treated to. Springer have provided a list of their latest titles in Evolutionary Computation, including some new books to look forward to that will be published in 2018. Looking ahead to the New Year, don't forget the deadlines for your abstracts for GECCO 2018 in January (and remember to pre-book your accommodation in Japan now!), and it's also time to start working out your travel arrangements for EvoStar in the beautiful Parma in April.

If you would like to write about your work for SIGEVO please drop us a line and when we can let you know how to about it. We are also happy to advertise any positions you may have available, or conference deadlines.

Season's Greetings!

**Emma Hart and Gabriela Ochoa**

Help Route Santa [www.routesanta.org](http://www.routesanta.org)

Add your house to the map and let an Evolutionary Algorithm help Santa work out the shortest route between all the places he needs to visit across the world!

Software and website developed by **Dr Neil Urquhart**, Edinburgh Napier University, Scotland.

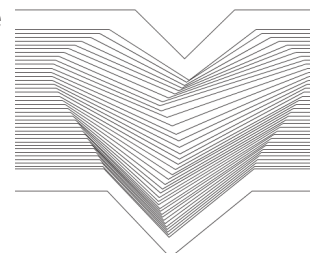
Disclaimer: Adding your house to the map does not guarantee a visit, you must have been a good girl / boy / lady / gentleman all year as well!



The front cover artwork GEN 4-2, ATRACCIÓN is produced by the artistic project [The Horizon Project - Emotion in lines](#), where interactive evolutionary algorithms are used to breed images expressing human emotions.

Artist: **Patricia Hernández Rondán**.

Professor in the Department of Drawing at the Faculty of Fine Arts, Seville, Spain, [patriciapahr@gmail.com](mailto:patriciapahr@gmail.com)



## Artificial Evolution 2017 - A Report



By **Sarah Thomson**,  
Computing Science and  
Mathematics,  
University of Stirling,  
Scotland, UK.

Artificial Evolution 2017 took place in the heart of Paris, in Institut des Systèmes Complexes, situated on a wide and architecturally beautiful boulevard. On arrival, attendees were given conference mugs and a choice of flavoured French chocolate. The conference began with a warm welcome from chair Dr. Evelyn Lutton, who displayed a world-map of the attendees this year. There were people from France, the UK, Germany, Austria, Canada and Ireland. Throughout its duration, Artificial Evolution introduced its international guests to the very best French cheese, wine, food and art! In line with the conference name, the social event was held at a gallery displaying evolutionary art.

Overall, the conference gave special attention to the usefulness of visualisation; both keynote speakers, Jean-Daniel Fekete and Gabriela Ochoa, emphasised the potential of visual analysis to aid in our comprehension of complex processes and interactions.

In addition, both keynotes related to graph theory; Dr. Fekete introduced a system where random graphs can be produced in a sophisticated way using evolutionary algorithms. Dr. Ochoa proposed a network representation for modelling fitness landscapes and noted that doing this has great potential for understanding the dynamics of heuristic search on the underlying problem instance.





In a general sense, Dr. Fekete introduced and proposed a shift towards what he termed Progressive Data Analysis, a paradigm that streamlines the (sometimes labo-rious and repetitive) data analysis process. Dr. Ochoa emphasized the integral role search space structure has on the heuristic search algorithms we all use in our search for good solutions to problems.



The conference held track sessions spanning a wide range of the different avenues in evolutionary computation: *theory, fitness landscapes, genetic programming, cooperation and co-evolution, meta-heuristics, real-world applications, and learning*. The morning kicked off with the Theory session, with a master-worker algorithm selection proposal by Jankee et al. They used a reward-based system and showed their framework had accurate results on an algorithm selection benchmark library. Alberto Franzin then presented a detailed comparative study on acceptance strategies in evolutionary algorithms, finding that generally, the Metropolis and late-acceptance strategies perform best.

The next session was on *fitness landscapes*. Sebastien Verel was the first speaker, showing how he applied fitness landscape techniques to better understand and tune the parameters of an EA for a real-world nuclear reactor problem. They used landscape ruggedness and neutrality estimation to do this in a low-cost way. During the *meta-heuristics* track session, insightful algorithm variants were prevalent. There was an improvement on the state-of-the-art for the Quadratic Assignment Problem with an Iterative Tabu Search, and a heterogeneous ACO approach used on the TSP.



The final track of the conference was real-world applications. Here we saw a richly diverse range of possible applications and uses for evolutionary algorithms in the real world. Martin Kretschmer presented his evolutionary approach to learn effective strategies for preventing spread of fires using optimal barrier construction. Next was Stephen Brooks, showing that Tone Mapped Image quality could be significantly improved when using an evolutionary strategy. Leslie Pérez Cáceres presented her work on using *IRACE* parameter tuning tool to optimise the use of GCC for quicker execution of machine code. They showed that on a range of heuristic search algorithms, the runtime could be improved with their methodology, with an efficiency increase of up to 40%.

Overall, a shift in the evolutionary algorithm community towards increasingly adaptive operator or algorithm choices was clear during EA2017, for example from the algorithm selection framework proposed by Jankee et al., or the landscape-aware tuning of an EA for nuclear reactor design by Muniglia et al.

Many of the talks opened up spirited and enthusiastic discussion from the audience. Coffee and lunch breaks were bursting with intellectual and collaborative discussion, with many attendees from different sub-fields finding commonalities with each other. The whiteboards in the room were well used, to illustrate ideas!

To learn more about the promising and cutting-edge ideas presented at Artificial Evolution, please visit the [2017 website](#), where the [proceedings](#) are freely available.

## About the author

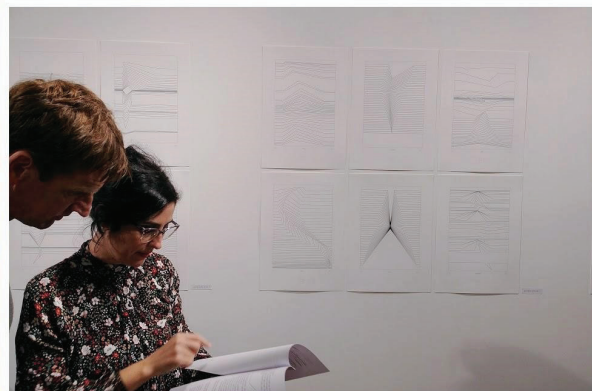
Sarah is a full-time PhD student at the University of Stirling in Scotland, funded by the EPSRC for the DAASE (Dynamic Adaptive Automated Software Engineering) Project, a collaboration between five universities. Her research focuses on our comprehension and use of computational fitness landscapes for better heuristic search.



## Art Exhibition: Art&Science in Evolutionary

By **Nadarajen Veerapen**

Computing Science and Mathematics, University of Stirling, Scotland, UK.



Attendees of Artificial Evolution (EA 2017), held in Paris, France, were treated to a cocktail reception and vernissage, or private viewing, of the “Art&Science in Evolutionary Computation” art exhibition at Galerie Louchard in Paris. The exhibition ran from 24 October to 12 November 2017. The selected artworks were created through a number of evolutionary methods: ant-based clustering, predator-prey model, evolutionary algorithms and fly algorithm. The corresponding papers are published in volume 1 of the newly-launched Art and Science journal (ISTE OpenScience). EA 2017 attendees had the opportunity to engage with the artists and mingle over a wide array of delightful hors-d’oeuvres.



**EXHIBITS — The Horizon project: “Emotion in lines”** – Patricia Hernández Rondán (a), Francisco Fernández de Vega (b), Cayetano Cruz (b), Vicente Albarrán (b), Mario García (c), Lilian Navarro (b), Tania Gallego (d), Itzel Andrea García (e), (a) Department of Drawing at the Faculty of Fine Arts, Seville, Spain, (b) University of Extremadura, Spain, (c) Tijuana Institute of Technology, Mexico, (d) Autonomous Community of Extremadura, Spain, (e) CETYS University, Baja California campus, Tijuana, Mexico — **Sleep Paintings** – Carlos M. Fernandes, LARSyS: Laboratory for Robotics and Systems in Engineering and Science University of Lisbon, Portugal — **Emergillience** – Sophie Lavaud, Visual artist and researcher at Institut ACTE (Arts, Créations, Théories et Esthétiques), Université Paris 1/CNRS, France — **Art Beings** – Alain Lioret, Arts et Technologies de l’Image, Université Paris 8, France — **Fly4Arts: Evolutionary Digital Art with the Fly Algorithm** – Zainab Ali Abbood and Franck P. Vidal, School of Computer Science, Bangor University, UK.

The exhibition also featured a retrospective of Emmanuel Cayla’s work, **Variations on a Vegetal Theme**.



**Nadarajen Veerapen** is a Research Fellow at the University of Stirling, Scotland, UK. He received his PhD from the University of Angers, France. He currently works on the “Cartography of computational search spaces” funded by the Leverhulme Trust. His research interests include local search, hybrid methods and visualisation.



### **EVOSTAR 2018**

Parma, Italy, 4th-6th April

Parma is located in northern Italy, in Emilia-Romagna, halfway between Bologna and Milan.

Parma is an elegant city with a refined atmosphere, inherited from its 18th century legacy with the French royal family (the central Parco Ducale reproduces the design of the Jardin des Tuileries in Paris), that can only be breathed in a “petite capitale”. With its center rich of art, parks and treasures from different ages, Parma is a very welcoming place.

Parma is known for its gastronomic heritage, has been selected as “food creativity town” by UNESCO, and is world-famous for products like Parmigiano Reggiano cheese and Parma ham.

Detailed tourist information can be found at <http://turismo.comune.parma.it/en> The conference site is the historical central building of the University in via Università 1, right in the city centre and in walking distance from most central hotels.

### **About EvoStar**

EvoStar comprises of four co-located conferences run each spring at different locations throughout Europe. These events arose out of workshops originally developed by EvoNet, the Network of Excellence in Evolutionary Computing, established by the Information Societies Technology Programme of the European Commission, and they represent a continuity of research collaboration stretching back over 20 years.

EvoStar is organised by SPECIES, the Society for the Promotion of Evolutionary Computation in Europe and its Surroundings. This non-profit academic society is committed to promoting evolutionary algorithmic thinking, with inspiration of parallel algorithms derived from natural processes. It provides a forum for information and exchange.



Local Chair: **Stefano Cagnoni**





## GECCO 2018 @ Kyoto

The Genetic and Evolutionary  
Computation Conference

July 15th - 19th 2018

### GECCO 2018

The Genetic and Evolutionary Computation Conference (GECCO) presents the latest high-quality results in genetic and evolutionary computation since 1999. Topics include: genetic algorithms, genetic programming, ant colony optimization and swarm intelligence, complex systems (artificial life/robotics/evolvable hardware/generative and developmental systems/artificial immune systems), digital entertainment technologies and arts, evolutionary combinatorial optimization and metaheuristics, evolutionary machine learning, evolutionary multiobjective optimization, evolutionary numerical optimization, real world applications, search-based software engineering, theory and more.

Submission of	Deadline
Full Paper Abstracts	January 30, 2018
Full and Poster-only Papers	February 6, 2018

### Kyoto

Kyoto is a major historical city in Japan and the perfect GECCO destination. Formerly the Imperial capital of Japan for more than one thousand years, now capital of the Kyoto prefecture, part of Kyoto-Osaka-Kobe metropolitan area in the Kansai region. Kyoto is home to 17 UNESCO World Heritage Sites and many more Japanese national treasures. It is served by many international flights arriving at the Kansai region and provides plenty of accommodation options.

The conference will take place at the Kyoto TERRSA in Kyoto. During the conference, Gion Festival will be held so that you would better make your hotel reservation as soon as possible. You can book conference hotels through the links on the [conference website](#)

General Chair:  
**Keiki Takadama**

Editor-in-Chief:  
**Hernan Aguirre**

Local Chair:  
**Hisashi Handa**



## Springer Evolutionary Computing Titles – Published and Planned

2016 Blum and Raidl	<a href="#">Hybrid Metaheuristics: Powerful Tools for Optimization</a>
2017 Boddington	<a href="#">Towards a Code of Ethics for Artificial Intelligence</a>
2016 Bossomaier et al.	<a href="#">An Introduction to Transfer Entropy: Information Flow in Complex Systems</a>
2015 Brabazon et al.	<a href="#">Natural Computing Algorithms</a>
2018 Brabazon and McGarraghy	<a href="#">Foraging-Inspired Optimisation Algorithms</a>
2015 Burke and Kendall (eds)	<a href="#">Search Methodologies: Introductory Tutorials in Optimization and Decision Support Techniques</a>
2017 Dasgupta et al.	<a href="#">Advances in User Authentication</a>
2015 Datta and Deb (eds)	<a href="#">Evolutionary Constrained Optimization</a>
2015 Eaton	<a href="#">Evolutionary Humanoid Robotics</a>
2018 Edelkamp	<a href="#">Algorithmic Intelligence: Towards an Algorithmic Foundation for Artificial Intelligence</a>
2015 Eiben and Smith	<a href="#">Introduction to Evolutionary Computing, 2nd ed.</a>
2015 Gandomi et al. (eds.)	<a href="#">Handbook of Genetic Programming Applications</a>
2015 Kacprzyk and Pedrycz	<a href="#">Springer Handbook of Computational Intelligence</a>
2017 Kounev et al.	<a href="#">Self-Aware Computing Systems</a>
2017 Kramer	<a href="#">Genetic Algorithm Essentials</a>
2016 Kramer	<a href="#">Machine Learning for Evolution Strategies</a>
2016 Krawiec	<a href="#">Behavioral Program Synthesis with Genetic Programming</a>
2016 Lewis	<a href="#">A Guide to Graph Colouring: Algorithms and Applications</a>
2016 Lewis et al. (eds.)	<a href="#">Self-aware Computing Systems: An Engineering Approach</a>
2016 Merrick	<a href="#">Computational Models of Motivation for Game-Playing Agents</a>
2017 Miranda (ed.)	<a href="#">Guide to Unconventional Computing for Music</a>
2015 Moore and Williams (eds.)	<a href="#">Epistasis: Methods and Protocols</a>
2016 Olague	<a href="#">Evolutionary Computer Vision: The First Footprints</a>
2016 Oliehoek and Amato	<a href="#">An Introduction to Decentralized POMDPs</a>
2015 Petke	<a href="#">Bridging Constraint Satisfaction and Boolean Satisfiability</a>
2015 Preuss	<a href="#">Multimodal Optimization by Means of Evolutionary Algorithms</a>
2016 Rendell	<a href="#">Turing Machine Universality of the Game of Life</a>
2016 Resende and Ribeiro	<a href="#">Optimization by GRASP</a>
2016 Riolo et al. (eds )	<a href="#">Genetic Programming Theory and Practice XIII</a>
2016 Shaker et al.	<a href="#">Procedural Content Generation in Games</a>
2016 Siarry	<a href="#">Metaheuristics</a>
2015 Stanley and Lehman	<a href="#">Why Greatness Cannot Be Planned: The Myth of the Objective</a>
2018 Stepney et al. (eds.)	<a href="#">Computational Matter</a>
2015 Trefzer and Tyrrell (eds.)	<a href="#">Evolvable Hardware: From Practice to Application</a>
2017 Urbanowicz and Browne	<a href="#">Introduction to Learning Classifier Systems</a>
2018 Veale and Cardoso (eds.)	<a href="#">Computational Creativity: The Philosophy and Engineering of Autonomously Creative Systems</a>
2016 Ventura and Luna	<a href="#">Pattern Mining with Evolutionary Algorithms</a>
2018 Yannakakis and Togelius	<a href="#">Artificial Intelligence and Games</a>
2018 Zelinka and Chen (eds.)	<a href="#">Evolutionary Algorithms, Swarm Dynamics and Complex Networks</a>

## 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](mailto:editor@sigevolution.org)

All the issues of SIGEVOlution are also available online at: [www.sigevolution.org](http://www.sigevolution.org)

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