

# SIGEVOLution

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

Volume 9  
Issue 2

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## Editorial

This issue celebrates the busy 5 days in Denver that was GECCO 2016. A huge thanks to the General Chair **Frank Neumann** and Editor-in-Chief **Tobias Friedrich** and their organisation team for a wonderful conference that provided fantastic opportunities to hear talks from the people at the top of our field, catch up with new developments, learn some new things in workshops and tutorials and of course socialise with fellow researchers from across the world. If you couldn't make it, take advantage of the free online proceedings that are available for one year if accessed via the SIGEVO website to find out more.

This newsletter summarises some interesting statistics from GECCO16 (thanks to Tobias!), highlights the best-paper awards and other prize-winners, and includes articles on the inaugural SIGEVO plenary lecture, and the ACM-W scholarship winners to mention just a few. SIGEVO chair **Marc Schoenauer** also gives us an overview of some new SIGEVO developments that are currently being planned.

Finally, congratulations to **Peter Bosnan** who takes over the reins as General Chair for GECCO 17 which will be held in Berlin, and to his Editor-in-Chief **Gabriela Ochoa**. I'm looking forward to it already!

Emma Hart, Editor

## SIGEVO Exec Board meeting in Denver

Marc Schoenauer, Chair

SIGEVO is the [ACM Special Interest Groups](#) dedicated to Genetic and Evolutionary Computation. It is a mid-sized SIG (350-400 members), and the main activities of its volunteers are the organization and the sponsoring of EC-related events, starting with GECCO and FOGA. All major decisions regarding SIGEVO are decided by its [Executive Board](#). And most of the 18 SIGEVO Executive Committee members attend GECCO, making it the best venue for our early face-to-face business meeting. The 2016 meeting was held in Denver on July, and the following decisions were made.

**SIGEVO Chair's Lecture:** In Denver, **Stephanie Forrest** gave the first of a new series of lectures sponsored by SIGEVO, to take place on the last day of the conference, before the AGM and closing session. Stephanie gave an inspiring talk about [The Biology of Software](#) (see also Pg 12), that was dedicated to John Holland, one of our most inspiring pioneers, who passed away last year.

**Awards:** Complementing the [SIGEVO Impact Award](#), that recognizes the most impactful papers in 10-year-old GECCOs, two new awards will be created (subject to ACM approval): the **SIGEVO Best PhD Dissertation award**, and the **SIGEVO "Outstanding Achievement"** award (name subject to change), implementing some kind of fellowship at the SIG level, as a follow-up of the [former ISGEC](#) fellowship.

**Summer School:** Every year, GECCO already offers a series of [high quality tutorials](#), led by senior members of our field. A Summer School will be run, piggy backing on GECCO, allowing the students to attend GECCO tutorials (and sessions) while working on hands-on projects under the supervision of some of these senior members. A first attempt to hold a summer school will be made at GECCO 2017 in Berlin, chaired by [Enrique Alba](#) and co-chaired by [Franz Rothlauf](#). Contact them if you volunteer to help.

**Call for (more) projects:** SIGEVO finances are in good shape, mainly due to the revenues from the downloads of GECCO proceedings in the ACM Digital Library. This allows us to help students to attend GECCO (up to 25k\$ per year), and gives us some degree of freedom for launching new projects to develop EC-related activities (see below). If you have an idea and are willing to give it some time, we can subsidize it. Talk to [SIGEVO officers](#).

**Job Ads:** Following this call for projects at Denver GECCO closing session, **Tea Tušar** picked up the idea and has already created a "[Jobs Ads](#)" page on SIGEVO web site, with the idea of organizing a slow-dating lunch for face-to-face meetings at next GECCO.

**Evolution in Action:** SIGEVO are hoping to support an event in Berlin aimed at introducing Evolutionary Computing to children aged 10-14 (led by [Una-May O'Reilly](#)). For more details, see the the [Evolution in Action](#) pages.

## Free access to GECCO Proceedings in the Digital Library

- New Open Access for GECCO 2016 proceedings for one year:  
[Proceedings - Posters - Workshops - Tutorials](#)
- Check [ACM Digital Library](#), and in particular [GECCO Proceedings](#)
- All references to GECCO papers can also be found from the corresponding [DBLP page](#).

## SIGEVO Job Advertisement Website

SIGEVO's Job Ads website is up and running! See the open positions or add a new ad here:

<http://sig.sigevo.org/index.html/tiki-index.php?page=Job+Ads>

You can

- [See the list of currently open positions](#)
- [Enter a new ad](#)



Tea Tušar

In case of a problem, please contact **Tea Tušar** - [tea.tusar@ijs.si](mailto:tea.tusar@ijs.si)

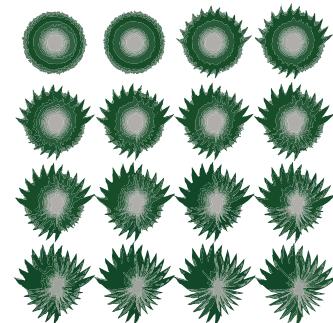
## Evolutionary Computation, MIT Press

Editor-in Chief: Hans-Georg Beyer



### Latest News!

- Impact factor June 2016 **3.6**
- 6th out of 105 journals in CS, Theory and Methods
- 13th out of 130 journals in CS, AI
- Median time from submission to first decision: approx. 3 months



### Special Issue: to appear Winter Issue 24:4

Combinatorial Optimization Problems, guest edited by Francisco Chicano, Christian Blum and Gabriela Ochoa

New Editor-in-Chief announced! from January 2017, **Emma Hart** from Edinburgh Napier University, Scotland, will take over as Editor-in-Chief. Please feel free to contact her with any questions or suggestions!



Emma Hart

# Genetic Programming Evolvable Machines, Springer

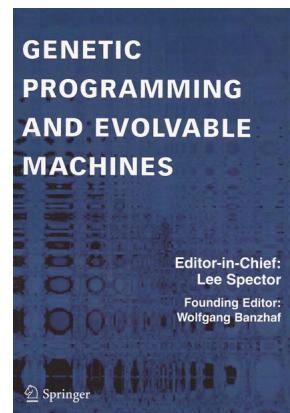
Editor: Lee Spector

## Latest news!

The 2015 Impact Factor for Genetic Programming and Evolvable Machines is 1.143 (an increase from .903 last year).

## Renewed Advisory Board and Associate Editors

EiC Lee Spector is delighted to announce that the Advisory Board has been renewed and now contains the following senior members of the community (with an asterisk marking each new role):



Wolfgang Banzhaf (on Advisory Board as well as Founding Editor)

\* **Stephanie Forrest** (new to board)

David Goldberg

Erik Goodman

John Koza

\* **Marc Schoenauer** (elevation from regular board member)

\* **Andy Tyrrell** (elevation from Associate Editor)

There has also been a renewal/expansion of the Associate Editors, including the addition of a new Thematic Area Editor for Software Engineering:

James A. Foster (Area Editor for Life Sciences)

\* **Mark Harman** (new to board, Area Editor for Software Engineering, which is a new Thematic Area)

Hitoshi Iba

Krzysztof Krawiec

William B. Langdon (Resource Review Editor)

Julian Miller

\* **Alberto Moraglio** (elevation from regular board member)

Una-May O'Reilly (Area Editor for Data Analytics and Knowledge Discovery)

\* **Lukas Sekanina** (elevation from regular board member)

Moshe Sipper (Area Editor for Games)

Stephen Smith

Terence Soule

Marco Tomassini

\* **Martin Trefzer** (elevation from regular board member)

Leonardo Vanneschi

# GECCO 2016 In Numbers

Tobias Friedrich, Editor-in-Chief 2016

Overall 381 papers were submitted to 15 different tracks by 948 authors from 393 different institutions from more than 55 countries. 30 track chairs and 647 reviewers wrote 1740 reviews to select 143 full papers (8 pages in the proceedings) and 75 poster papers (2 pages in the companion).

## Average Recommendation

GECCO 2016  
Statistics  
Prof. Dr. Tobias Friedrich  
Hasso-Plattner-Institut  
**HPI**

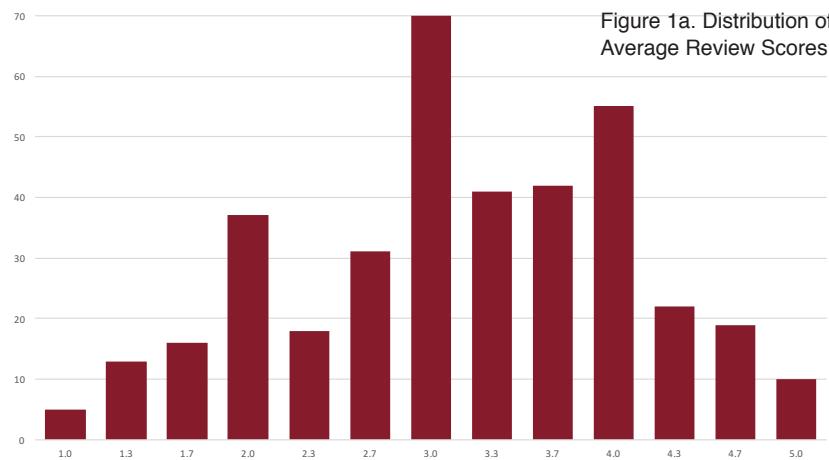


Figure 1a. Distribution of Average Review Scores

## Decisions depending on score

GECCO 2016  
Statistics  
Prof. Dr. Tobias Friedrich  
Hasso-Plattner-Institut  
**HPI**

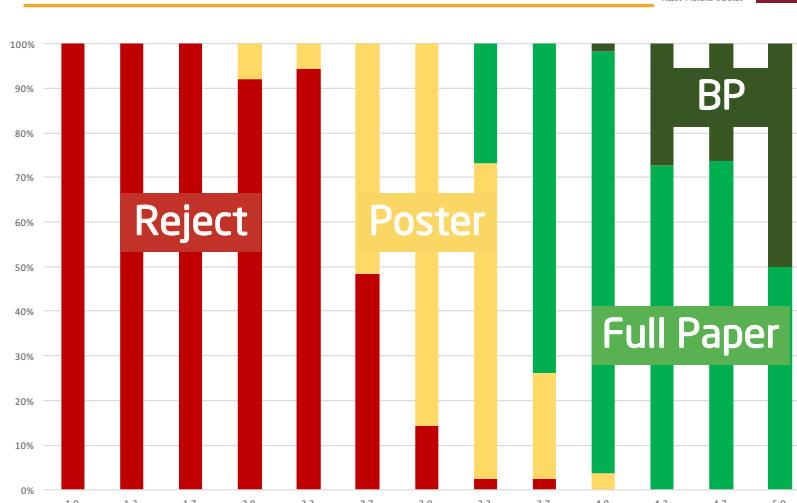


Figure 1b.  
Final Decisions  
vs  
Average Review  
Score

The top 10 topics assigned to submissions are shown in figure 2 ordered by the total number of submissions that used each keyword.

The top 10 positively correlated keywords that were chosen at least 10 times are shown in figure 3.

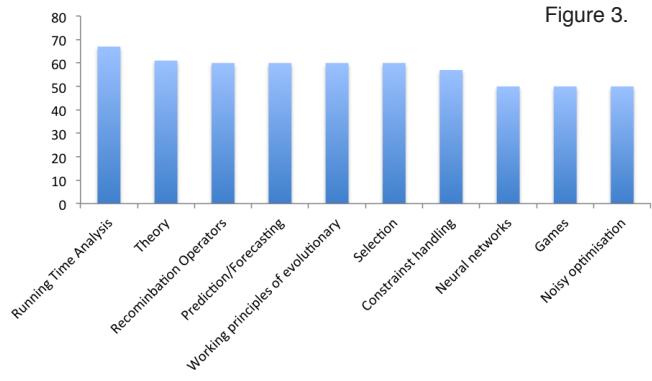
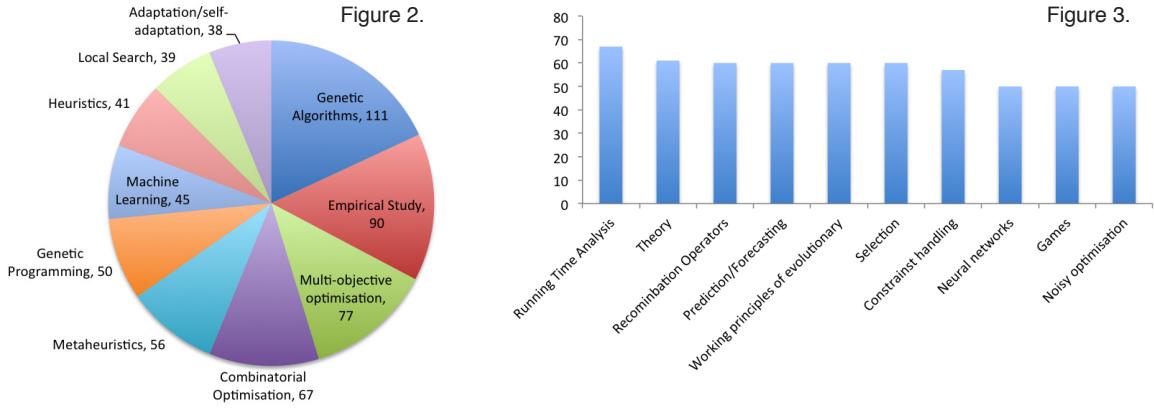
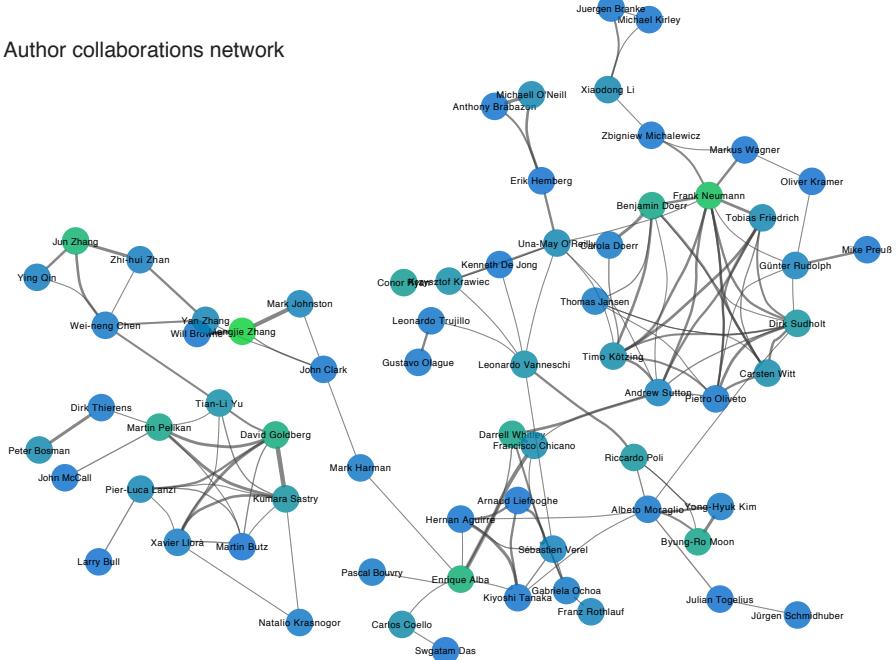
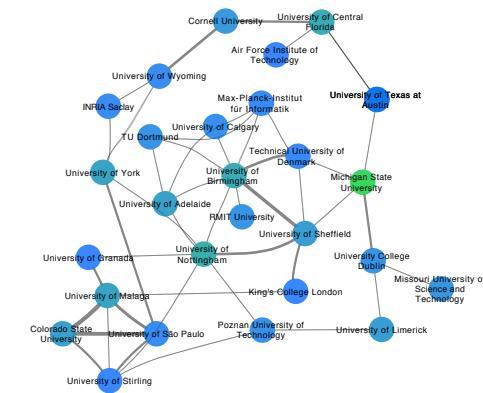


Figure 4. Author collaborations network



Additionally to above submission numbers regarding GECCO 2016, we also studied the past 10 years of full papers presented at GECCO (Figure 4). Nodes are authors with at least 10 papers published at the last 10 GECCOs. The thickness of an edge indicates the number of joint GECCO papers during this time interval. The color of a vertex corresponds to the number of published GECCO papers (blue=small, green=large). Figure 5 shows the largest connected components of the corresponding affiliation graph. Here nodes are institutions with at least 10 papers and edges indicate joint papers with both institutions.

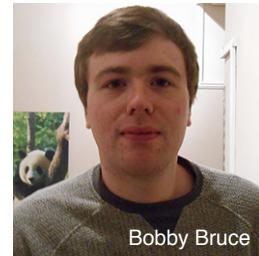
Figure 5. Institution collaborations network



## A Report on the Genetic Improvement Workshop@GECCO 2016

Bobby Bruce, PhD Student, University College London

In July I was fortunate enough to attend the 2nd Genetic Improvement workshop in Denver, hosted under the Genetic and Evolutionary Computing Conference (GECCO) umbrella. For those unaware, Genetic Improvement (or simply 'GI') is an emerging area of software engineering that attempts to use search-based techniques to improve code. I myself have spent much of the last two years emerging myself in GI literature and carrying out investigations relevant to the field. Even in this short time I have been privileged to witness it grow from the solving of toy problems to frameworks capable of outperforming human-driven manual alternatives (readers need look no further than the winners of this year's Humie awards). Events such as the GI workshop serve as a platform for ideas, research proposals, and new experimental results to be discussed. They fill a niche for those who wish to discuss research with others in a structured manner while avoiding the restrictive formalities of submitting to a conference or journal. Building on the success of the 1st workshop (hosted in Madrid last year) the event was extended to cover three consecutive sessions at the GECCO conference. Pleasingly attendance was high with an audience full of both familiar faces and curious newcomers.



Bobby Bruce

The morning session was opened with a keynote by Westley Weimer from the University of Virginia who enthusiastically touted the advantages he saw in using static analysis when automatically improving software. I found Westley's persuasive arguments tapped into a wider idea that we in the GI community are, perhaps, too inward looking and would benefit from studying techniques found in other areas of software engineering, particularly the compiler community. The keynote was followed by a series of full papers submitted to the workshop. Roberto Santana presented research on Estimation of Distribution Algorithms (EDAs) and their effectiveness at optimising compiler flags. It was refreshing to see such a high-quality investigation presented at a workshop event and, deservedly, the submission was given the workshop's Best Paper award.

The afternoon session contained the presentation of the short papers in a pleasing format which permitted ample time for discussion and feedback on points raised. Justyna Petke discussed the possibility of applying GI for the purpose of code obfuscation while John Woodward enlightened attendees with his musing on whether the "number of evaluations" metric (traditionally used to evaluate GI algorithms) was sufficient. Markus Wagner gave a presentation on his intention to optimise the energy consumption of Android devices. A vote by attendees deemed this presentation worthy of the workshop's Best Presentation award. Given the number of people with access to a smartphone now exceeds number of people with access to a laptop or desktop computer, it is difficult not to conclude that new Software Engineering techniques, such as GI, are required to fully exploit these complex (and energy constrained) devices.

The workshop was concluded with an open-platform session where attendees could raise questions or viewpoints on GI. The longest discussion originated from a query on what the official definition of GI was and whether this definition is sufficient. One attendee suggested Genetic Improvement may be a branch of Genetic Programming rather than something unique to itself. Some were unsatisfied with the definition believing it to be too broad, pulling in other, often well-established, areas, into the GI net. However, others rebelled against the notion of being too preoccupied with definitions noting all areas of research had corner cases with GI being no exception.

The session ended with connections made and important notes scribbled into programme margins. I left reassured in my belief that events such as these serve as essential support mechanisms for new areas of research like Genetic Improvement. They provide researchers, young and old, with an event in which they may explore what has been discovered and what is worth discovering in the coming months and years. For this reason I hope that next year's workshop in Berlin can mimic this year's success.

## ACM-W Scholarships

ACM-W provides support for women undergraduate and graduate students in Computer Science and related programs to attend research conferences. This exposure to the CS research world can encourage a student to continue on to the next level (Undergraduate to Graduate, Masters to Ph.D, Ph.D. to an industry or academic position). The student does not have to present a paper at the conference she attends.



The ACM-W scholarships are divided between scholarships of up to \$600 for intra-continental conference travel, and scholarships of up to \$1200 for intercontinental conference travel. Scholarship applications are evaluated in 6 groups each year, in order to distribute awards across a range of conferences.

ACM-W encourages the student's home department to match the scholarship award and recognize the student's achievement locally within their department. In addition, if the award is for attendance at one of several ACM special interest group conferences (i.e. SIGEVO) the SIG will provide complementary conference registration and a mentor during the conference.

GECCO were delighted that 6 scholarships were awarded to enable female students to attend GECCO 16. Each student was paired with a mentor working in a similar area. The mentors and winners were as follows:

- Anne Auger (INRIA) & Jing Yang
- Una-May O'Reilly (MIT) & Eva Moscovici (University of Massachusetts, Amherst)
- Gabriela Ochoa (University of Stirling) & Thainá Mariani (Federal University of Parana)
- Anya Vostinar (Michigan State University) & Samantha Heck (University of Idaho, USA)
- Gisele Pappa (Federal University of Minas Gerais (UFMG) & Vanessa Volz (TU Dortmund)
- Tea Tusa (INRIA) & Narjess Dali (Universite de la Manouba, Tunisia)



Group photo: ACM-W Scholarships

### **Vanessa Volz**

*"I really enjoyed my time at GECCO and am very grateful for the chance to attend it. Although I knew quite a few attendees in advance through my home university and the involvement with some workshops, it was nice to get to know even more people through the scholarship. I'm already planning new papers with the newly established contacts, making GECCO a great experience for me."*



### **Eva Moscovici**

*"GECCO is an excellent conference, and a great opportunity. This was my first academic conference. I got valuable the experience of presenting my research in front of other researchers. It was also very interesting to meet a lot of people who are doing various projects that involve evolutionary algorithms, whose research direction, however, significantly differed from mine. And having a mentor augmented that experience. Una-May, my mentor, introduced me to several people who I have been interacting with throughout the conference. She also gave me advice on how to figure out which presentations I want to see (which is hard, as there were a lot of interesting presentations going on at the same time). It was also interesting talking to my mentor about research and MIT."*



### **Samantha Heck**

*"I work on robots using evolutionary algorithm, as well as on Darwin's Demons, a video game using the principles of evolution. By attending GECCO, I was able to learn so much about the field and what doing research in it looks like. I was also able to network and meet likeminded people like my mentor, Anya, who I really enjoyed talking to over the course of the conference and who made it easier to meet people by introducing me to them. It was a really wonderful learning experience that opened my eyes to all of the facets of evolutionary computation."*



### **Narjess Darli**

*"I was mentored by Tea Tusan that I thank very much for helping me a lot before the conference and even at the meeting. Our mentoring relationship started before attending GECCO. We talked by Skype and she clarified me how to choose the convenient tutorials and how to get the maximum possible of the conference. Concerning my experience of attending the conference, I was very impressed by its organization, the presentations, the tutorials, the workshops .... I attended many important presentations whether in my research field or in the other areas. I met a lot of researchers in the conference and we shared our ideas and some of our insights. I made many friends that I hope to meet next year in GECCO'17. I really enjoyed presenting my work in the poster session, where I met many researchers who came to ask me questions about my work, and gave me relevant remarks."*



### **Thaina Mariana**

*"Attending GECCO was the best professional and cultural experience I ever had. I could see different works including the ones of my research field about search-based software engineering and hyper-heuristic. The experience of presenting my paper on GECCO was really amazing. I met researchers from around the world and we discussed about our works, even the ones of different research fields. My mentor was very kind by helping in anything possible. It was great to know her, since she is a great researcher of my field. In addition, I met students from different countries and cultures. I made many friends that I hope to see again in the next GECCO editions. Thank you ACM for this scholarship. I hope other women may have the same experience I had."*



## SIGEVO Plenary Lecture in Memory of John Holland

### The Biology of Software

Stephanie Forrest - University of New Mexico

Biological design principles can potentially change the way we study, engineer, maintain, and develop large dynamic software systems. For example, computer programmers like to think of software as the product of intelligent design, carefully crafted to meet well-specified goals. In reality, large software systems evolve inadvertently through the actions of many individual programmers, often leading to unanticipated consequences. Because software is subject to constraints similar to those faced by evolving biological systems, we have much to gain by viewing software through the lens of biology. The talk will highlight how abstractions of biological processes can lead to new computational algorithms and engineering principles using examples from my own research. Specifically, it will show how the biological concepts of Darwinian evolution and immunology can be applied to problems such as repairing software bugs and cybersecurity.

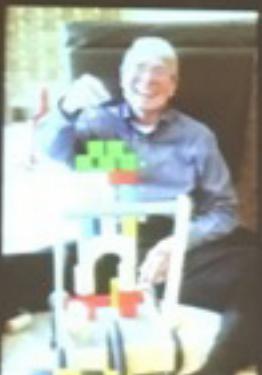
*The lecture is dedicated to John H. Holland, whose lifelong study of the mechanisms that produce adaptive behavior in complex systems left an intellectual legacy that will guide research in intelligent and complex systems for many years to come.*



Una-May O'Reilly (who introduced Stephanie) just before Stephanie's talk

Stephanie Forrest talks about John Holland's big ideas

### John's Big Ideas



- Discovery and dynamics of building blocks
- Learning: Credit assignment and Discovery
- Emergence of internal and exploratory models
- Generic properties of complex adaptive systems

## GECCO Keynotes

### The Challenges of Natural Algorithms

with Bernard Chazelle

Eugene Higgins Professor of Computer Science Princeton University, USA

Bernard Chazelle is Eugene Higgins Professor of Computer Science at Princeton University, where he has been on the faculty since 1986. His current research focuses on the “algorithmic nature” of living systems. A professor at the Collège de France in Paris in recent years as well as a member of the Institute for Advanced Study in Princeton, he received his Ph.D in computer science from Yale University in 1980. The author of the book, “The Discrepancy Method,” he is a fellow of the American Academy of Arts and Sciences, the European Academy of Sciences, and the recipients of three Best-Paper awards from SIAM.

This talk will sketch an algorithmic approach to the dynamics of living systems. Our working models consist of entropy-producing dissipative dynamic networks driven by a supply of free energy. They can be found in opinion dynamics, synchronization systems, as well as many evolutionary contexts. The main challenge posed by these natural algorithms is the dearth of analytical tools currently at our disposal. The focus of our work has been on building a new theory of endogenously-driven dynamic networks rich enough to allow for the renormalization of large-scale systems. The main novelty of our approach to dynamical systems is to make algorithms the centerpiece of the analysis.



Bernard Chazelle

### Taming the Complexity Monster or: How I learned to Stop Worrying and Love Hard Problems

with Holger H. Hoos

Professor of Computer Science Peter Wall Institute for Advanced Studies University of British Columbia, Canada

Holger H. Hoos is a Professor of Computer Science and a Faculty Associate at the Peter Wall Institute for Advanced Studies at the University of British Columbia (Canada). His main research interests span empirical algorithmics, artificial intelligence, bioinformatics and computer music. He is known for his work on the automated design of high-performance algorithms and on stochastic local search methods. Holger is a co-author of the book “Stochastic Local Search: Foundations and Applications”, and his research has been published in numerous book chapters, journals, and at major conferences in artificial intelligence, operations research, molecular biology and computer music.



Holger H. Hoos

In this talk, Hoos will focus on one particular type of complexity that has been of central interest to the evolutionary computation community, to artificial intelligence and far beyond, namely computational complexity, and in particular, NP-hardness. Hoos will investigate the question to which extent NP-hard problems are as formidable as is often thought, and present an overview of several directions of research that aim to characterise and improve the behaviour of cutting-edge algorithms for solving NP hard problems in a pragmatic, yet principled way. For prominent problems ranging from propositional satisfiability (SAT) to TSP and from AI planning to mixed integer programming (MIP), Hoos will demonstrate how automated analysis and design techniques can be used to model and enhance the performance characteristics of cutting-edge solvers, sharing some surprising insights along the way.

## Women@GECCO Workshop 2016, Invited talk by Prof. Stephanie Forrest

By Gabriela Ochoa - University of Stirling, Scotland

Over the years, the Women@gecco workshop has held an invited talk, where a female role model shares with us the passion for her field, in the context of her life and career story. This year, we had the privilege to host Prof. Stephanie Forrest, who also presented the SIGEVO plenary lecture in Memory of John Holland at the main conference.

Stephanie is a leading figure in the field of complex adaptive systems, at the frontier between computing and biology. Her work is innovative and involves theory, practical relevance, public engagement and informing policy; making her an outstanding example of an all-round academic. This, combined with her friendly and approachable manner, made her presence at our forum even more valuable.

I specially remember reading Stephanie's excellent papers on the "Royal Road" problem during my PhD, and attending her inspiring tutorial on "Artificial Immune Systems" during the Santa Fe Complex Systems Summer School in 2002. I'm convinced that having leading female role models during my forming years had an important impact on my career, and this will continue to happen with the younger generation of female researchers in our field.

Stephanie's talk was entitled "My Life in Evolutionary Computation". After an overview of her career milestones, Stephanie shared with us invaluable career advice. One that resonates with me was: "Pick a problem that people actually care about if you solve it". Examples of such problems in her research are intrusion detection and cyber-security; modeling complex diseases such as cancer and influenza; and more recently, automatic real-world software repair.



Stephanie affirmed that having an early exposure to many disciplines was key in her forming years. Her reflections on inter-disciplinary research are worth sharing. She told us that it is a bit like fusion cuisine, sometimes the mix works wonderfully sometimes it is a disaster! (while her slides showed colourful veggie hot-dogs). In order to succeed, you need to be excellent in at least one of the disciplines involved.

Other notable pieces of wisdom related to collaboration, which she compared to marriage: easier to get into than out of, takes work and compromise, but extremely rewarding when going well. Finally, she remarked the importance of maintaining the joy of going to work everyday, and remembering the privilege of being an academic; with a sprinkle of caution ... "never make the mistake of thinking you are irreplaceable".

We cherish her advice and warm personality, and look forward to more of her delicious Biology-Computing fusions.

## HUMIES

The annual Humies award presents awards totalling \$10,000 for huma-competitive results that have been produced by any form of genetic and evolutionary computation (including, but not limited to genetic algorithms, genetic programming, evolution strategies, evolutionary programming, learning classifier systems, grammatical evolution, gene expression programming, differential evolution, etc.) and that have been published in the open literature between the deadline for the previous competition and the deadline for the current competition.

This year the prizes were awarded to:



### Gold Medal

Automatic Software Transplantation

Earl Barr, Mark Harman, Yue Jia, Alexandru Marginean, Justyna Petke  
CREST, UCL, London, UK



### Silver Medal (Tie)

On Routine Evolution of Complex Cellular Automata

Michal Bidlo, Evolvable Hardware Group, Brno Uni. of Tech, Czech Republic

Can a machine replace humans in building regular expressions? A case study

Alberto Bartoli, Andrea De Lorenzo, Eric Medvet, Fabiano Tarlao, University of Trieste, Italy



### Bronze Medal

Multi-objective Software Effort Estimation

Federica Sarro, Alessio Petrozziello, Mark Harman, CREST, UCL, London, UK

## GECCO Student Workshop

The student workshop at GECCO 2016 aims to encourage graduate and undergraduate students to submit and present their research on genetic and evolutionary computation at GECCO (Genetic and Evolutionary Computation Conference) 2016 in Denver, Colorado, USA. This full day workshop assists students with their work and facilitates their inclusion in the research community.

At the workshop, students receive valuable feedback on the quality of their work and their presentation style. This is assured by constructive discussions after each talk led by a mentor panel of established researchers. Students are encouraged to use this opportunity for guidance on future research directions.

In addition, we provide opportunities to:

- present the work to the whole conference audience at the poster session,
- receive a best paper award, and,
- continue the discussion at a get together after the workshop

## **Best Paper Awards were presented to:**

- **1st Place**  
Title: Parallel SMS-EMOA for Many-Objective Optimization Problems  
Authors: Raquel Hernández Gómez, Carlos A. Coello Coello  
Affiliation: CINVESTAV-IPN, México
- **2nd Place**  
Title: Integrating Local Search within neat-GP  
Authors: Perla S. Juárez Smith, Leonardo Trujillo Reyes  
Affiliation: Instituto Tecnológico de Tijuana, México
- **3rd Place**  
Title: Small-Moves Based Mutation For Pick-Up And Delivery Problem  
Authors: Viacheslav Shalamov, Andrey Filchenkov, Daniil Chivilikhin  
Affiliation: ITMO University, Russia

As the authors were unable to attend the conference due to visa issues, the talk was given and the award was received by Arina Buzdalova (ITMO University, Russia).

### **Organisers**

- Samadhi Nallaperuma  
(University of Sheffield, UK)
- Vanessa Volz  
(TU Dortmund University, Germany)

### **Senior Advisor**

- Boris Naujoks  
(TH Köln - University of App. Sciences, Germany)

### **Mentor Panel**

- Tobias Glasmachers (Ruhr-Universität Bochum, Germany)
- Boris Naujoks (TH Köln - University of Applied Sciences, Germany)
- Dirk Sudholt (University of Sheffield, UK)



## **SIGEVO Impact Award**

This award distinguishes a paper or papers from the GECCO held 10 years previously that has produced the most impact.

A joint award was made to two papers from GECCO 2006:

- Reference point based multi-objective optimization using evolutionary algorithms  
by K. Deb, J. Sundar
- Search-based determination of refactorings for improving the class structure of object-oriented systems  
by O. Seng, J. Stammel, D. Burkhart

## Best Paper Awards

### Track: ACO-SI + CO + THEORY

Winner: The (1+1) Elitist Black-Box Complexity of Leading Ones is  $\Theta(n^2)$   
Carola Doerr and Johannes Lengler



### Track: DETA + PES + SBSE

Winner: Demonstrating the Feasibility of Automatic Game Balancing  
Vanessa Volz, Günter Rudolph, Boris Naujoks



### Track: EMO

Winner: A Multi-Objective Evolutionary Algorithm based on Parallel Coordinates  
Raquel Hernández, Carlos A. Coello, Enrique Alba



### Track: GP

Winner: A Dispersion Operator for Geometric Semantic Genetic Programming  
Luiz Otávio, V. B. Oliveira, Fernando E. B. Otero, Gisele Lobo Pappa



### Track: ECOM

Winner: Extension of the CMSA Algorithm: An LP-based Way for Reducing Sub-instances  
Christian Blum and Jordi Pereira



### Track: RWA

Winner: Planning Inspection Paths through Evolutionary Multi-objective Optimization  
Kai Olav Ellefsen, Herman Augusto Lepikson, Jan Christian Albiez



### Track: CS

Winner: Quantifying Deception: A Case Study in the Evolution of Antimicrobial Resistance  
Margaret J. Eppstein, C. Brandon Ogbunugafor



### Track: GA

Winner: Breaking the Billion Variable Barrier in Real-World Optimization Using a Customized Evolutionary Algorithm  
Kalyanmoy Deb and Christie Myburgh



### Track: EML

Winner: Evaluation of a Tree-based Pipeline Optimization Tool for Automating Data Science  
Randal Shadbolt Olson, Nathan Bartley, Ryan John Urbanowicz, Jason H. Moore



# 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 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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