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

Editorial

Welcome to the 3rd (Fall/Autumn) 2024 issue of the SIGEvolution newsletter! We start with an overview of the 2024 Humies competition, which awards results produced by evolutionary algorithms that are competitive or outperform results produced by human designers. Our next contribution describes the algorithm (a hyper-heuristic) used to schedule the rooms and events of GECCO 2023. We follow with a PhD thesis report on Neuroevolution Trajectory Networks, and a Lost Gem: the proceedings of ICGA, the very first International Conference on Genetic Algorithms and their Applications.

We are happy to announce that GECCO 2025 will be held in Malaga, Spain from July 14-18. We conclude with further announcements and calls for papers. Remember to contact us if you'd like to contribute or have suggestions for future newsletter issues.

Gabriela Ochoa (Editor)

About the Cover

The cover (by Gerald Pereira et. al. from CSIRO, Australia, Bronze awardees @ Humies 2024), illustrates an evolved flow reactor design, a key component of the flow chemistry industry. This evolved design outperformed state-of-the-art hand-designed baselines, giving higher efficiency and potential energy savings.

The designs have been optimized through a combination of genetic algorithms to predict and optimize novel structures with computational fluid dynamics for performance assessment, applied to bespoke chemical processing such as heavy metal extraction from contaminated water.

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21st Human-Competitive Results Awards ("Humies") 2024

Erik Goodman (https://www.egr.msu.edu/~goodman/), BEACON Centre, Michigan State University, USA

The GECCO 2024 Conference was held July 14-18 this year, once again in hybrid mode. Nearly 400 people came to Melbourne, Australia to attend in person, and an additional 275 or so registered to attend virtually. The finals of the Humies competition (see www.human-competitive.org (http://www.human-competitive.org) for the Call for Entries) was a plenary session on Wednesday, July 17, that was attended by about 150 people.

The eight finalists earlier selected by the judges (from among 16 entries, and based on the papers and entry forms they submitted) presented their work in 10-minute talks, or, in one case, a pre-recorded video.

The Humies competition annually awards $10,000 in cash prizes for computational results that are deemed competitive with results produced by humans but are generated automatically by computers. The judges viewed all presentations and then held their deliberations to select the prize winners. All 18 entries and the presentation materials of the eight finalists are available to the general public at the Humies website www.human-competitive.org (http://The Humies competition annually awards $10,000 in cash prizes for computational results that are deemed to be competitive with results produced by humans but are generated automatically by computers. The judges viewed all presentations and then held their deliberations to select the prize winners. All 18 entries and the presentation materials of the eight finalists are available to the general public at the Humies website www.human-competitive.org).

The competition, sponsored annually by John Koza (who is widely regarded as the "Father of Genetic Programming") solicits papers published within the last year that describe work fulfilling one or more of eight criteria, including such features as winning a regulated competition against humans or other programs; producing results that are publishable in their own right, not because a computer program created them; patentability; and other criteria described in full on the Humies website. This year saw a tie for the Bronze Award. The Gold Award included US$5,000; the Silver Award $3,000, and the Bronze Awards, $1,000 each. The judges for the competition were Wolfgang Banzhaf, Stephanie Forrest, Erik Goodman, Una-May O'Reilly, Lee Spector and Darrell Whitley. Publicity for the Humies was done by Bill Langdon.

As usual, after considering all of the entries, the judges wanted to give awards to many of them, but the final result was the following four awards:

Gold Award

The Gold, with a $5,000 prize, was awarded to the team of Kévin Cortacero, Brienne McKenzie, Sabina Müller, Roxana Khazen, Fanny Lafouresse, Gaëlle Corsaut, Nathalie Van Acker, François-Xavier Frenois, Laurence Lamant, Nicolas Meyer, Béatrice Vergier, Dennis G. Wilson, Hervé Luga, Oskar Staufer, Michael L. Dustin, Salvatore Valitutti, and Sylvain Cussat-Blanc.

The oral presentation at GECCO was made by Dennis Wilson, who is from the University of Toulouse – Institut de Recherche en Informatique de Toulouse (IRIT) – Artificial and Natural Intelligence Toulouse Institute, France. The paper's 17 co-authors came from institutions in Toulouse and Bordeaux, France and Oxford, UK. Their paper was entitled Evolutionary design of explainable algorithms for biomedical image segmentation, (https://www.nature.com/articles/s41467-023-42664-x) and was published in Nature Communications 14, 7112 (2023).

They created a program called Kartezio, which uses Cartesian Genetic Programming (CGP) to create readily interpretable pipelines of image processing components that can segment and then annotate images for such purposes as identification of cancers, etc. The training does not require nearly as many images as the contemporary deep-learning models but produces annotated images that are easily interpreted and understood by medical practitioners, potentially expanding the range of diagnostic utilities available.

Silver Award

The Silver Award and $3,000 went to a team which included Penousal Machado (who presented), T. Martins, J. Correia, L. E. Santo, N. Lourenço, J. M. Cunha, S. M. Rebelo, P. Martins, and J. Bicker, all from the University of Coimbra, Portugal.

Their paper is entitled, From Pixels to Metal: AI-Empowered Numismatic Art (https://www.ijcai.org/proceedings/2024/854), and has been accepted for the IJCAI Proceedings, August 2024. The paper describes their response to a challenge from the Portuguese National Press-Mint: to use Artificial Intelligence to design a commemorative coin that celebrates the digital world.

They explain the process of this coin's co-creation, which included the development of an evolutionary art system guided by Contrastive Language Image Pre-training (CLIP) and Machine Learning-based aesthetic models, a system for prompt evolution, and a representation for encoding genotypes in mintable format. The

"heads" side of the coin was created by AI, and the "tails" side is a digital description of the image on the heads side. They won the challenge and the National Press-Mint produced a limited edition 10-euro silver proof coin, with a total of 4,000 units. The coin was met with enthusiasm, selling out within two months.

Bronze Award (Tie)

One Bronze Award and $1,000 went to Yunqi Shi, Ke Xue, Lei Song, and Chao Qian (who presented at GECCO), all from the School of Artificial Intelligence of Nanjing University, Nanjing, Jiangsu, China. Their paper was entitled, Macro Placement by Wire-Mask-Guided Black-Box Optimization (https://dl.acm.org/doi/10.5555/3666122.3666421), and appeared in Advances in Neural Information Processing Systems 36 (NeurIPS'23). Chip floorplanning, including macro placement to minimize half-perimeter wire length, is a growing challenge in VLSI design as the number to be placed increases.

Previous methods included packing-based, analytical and reinforcement learning methods. Still, the authors proposed a new black-box optimization (BBO) framework (called WireMask-BBO) for macro placement, by using a wire-mask-guided greedy procedure for objective evaluation. Using various BBO algorithms, WireMask-BBO empirically achieved significant improvements over previous methods – i.e., significantly shorter HPWL – while using much less time.

Furthermore, it fine-tuned existing placements by treating them as initial solutions, bringing up to 50% improvement in HPWL.

Bronze Award (Tie)

Another Bronze Award and $1,000 went to the team of Gerald Pereira, David Howard, Paulus Lahur, Michael Breedon, Phil Kilby, and Christian Hornung, all representing CSIRO, from Clayton South and Pullenvale, Australia. Their entry was entitled, Freeform generative design of complex functional structures, (https://www.nature.com/articles/s41598-024-62830-5) and appeared in Sci Rep 14, 11918 (2024).

They tackled the challenging problem of designing 3D-printed metal geometric structures to improve reaction rates in continuous-flow chemical reaction systems. A key application of such systems is the removal of heavy metals from urban water supplies. These geometries are typically designed by humans using CAD/CAM systems, but this generative machine learning approach is poised to produce dramatically better results.

They demonstrated such an approach that optimizes diverse, bespoke reactor elements for flow chemistry applications, combining evolutionary algorithms and a scalable fluid dynamics solver for in silico performance assessment. Experimental verification confirms the discovery of never-before-seen bespoke mixers with performance that exceeds the state of the art by 45%.

Automated scheduling of GECCO 2023

Ahmed Kheiri, Yaroslav Pylyavskyy and Peter Jacko, Lancaster University, Lancaster, UK

In this article, the authors describe the process they used for the automated scheduling of talks and other sessions in GECCO 2023, using a hyper heuristic-based optimisation algorithm.

Since 1999, the Genetic and Evolutionary Computation Conference (GECCO) has showcased the latest high-quality results in genetic and evolutionary computation, covering topics that range from genetic algorithms to evolutionary machine learning and their application in real-world problems.

GECCO 2023 (https://gecco-2023.sigevo.org/HomePage)was held at the Altis Grand Hotel, a landmark venue in Lisbon renowned for hosting numerous notable events over the years. The conference took place from July 15 to July 19, 2023, in a hybrid format, and involved 883 registrants (272 online and 611 onsite).

The first two days (Saturday and Sunday) focused on Workshops, Tutorials, Competitions, and Women+@GECCO, while the remaining three days (Monday to Wednesday) featured the Opening and Closing ceremonies, Main Tracks, Keynotes, Poster Sessions, ECiP (Evolutionary Computation in Practice), HOP (Hot Off the Press), HUMIES (Human-Competitive Awards), and Job Market. The Poster Sessions included a variety of submissions, such as poster submissions, Late-Breaking Abstracts (LBAs), and entries from the student workshop and competitions.

The hotel featured a total of 8 rooms spread across four different floors. On the ground floor, there was 1 room with a capacity of 90. The first floor had 3 rooms, each accommodating between 50 and 150 attendees. On the 12th floor, there was another room with a capacity of 70. The 13th floor housed 3 rooms, with capacities ranging from 60 to 150 attendees. Additionally, the Plenary Room, located on floor -1, was available exclusively from Monday to Wednesday for events such as Invited Keynotes.

During Saturday and Sunday, a total of 28 sessions were allocated for workshop tracks, with each workshop lasting between 0.5 to 3 sessions. There were also two additional sessions reserved for the student workshop. Detailed information for each workshop included the mode of attendance (online vs. in-person) for speakers and organisers, time zones for online presentations, constraints for workshops and individual talks, as well as the preferred order and duration of talks. For tutorial tracks, there were 32 sessions available. Additionally, two sessions were designated for competition tracks.

From Monday to Wednesday, approximately 192 time slots were available for talks. This calculation was based on having 6 sessions per day over 3 days, with 8 rooms available and 4 talks per session. Out of 209 submissions, 29 were designated as HOP submissions. Four sessions were specifically allocated for HOP, with 7-8 time slots per session. Additionally, there were 26 Best Papers (BPs) to be scheduled.

To generate an efficient schedule for the conference, multiple requirements had to be considered, which are presented next:

1. Accommodation of speakers who were unavailable during specific sessions, including time zone consideration for online speakers (42 in total).
2. Avoid speakers' clashes. Each talk could potentially clash with several talks, ranging from 0 to 10.
3. Some talks had to be scheduled in a specific order within their corresponding track.
4. Some tracks were not allowed to be scheduled in specific sessions (e.g., BP sessions could not be scheduled on Wednesday to allow time for winners certificates preparation).
5. Allocation of tracks into appropriate rooms by considering expected attendance (e.g., BP sessions required large rooms).
6. Avoid scheduling the same track in parallel to ensure participants do not miss their preferred talk.

7. Some rooms had to be unused during specific sessions (e.g., during the Job Market session, the Plenary Room had to be free).

8. Accommodation of speakers who could not present in specific rooms due to accessibility or facility issues.

9. Avoid scheduling some tracks in parallel due to similarity (e.g., workshop organisers requested certain workshops and tutorials to not be scheduled in parallel).

10. Consideration of the number of time slots that were available in each session. Some flexibility was allowed for certain sessions but the majority of sessions had to consist of 4 time slots.

11. Sessions that were scheduled on the upper floors had to start later, allowing adequate time for participants to reach the floor due to limited elevator capacity.

12. Onsite and online talks had to be grouped separately to offer a smooth transition between the two modes to participants.

13. The sessions on Tuesday before lunch had to end at different times to avoid overcrowding during lunch.

14. Consideration of historical practices and consecutive scheduling of tracks (e.g., introductory Tutorials had to be scheduled on Saturday before Specialised Tutorials which had to be scheduled on Sunday).

15. Workshops and Tutorials that were scheduled as first sessions last year were not allowed to be scheduled again as first.

16. Limitation of the number of rooms assigned per track to prevent participants from frequently switching rooms.

17. Consideration of track chair duties to avoid clashes (e.g., a person being simultaneously a track chair in two tracks or being a speaker in another track)

18. Some longer talks required multiple time slots (e.g., Workshops, Tutorials, etc.).

Effectively scheduling the GECCO 2023 conference by considering the above requirements is not a trivial task, and doing so manually would pose an arduous challenge for the organisers. Therefore, to facilitate the scheduling process, we used our conference scheduler which scheduled the conference effortlessly and autonomously. Our algorithm only required an Excel file in which we set all the preferences and requirements of the conference. Then, we executed our algorithm to obtain multiple candidate schedules within a few hours. The algorithm itself uses a selection hyper-heuristic that incorporates a random selection method with an improve-or-equal move acceptance criterion, which only accepts moves that do not deteriorate the current solution. Our approach involves simple low-level heuristics, such as: (1) swapping a random talk with another randomly chosen talk within the same track, (2) exchanging one track with another randomly chosen track, and (3) inserting a random talk into a different position within the same track. Each low-level heuristic is equally likely to be chosen, with a probability of 1/3. To enhance the exploration of solutions, the algorithm periodically shuffles the current solution at regular intervals during execution. Thus, our approach involves running the hyper-heuristic algorithm to support exploitation, followed by shuffling the solution to support exploration. This iterative process continues until a termination criterion is met, with the hyper-heuristic running for another 30 minutes after each shuffle, ensuring continuous exploration and exploitation of solutions. To handle the numerous requirements, we treat each requirement and preference as a soft constraint and assign a weight to it according to its subjective significance. This results in the following objective function, a summation of the weighted soft constraints, which we minimise:

$$\min \sum w_{sc_i} \times V_{sc_i}$$

where w_sc_i indicates the corresponding weight of constraint SC_i, and V_sc_i is the corresponding violated amount of constraint SC_i.

We ran the algorithm for a duration of 4 hours, resulting in 8 intervals as we shuffle the solution every 30 minutes. Note that we scheduled the GECCO 2023 workshops (first two days) and main conference (last three days) separately.

The following are the only constraint violations identified:

1. Three main tracks were not scheduled in consecutive order. Although this constraint was low priority for the main tracks, it was considered high priority for the Saturday and Sunday schedules.
2. Seven talks were scheduled on days they specified as unavailable. A closer look revealed that these talks indicated unavailability for the entire days.
3. The Theory track was allocated to two different rooms.
4. The GECH track was assigned to a room with limited seating capacity for its size. Additionally, the ACO-SI and CS tracks were placed in a room with somewhat limited seating capacity for tracks of their size.
5. Two online talks were not scheduled during their most preferred time slots based on their time zones. One was scheduled from 06:00 to 07:30, and another from 21:30 to 23:00.
6. An online workshop submission was scheduled from 22:00 to 23:50, while the optimal slots considering the speaker's time zone would have been 16:30-18:20 or 18:40-20:30. However, scheduling it in any of these ideal slots would require another online talk in the same workshop to be scheduled from either 03:30-05:20 or 05:40-07:30, which is not ideal.
7. An introductory tutorial is scheduled for the first time slot on Sunday rather than Saturday. However, the speaker requested their tutorial be scheduled for Sunday. Additionally, a specialised tutorial is scheduled for the last time slot on Saturday, but the speakers requested it be scheduled for Saturday.
8. The final constraint violation stems from conflicting availability preferences of authors within the same session. One author for an onsite submission in a particular workshop expressed unavailability on Saturday, yet the session was scheduled for that day. Conversely, another author from a different submission in the same session is only available on Saturday. This creates a dilemma where satisfying the constraint for one submission would inevitably violate the constraint for the other.

Overall, our conference scheduler successfully scheduled the GECCO2023 conference in an effortless and autonomous manner, saving a huge amount of time and effort that organisers would otherwise have invested if scheduled manually. The conference scheduler generates a high-level schedule, which determines the time and room allocations for each track, and a low-level schedule, which assigns individual talks to sessions, rooms, and time slots. It considers numerous requirements and preferences such as presenter and attendee preferences, room capacity, room accessibility, and minimising session hopping (i.e., reducing travel between rooms). In addition, it aims to promote inclusive, accessible, and sustainable events. Examples include scheduling specific talks in rooms that support advanced accessibility, minimising changeover times for tracks involving sessions at different locations, and offering flexible options for participants with caring responsibilities or special requirements, such as religious needs, to attend all or part of the conference. Our conference

scheduler is also suitable for other conferences with different formats, and has been used in the past to schedule the OR Society's 60th Annual Conference, the New to OR Conference, and the International Symposium on Forecasting 2022, in addition to GECCOs 2020-2023. Ultimately, we hope that our conference scheduler will enable academics to maximise their conference experience and alleviate the scheduling burden on organisers.

URL

The conference scheduling and various algorithms are available for the research community, which can be accessed on the following GitHub repository: https://github.com/ahmedkheiri/CSPLib (https://github.com/ahmedkheiri/CSPLib).

About the Authors

Ahmed Kheiri is a Senior Lecturer at Lancaster University, soon to join Alliance Manchester Business School at the University of Manchester. Dr Kheiri specialises in designing and implementing intelligent, ready-to-use hyper-heuristic methods for decision support, with applications across various real-world problems. Dr Kheiri has been active in the Evolutionary Computation community, serving on the GECCO organising committee since 2020. In 2022, he co-founded and became the first Hybrid Scheduling Chair, a position he continues to hold as of 2024.

Peter Jacko is a Senior Decision Scientist for Berry Consultants which he joined in 2021 and a Senior Lecturer in the Department of Management Science at Lancaster University, UK which he joined in 2013. Dr. Jacko is devoted to the development of the science of the solution of problems in the design and management of complex systems such as public health processes, business decision-making, and communications networks.

Yaroslav Pylyavskyy is a PhD candidate in Management Science at Lancaster University, specialising in Optimisation. He is set to graduate soon and is currently completing an internship as a Data Scientist at TESCO Technology, focusing on Operational Research. His expertise lies in developing and applying Operational Research techniques, such as mathematical models and metaheuristics, to support business decision-making and provide insights through data analytics.

PhD Thesis: Neuroevolution Trajectory Networks (NTNs)

Stefano Sarti, University of Stirling, Scotland, UK.

Neuroevolution refers to using evolutionary computation to design and optimize neural networks. This thesis entitled Neuroevolution trajectory networks: illuminating the evolution of artificial neural networks (https://dspace.stir.ac.uk/handle/1893/36055), focuses on explainability in neuroevolution. Several neuroevolution algorithms and frameworks have been proposed, which underscores the rising need for methods to evaluate and understand them and their optimisation dynamics.

The thesis builds on Search Trajectory Networks (STNs) [1], a successful analysis and visualisation technique leveraging data-driven graph instantiations (complex networks). This thesis applies such technique to Neuroevolution systems and their large search spaces, hence forming a new line of inquiry: Neuroevolution Trajectory Networks (NTNs).

The thesis successfully brings the application of complex networks to the realm of Neuroevolution, helping to illuminate some of the less understood mechanisms that drive this domain. The Neuroevolution frameworks and algorithms examined include:

- Neuroevolution of Augmenting Topologies (NEAT) [4, 5]
- NEAT with Novelty Search [3]
- Fast-Deep Evolutionary Network Structured Representation with Incremental Development (Fast-DENSER ID) [2]

These systems were examined using classic reinforcement learning control tasks (double pole balancing and maze navigation), as well as image classification benchmarks (MNIST, SVHN, CIFAR-10, and Fashion-MNIST).

The thesis's main contributions are as follows:

- **Bringing complex network tools to study Neuroevolution** – demonstrating the adaptability of STN visualisations for modelling dense ANNs in neuroevolution, revealing inefficiencies in NEAT's recombination operator and laying the groundwork for NTNs.
- **Studying the role of recombination in Novelty Search** – using NTNs to study crossover's role in Novelty Search. Our analysis shows that fitness search with recombination offers greater

diversity, while Novelty Search without crossover excels in diversity generation, proving NTNs' flexibility.

- **Offering a topological analysis of Behavioural Characterisations** – this work differentiates NTNs from STNs, by modelling features that are unique to neuroevolution. Our results show that simpler network topologies generate more diverse behaviours, leading to a proposal for a transitive Behaviour Characterisation.

- **Tracking transfer learning in Deep Neural Networks** – extending NTNs to model CNNs in image classification, capturing the dynamics of evolving solutions and demonstrating NTNs' ability to reveal new insights in neuroevolution and DNN principles.
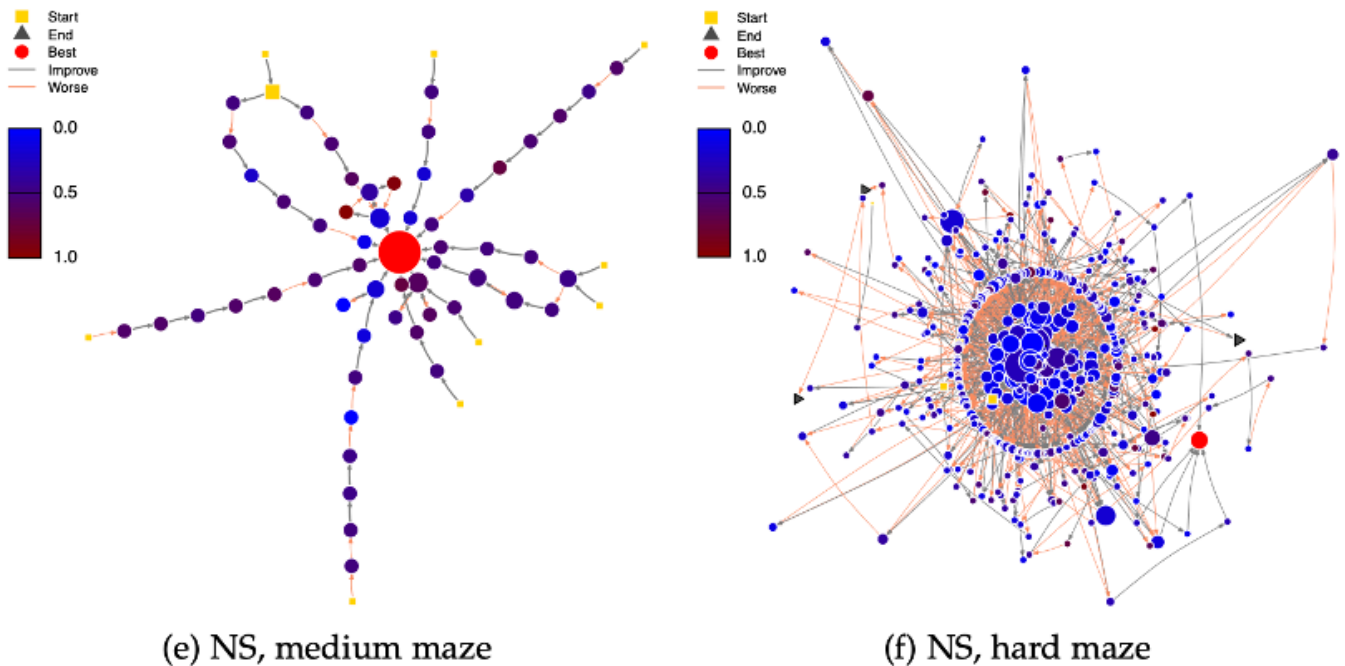

(e) NS, medium maze

(f) NS, hard maze

Figure 1: NTNs aggregating 10 runs of Novelty Search strategy in two maze configurations. The colour of nodes is based on a gradient indicating topological complexity. The size of nodes reflects the incoming strength of the connections.

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[1] G Ochoa, KM Malan, C Blum (2021) Search trajectory networks: A tool for analysing and visualising the behaviour of metaheuristics (https://www.sciencedirect.com/science/article/abs/pii/S1568494621004154), *Applied Soft Computing* 109, 107492

[2] Sarti, S., Laurenço, N., Adair, J., Machado, P., Ochoa, G. (2023). Under the Hood of Transfer Learning for Deep Neuroevolution (https://doi.org/10.1007/978-3-031-30229-9_41). Applications of Evolutionary Computation. EvoApplications 2023. Lecture Notes in Computer Science, vol 13989. Springer, Cham.

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[5] Sarti, S., Ochoa, G. (2021). A NEAT Visualisation of Neuroevolution Trajectories (https://doi.org/10.1007/978-3-030-72699-7_45). Applications of Evolutionary Computation. EvoApplications 2021. Lecture Notes in Computer Science, vol 12694. Springer, Cham.

About the Author

Stefano Sarti is a researcher at the University of Stirling.
He completed his PhD in 2024.

The main topics were Neuroevolution, Neurocontrollers for Reinforcement Learning and Explainability in Evolutionary Computing.

Lost Gems: ICGA 1985

Proceedings of an International Conference on Genetic Algorithms and their Applications

W. B. Langdon, University College London, London, UK

Before GECCO

In 1999 the first Genetic and Evolutionary Computation Conference (GECCO) [1] was founded as a "recombination" of the annual Genetic Programming (GP) conference [2] and the biannual International Conference on Genetic Algorithms (ICGA), which had been started in 1985 and was held every two years in the USA.

ICGA 1985 was held in Pittsburgh at CMU and edited by John J. Grefenstette, whilst two years later it was hosted by MIT and again edited by John Grefenstette. Although sponsored by Texas Instruments and the US Navy, ICGA 1985 was not formally published. An electronic copy is now available at:
http://gpbib.cs.ucl.ac.uk/icga/ (http://gpbib.cs.ucl.ac.uk/icga/)

Acknowledgements

I would like to thank Tom Westerdale for the loan of these historical proceedings.

References

[1] W. Banzhaf, J. Daida, A. E. Eiben, M. H. Garzon, V. Honavar, M. Jakiela, and R. E. Smith, editors. GECCO-99: Proceedings of the Genetic and Evolutionary Computation Conference (https://www.amazon.com/exec/obidos/ASIN/1558606114/qid%3D977054373/105-7666192-3217523), Orlando, Florida, USA, 13-17 July 1999. Morgan Kaufmann.

[2] J. R. Koza, D. E. Goldberg, D. B. Fogel, and R. L. Riolo, editors. Genetic Programming 1996: Proceedings of the First Annual Conference (https://direct.mit.edu/books/edited-volume/4790/Genetic-Programming-1996Proceedings-of-the-First), Stanford University, CA, USA, 28–31 July 1996. MIT Press.

Announcements

ACM Transactions on Evolutionary Learning and Optimization (TELO)

Latest Issue: Volume 4, Issue 3. September 2024

Editors

- Juergen Branke (https://dl.acm.org/profile/81309488239),
- Manuel López-Ibáñez (https://dl.acm.org/profile/81333489997)

- *A Population Initialization Method Based on Similarity and Mutual Information in Evolutionary Algorithm for Bi-Objective Feature Selection*. Xu Cai,Yu Xue. Article No.: 13, Pages 1–21. https://doi.org/10.1145/3653025 (https://doi.org/10.1145/3653025)
- *Generalized Early Stopping in Evolutionary Direct Policy Search.* Etor Arza, Léni K. Le Goff, Emma Hart. Article No.: 14, Pages 1–28. https://doi.org/10.1145/3653024 (https://doi.org/10.1145/3653024)
- *Applicability of Neural Combinatorial Optimization: A Critical View*. Andoni I. Garmendia, Josu Ceberio, Alexander Mendiburu. Article No.: 15, Pages 1–26. https://doi.org/10.1145/3647644 (https://doi.org/10.1145/3647644)

- *Effective and Imperceptible Adversarial Textual Attack Via Multi-objectivization.* Shengcai Liu, Ning Lu, Wenjing Hong, Chao Qian, Ke Tang. Article No.: 16, Pages 1–23. https://doi.org/10.1145/3651166 (https://doi.org/10.1145/3651166)

- *Comparison of High-Dimensional Bayesian Optimization Algorithms on BBOB*. Maria Laura Santoni, Elena Raponi, Renato De Leone, Carola Doerr. Article No.: 17, Pages 1–33. https://doi.org/10.1145/3670683 (https://doi.org/10.1145/3670683)

- *A Combinatorial Optimization Framework for Probability-Based Algorithms by Means of Generative Models*. Mikel Malagón, Ekhine Irurozki, Josu Ceberio. Article No.: 18, Pages 1–28. https://doi.org/10.1145/3665650 (https://doi.org/10.1145/3665650)

Call for Papers: Conferences & Workshops

evo✱ 2025   EvoStar 2025

Evostar conferences are being held in **Trieste, Italy** from 23 to 25 April 2025 in hybrid mode. Read more about Evostar here (https://www.evostar.org/2025/about-evostar).

Download the CFP in PDF here (https://www.evostar.org/2025/wp-content/uploads/sites/2/2024/07/evo25-flyers_general1.pdf).

Visit the EvoStar Conferences Webpages

- EuroGP (https://www.evostar.org/2025/eurogp)
- EvoApplications (https://www.evostar.org/2025/evoapps)
- EvoCOP (https://www.evostar.org/2025/evocop)
- EvoMUSART (https://www.evostar.org/2025/evomusart)

Submission Deadline

- 1 November 2024 AoE

GI @ ICSE 2025 Genetic Improvement Workshop

The 14th International Workshop on Genetic Improvement co-located with the 47th IEEE/ACM International Conference on Software Engineering, ICSE 2025 (https://conf.researchr.org/home/icse-2025), Ottawa, Canada, 26 April – 4 May 2025 (One day, TBD).

We invite submissions that discuss recent developments in all areas of research on, and applications of, Genetic Improvement.

GI is the premier workshop in the field and provides an opportunity for researchers interested in automated program repair and software optimisation to disseminate their work, exchange ideas and discover new research directions.

Important Dates

- Submission: 11 Nov 2024
- Notification: 8 Dec 2024
- Camera-ready: 5 Feb 2025
- Workshop: 26 Apr 2025 – 4 May 2025 (one day)

FOGA 2025

18th ACM/SIGEVO Conference on Foundations of Genetic Algorithms. FOGA XVIII, (https://naco.liacs.nl/foga2025//) Aug 27 – 29, 2025, Leiden, The Netherlands.

FOGA 2025 is a conference organized by ACM/SIGEVO and hosted by the Leiden Institute of Computer Science (LIACS) in Leiden, The Netherlands. The first FOGA conference was held in 1990 in Bloomington, Indiana. The conference will this year take place on three days (Wed – Fri).

FOGA is *not* only focused on mathematical analysis of randomized search heuristics, but aims at covering the entire spectrum of work, ranging from rigorously derived mathematical results to carefully crafted empirical studies, as long the key contribution is in helping us understand why something is happening.

The FOGA series aims at advancing our understanding of the working principles behind evolutionary algorithms and related randomized search heuristics, such as local search algorithms, differential evolution, ant colony optimization, particle swarm optimization, artificial immune systems, simulated annealing, and other Monte Carlo methods for search and optimization. Connections to related areas, such as Bayesian optimization and direct search, are of interest as well. FOGA is the premier event to discuss advances on the theoretical foundations of these algorithms, tools needed to analyze them, and different aspects of comparing algorithms' performance.

Important Dates (Anywhere on Earth)

- Submission: May 2, 2025
- Author rebuttal: 6-13 June, 2025
- Notification of decision to authors: June 27, 2025
- Camera ready: July 10, 2025
- Early registration: July 10, 2025
- Conference: Aug 27 – 29, 2025

Call for Papers: Journal Special Issues

ACM Transactions on Evolutionary Learning and Optimization (TELO)

Special Issue on Integrating Evolutionary Algorithms and Large Language Models

Guest Editors

- Erik Hemberg, Massachusetts Institute of Technology, USA, hembergerik@csail.mit.edu
- Una-May O'Reilly, Massachusetts Institute of Technology, USA, unamay@csail.mit.edu
- Dennis Wilson, ISAE-Supaero, University of Toulouse, France, dennis.wilson@isae.fr

We invite research that investigates how Evolutionary Algorithms and Large Language Models can be combined to yield new insights, results, and questions in Evolutionary Computation. We are interested in a wide range of integrations, including LLM-assisted evolution, LLMs for search operators, multi-objective and open-ended optimization using LLMs, andanalysis on search spaces, robustness, and benchmarks.

Important Dates

- Open for Submissions: June 1, 2024
- Submissions deadline: October 1, 2024
- First-round review decisions: January 1, 2025
- Deadline for revision submissions: March 1, 2025
- Notification of final decisions: June 1, 2025

Submission Information

Submission Information Manuscripts should be prepared according to the "Guidelines for Authors" section at https://dl.acm.org/journal/telo/author-guidelines (https://dl.acm.org/journal/telo/author-guidelines) and submissions should be made through the journal submission website at https://mc.manuscriptcentral.com/telo (https://mc.manuscriptcentral.com/telo) by selecting the Manuscript Type "Special Issue on Integrating Evolutionary Algorithms and Large Language Models". If you would like to apply for an ACM Reproducibility Badge, please clearly state this in your Cover Letter.

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 (https://sig.sigevo.org/index.html/tiki-index.php?page=How%20to%20join%20SIGEVO)].

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 a piece of EC software, and 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 in an interesting EC-related event? Would you be willing to tell us about it? Then send us a summary of 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 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 plain text, MS Word, or Latex, but do not forget to send your sources and images.

Enquiries about submissions and contributions can be emailed to gabriela.ochoa@stir.ac.uk
All the issues of SIGEVOlution are also available online at: www.sigevolution.org (http://www.sigevolution.org)

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