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SYNASC2022: 24th International Symposium on Symbolic and Numeric Algorithms for Scientific Computing

Research Institute for Symbolic Computation, Castle of Hagenberg

Hagenberg, Austria, September 12-15, 2022

Conference website	https://synasc.ro/2022/
Submission link	https://easychair.org/conferences/?conf=synasc2022
Submission deadline	June 1, 2022

Topics: artificial intelligence   distributed computing   symbolic and numeric computation   logic and programming

SYNASC aims to stimulate the interaction among multiple communities focusing on defining, optimizing and executing complex algorithms in several application areas. The focus of the conference ranges from symbolic and numeric computation to formal methods applied to programming, artificial intelligence, distributed computing and computing theory. The interplay between these areas, in fact, is essential in the current scenario where economy and society demand for the development of complex, data intensive, trustable and high performant computational systems.

Submission Guidelines

All papers must be original and not simultaneously submitted to another journal or conference. The following paper categories are welcome:

- Regular papers describing fully completed research results (up to 8 pages in the two-columns paper style).
- System descriptions and experimental papers describing implementation results of experimental data, with a link to the reported results (up to 4 pages in the two-columns paper style).
- Work in progress papers, describing ongoing work and/or preliminary results (up to 4 pages in the two-columns paper style).
- PhD Students short papers, describing ongoing work and research challenges of PhD students (up to 4 pages in the two-columns paper style).

List of Topics

SYNASC is organized within six tracks:

- *Symbolic Computation*

    - computer algebra
    - symbolic analysis
    - symbolic combinatorics
    - symbolic techniques applied to numerics
    - hybrid symbolic and numeric algorithms
    - numerics and symbolics for geometry
    - programming with constraints, narrowing
    - applications of symbolic computation to artificial intelligence and vice-versa

- *Numerical Computing*

    - iterative approximation of fixed points
    - solving systems of nonlinear equations
    - numerical and symbolic algorithms for differential equations
    - numerical and symbolic algorithms for optimization
    - parallel algorithms for numerical computing
    - scientific visualization and image processing

- *Logic and Programming*

    - automatic reasoning

- ○ formal system verification
- ○ formal verification and synthesis
- ○ software quality assessment
- ○ static analysis
- ○ timing analysis
- ○ automated testing

- *Distributed Computing*

  - ○ modelling of parallel and distributed systems
  - ○ parallel and distributed algorithms
  - ○ architectures for parallel and distributed systems
  - ○ applications for parallel and distributed systems, acceleration of AI or Big Data applications using distributed and parallel computing
  - ○ networked intelligence and Internet of Things

- *Artificial Intelligence*

  - ○ knowledge discovery, representation, and management
  - ○ automated reasoning, uncertain reasoning, and constraint strategies
  - ○ recommender and expert systems
  - ○ intelligent systems, agents, and networks
  - ○ agent-based complex systems
  - ○ AI-based systems for scientific computing
  - ○ machine learning – including deep learning models and technologies
  - ○ explainable and trustworthy AI
  - ○ information retrieval, data mining, text mining and web mining
  - ○ computational intelligence - including fuzzy, neural and evolutionary computing
  - ○ AI applications: natural language processing, computer vision, signal processing, stock market, computational neuroscience, robotics, autonomous vehicles, medical diagnosis, cybersecurity, digital design, online education, algorithm invention and analysis

- *Theory of Computing*

  - ○ data structures and algorithms
  - ○ combinatorial optimization
  - ○ formal languages and combinatorics on words

- graph-theoretic and combinatorial methods in computer science
- algorithmic paradigms, including distributed, online, approximation, probabilistic, game-theoretic algorithms
- computational complexity theory, including structural complexity, boolean complexity, communication complexity, average-case complexity, derandomization and property testing
- logical approaches to complexity, including finite model theory
- algorithmic and computational learning theory
- aspects of computability theory, including computability in analysis and algorithmic information theory
- proof complexity
- computational social choice and game theory
- new computational paradigms: CNN computing, quantum, holographic and other non-standard approaches to computability
- randomized methods, random graphs, threshold phenomena and typical-case complexity
- automata theory and other formal models, particularly in relation to formal verification methods such as model checking and runtime verification
- applications of theory, including wireless and sensor networks, computational biology and computational economics
- experimental algorithmics

Committees

Program Committee

- *Steering Committee:*

  - Anca Mirela Andreica, Babes-Bolyai University of Cluj-Napoca, Romania
  - James Davenport, University of Bath, UK
  - Tetsuo Ida, University of Tsukuba, Japan
  - Tudor Jebelean, Johannes Kepler University, Austria
  - Laura Kovacs, Technical University of Vienna, Austria
  - Dorel Lucanu, "Alexandru Ioan Cuza" University of Iasi, Romania
  - Viorel Negru, West University of Timisoara, Romania
  - Dana Petcu, West University of Timisoara, Romania
  - Alin Stefanescu, University of Bucharest, Romania
  - Stephen Watt, University of Western Ontario, Canada

- ○ Daniela Zaharie, West University of Timisoara, Romania

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  - ○ Daniela Zaharie, West University of Timisoara, Romania

- *Program Chairs:*

  - ○ Bruno Buchberger, Johannes Kepler University, Austria
  - ○ Mircea Marin, West University of Timisoara, Romania

- *Track Chairs:*

  - ○ Symbolic Computation

    - ▪ James Davenport, University of Bath, UK
    - ▪ Stephen Watt, University of Waterloo, Ontario, Canada

  - ○ Numerical Computing

    - ▪ Eva Kaslik, West University of Timisoara, Romania
    - ▪ Dorota Mozyrska, Bialystok University of Technology, Poland
    - ▪ Stephen Takacs, Johannes Kepler University Linz, Austria

  - ○ Logic and Programming

    - ▪ Nikolaj Bjorner, Microsoft Research, USA
    - ▪ Arie Gurfinkel, University of Waterloo, Canada
    - ▪ Laura Kovacs, Technical University of Vienna, Austria

  - ○ Artificial Intelligence

    - ▪ Edwin Lughofer, Johannes Kepler University, Austria
    - ▪ Andrei Petrovski, Robert Gordon University, UK
    - ▪ Daniela Zaharie, West University of Timisoara, Romania

  - ○ Distributed Computing

    - ▪ Marc Frincu, Nottingham Trent University, UK
    - ▪ Dana Petcu, West University of Timisoara, Romania

  - ○ Theory of Computing

- Gabriel Istrate, Institute e-Austria Timisoara, Romania
- Mircea Marin, West University of Timisoara, Romania

- *Special Sessions and Workshops Chair:*

  ○ Wolfgang Windsteiger, Johannes Kepler University, Austria
  ○ Daniel Pop, West University of Timisoara, Romania

- *Tutorial Chair:*

  ○ Florin Fortis, West University of Timisoara, Romania
  ○ Wolfgang Windsteiger, Johannes Kepler University, Austria

- *Proceedings Chairs:*

  ○ Bruno Buchberger, Johannes Kepler University, Austria
  ○ Mircea Marin, West University of Timisoara, Romania

Organizing committee

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  ○ Tudor Jebelean, Johannes Kepler University, Austria - chai
  ○ Carsten Schneider, Johannes Kepler University, Austria
  ○ Temur Kutsia, Johannes Kepler University, Austria
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- *Technical Committee Chairs:*

  ○ Theodor Grumeza, West University of Timisoara, Romania

○ David Perta, West University of Timisoara, Romania

Invited Speakers

Plenary talks:

- Michael Affenzeller, University of Applied Sciences Upper Austria
- Wolfgang Schreiner, Johannes Kepler University, Austria
- Martina Seidl, Johannes Kepler University, Austria
- Robert Wille, Technical University of Munich, Germany

Tutorials:

- Stefan Wagner, University of Applied Sciences Upper Austria

Publication

Research papers that are accepted and presented at the symposium will be collected as proceedings published by Conference Publishing Service (CPS) (included in IEEE Xplore) and will be submitted for indexing in ISI Web of Science, DBLP, SCOPUS.

In addition, a couple of special issues of journals are being organized for publishing extended and improved versions of high quality papers, in particular areas covered by SYNASC. At the moment the following agreements with journals have been made:

- *Journal of Symbolic Computation* (in particular for the tracks of Symbolic Computation, Logic and Programming)
- *Scalable Computing: Practice and Experience* (in particular for the track of Distributed Computing)

Venue

The conference will be held at Research Institute for Symbolic Computation (RISC), Castle of Hagenberg, Austria

Contact

All questions about submissions should be emailed to contact@synasc.ro