

The 17th International Symposium on Symbolic and Numerical Algorithms for Scientific Computing

21st – 24th September 2015
Timișoara, Romania

<http://synasc.ro/>

Organizers



**Department of
Computer Science**

*West University of Timișoara
(Timișoara, Romania)*



Institute e-Austria Timișoara

(Timișoara, Romania)



**Research Institute for
Symbolic Computation**

*Johannes Kepler University
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Artificial Intelligence

Andrei Petrovski

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Distributed Computing

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Advances in the Theory of Computing

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Workshops Chairs

Agents for Complex Systems

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Iterative Approximation of Fixed Points

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Management of Resources and Services in Cloud and Sky Computing

Dana Petcu

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Natural Computing and Applications

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Invited Speakers

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Johannes Kepler University (Austria)

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Dave Sands

Chalmers University of Technology (Sweden)

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Stefan Woltran

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Stephen Watt

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Tutorial Speakers

Daniel Hedin

Mälardalen University (Sweden)

Arie Gurfinkel

Carnegie Mellon University (USA)

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Research Institute e-Austria Timișoara (Romania)

Tracks

Monday, 21st September

- Registration (08:00)
- Opening (09:00)
(chair: Viorel Negru, room: A11)
- **Invited Talk** (09:20–10:10)
(chair: Laura Kovacs, room: A11)
From Decision Procedures to Synthesis Procedures
Ruzica Piskac
- Break (10:10)
- **Logic and Programming (1)** (10:30–12:10)
(chair: Ruzica Piskac, room: A11)
(10:30) Lambda Calculus with Regular Types
Besik Dundua, Mario Florido and Temur Kutsia
(10:50) On Synergies between Type Inference, Generation and Normalization of SK-combinator Trees
Paul Tarau
(11:10) vanHelsing: A Fast Prove Checker for Debuggable Compiler Verification
Roland Lezuo, Ioan Dragan, Gergő Barany and Andreas Krall
(11:30) Properties of Multiset Orders by Minimal and Maximal Submultisets
Aurelian Radoaca
- Lunch (12:10)
- **Invited Talk** (13:30–14:20)
(chair: Tudor Jebelean, room: A11)
Creative Telescoping via Hermite Reduction
Manuel Kauers
- Break (14:20)

■ **Numerical Computing (1)** (14:40–16:20)

(chair: Manuel Kauers, room: A11)

(14:40) A Rigorous Generic Branch and Bound Solver for Nonlinear Problems

Andrew Smith, Cesar Munoz, Anthony Narkawicz and Mantas Markevicius

(15:00) Identifiability and Noise Robustness for l1-analysis Regularizations in Compressive Sensing

Marc Nicodème, Flavius Turcu and Charles Dossal

(15:20) Numerical Investigations of Equilibriums in a Flight with High Angle of Attack

Alexandra-Emilia Fortis and Stefan Balint

(15:40) The Arithmetic of Even-Odd Trees

Paul Tarau

(16:00) Space and Execution Efficient Formats for Modern Processor Architectures

Ivan Simecek and Daniel Langr

■ **Break** (16:20)

■ **Numerical Computing (2)** (16:40–18:00)

(chair: Stefan Takacs, room: A11)

(16:40) Optimal Window and Lattice in Gabor Transform. Application to Audio Analysis

Helene Lachambre, Benjamin Ricaud, Guillaume Stempf, Bruno Torresani, Christoph Wiesmeyr and Darian Onchis

(17:00) The Flow in a Viscous Fluid over an Unsteady Stretching Surface

Remus-Daniel Ene, Vasile Marinca and Romeo Negrea

(17:20) Variant Implementations of SCBiCG Method for Linear Equations with Complex Symmetric Matrices

Kuniyoshi Abe and Seiji Fujino

(17:40) GPU Solver for Systems of Linear Equations with Infinite Precision

Jiri Khun, Ivan Simecek and Robert Lorencz

■ **Poster Session** (18:00–18:30)

(chair: , room: A11)

(18:00) Developing Railway Interlocking Systems with Session Types and Event-B

Tibor Kiss and Katalin-Tünde Jánosi-Rancz

(18:15) Properties of Multisets Compared to Sets

Aurelian Radoaca

■ **Welcome Reception** (18:30)

Tracks

Tuesday, 22nd September

- **Tutorial** (09:00–10:30)
(chair: Nikolaj Bjorner, room: A11)
Algorithmic Logic-based Verification with SeaHorn
Arie Gurfinkel
- **Break** (10:30)
- **Logic and Programming (2)** (10:50–12:10)
(chair: Arie Gurfinkel, room: A11)
(10:50) Combinatorial Techniques for Proof-based Synthesis of Sorting Algorithms
Isabela Dramnesc, Tudor Jebelean and Sorin Stratulat
(11:10) An Improved Upper-bound Algorithm for Non-preemptive Task Scheduling
Stefan Andrei, Albert Cheng and Vlad Radulescu
(11:30) A Matter of Trust: Smart Home System Relying on Logic, BCI and Sensor Agents
Violeta Tulceanu
(11:50) Simple Venn Diagrams for Finite Multisets
Aurelian Radoaca
- **Lunch** (12:10)
- **Invited Talk** (13:10–14:00)
(chair: Andrei Voronkov, room: A11)
Getting Personal with Differential Privacy
David Sands
- **Break** (14:00)
- **Tutorial** (14:20–15:50)
(chair: David Sands, room: A11)
Web App Security using JSFlo
Daniel Hedin
- **Break** (15:50)

■ **Artificial Intelligence (1)** (16:10–17:10)

(chair: Ciprian Zavoianu, room: A11)

(16:10) Automatic Definition of Optimal Default Parameters of Models: Image
Matting Application

Elena Ravve, Zeev Volkovich and Gerhard Weber

(16:30) Forecasting Techniques for Time Series from Sensor Data

*Adriana Horelu, Catalin Leordeanu, Elena Apostol, Dan Huru, Mariana Mocanu and Valentin
Cristea*

(16:50) An Energy Efficient Intelligent Wireless Body Area Network for Real-time
Vital Signs Monitoring

Todor Ivascu

■ **Trip and Conference Dinner** (17:30)

Tracks

Wednesday, 23rd September

■ Invited Talk (09:00–09:50)

(chair: Daniela Zaharie, room: A11)

Building a Nature-Inspired Computer

Peter Bentley

■ Break (09:50)

■ Artificial Intelligence (2) (10:10–12:10)

(chair: Peter Bentley, room: A11)

(10:10) A Surrogate-Based Strategy for Multi-Objective Tolerance Analysis in Electrical Machine Design

Alexandru-Ciprian Zavoianu, Edwin Lughofer, Gerd Bramerdorfer, Wolfgang Amrhein and Susanne Saminger-Platz

(10:30) Lie Algebra-Valued Hopfield Neural Networks

Călin-Adrian Popa

(10:50) Feature creation using genetic programming with application in malware detection

Cristina Vatamanu, Dragos Gavrilut, Razvan Benchea and Henri Luchian

(11:10) High Probability Mutation and Error Thresholds in Genetic Algorithms

Nicolae-Eugen Croitoru

(11:30) A Study on Techniques for Proactively Identifying Malicious URLs

Adrian-Stefan Popescu, Dragos-Teodor Gavrilut and Dumitru-Bogdan Prelipcean

(11:50) Stock Market Trading Strategies - Applying Risk and Decision Analysis Models for Detecting Financial Turbulence

Monica Tirea and Viorel Negru

■ Lunch (12:10)

■ Invited Talk (13:10–14:00)

(chair: Laura Kovacs, room: A11)

Dynamic Programming on Tree Decomposition in Practice. Some Lessons Learned

Stefan Woltran

■ Break (14:00)

■ **Symbolic Computation (1)** (14:20–15:40)

(chair: Stephen Watt, room: A11)

(14:20) Symbolic Derivation of Mean-Field PDEs from Lattice-Based Models

Christoph Koutschan, Helene Ranetbauer, Georg Regensburger and Marie-Therese Wolfram

(14:40) Computation of GCD of Sparse Multivariate Polynomials by Extended Hensel Construction

Masaru Sanuki, Daiju Inaba and Tateaki Sasaki

(15:00) Lagrange Inversion and Series for Lambert W

David Jeffrey, German Kalugin and Nick Murdoch

(15:20) Towards an Automatic Tool for Multi-scale Model Derivation Illustrated with a Micro-mirror Array

Walid Belkhir, Nicolas Ratier, Duy-Duc Nguyen, Bin Yang, Michel Lenczner, Frédéric Zamkostian and Horatiu Cirstea

■ Break (15:40)

■ **Symbolic Computation (2)** (16:00–17:00)

(chair: James Davenport, room: A11)

(16:00) Computation of Stirling Numbers and Generalizations

Silvana Ilie, David Jeffrey, Robert Corless and Xinyi Zhang

(16:20) An Algebraic Petri Nets Emulator

Lorenzo Capra

(16:40) Solving SAT by an Iterative Version of the Inclusion-Exclusion Principle

Gabor Kuper and Csaba Biro

■ Break (17:00)

■ **Artificial Intelligence (3)** (17:20–18:40)

(chair: Daniel Pop, room: A11)

(17:20) Automatic Language Identification for Romance Languages using Stop Words and Diacritics

Ciprian-Octavian Truică, Julien Velcin and Alexandru Boicea

(17:40) Improving Malware Detection Response Time with Behavior-based Statistical Analysis Techniques

Dumitru-Bogdan Prelipean, Adrian-Stefan Popescu and Dragos-Teodor Gavrilit

(18:00) Business Reviews Classification using Sentiment Analysis

Andreea Salinca

(18:20) Comparative Analysis of Existing Architectures for General Game Agents

Ionel-Alexandru Hosu and Andreea Urzică

Tracks

Thursday, 24th September

- **Invited Talk** (09:00–09:50)
(chair: Tetsuo Ida, room: A11)
Generalized Inclusion-Exclusion: Reducing complexity by borrowing
Stephen Watt
- **Break** (09:50)
- **Invited Talk** (10:10–11:00)
(chair: Stephen Watt, room: A11)
EasyChair
Andrei Voronkov
- **Break** (11:00)
- **Advances in the Theory of Computing** (11:20–12:20)
(chair: Gabriel Instrate, room: A11)
(11:20) General Sum-Connectivity Index with $\alpha \geq 1$ for Trees and Unicyclic Graphs
with k Pendants
Rozica-Maria Tache and Ioan Tomescu
(11:40) Static Analysis in Finitely Supported Mathematics
Andrei Alexandru and Gabriel Ciobanu
(12:00) On the Existence of 1-Bounded Bi-ideals with the WELLDIC Property
Raivis Bēts and Ianis Buls
- **Lunch** (12:20)
- **Distributed Computing** (13:20–14:20)
(chair: Marc Frincu, room: A11)
(13:20) Continuation Semantics for Dynamic Hierarchical Systems
Gabriel Ciobanu and Eneia-Nicolae Todoran
(13:40) Scalable and Fault Tolerant Monitoring of Security Parameters in the Cloud
Bogdan-Constantin Irimie and Dana Petcu
(14:00) Adaptations of the k-means Algorithm to Community Detection in Parallel
Environments
András Bóta, Miklós Krész and Bogdán Zavalnij
- **Closing** (15:00)
(chair: Viorel Negru, room: A11)

Workshops and Tutorials

Monday, 21st September

■ MICAS Workshop (1) (10:30–12:10)

(chair: Dana Petcu, room: 045c)

(10:30) Expressive Data Storage Policies for Multi-cloud Storage Configurations

Ansar Rafique, Dimitri van Landuyt and Wouter Joosen

(10:50) SLA-based Secure Cloud Application Development: the SPECS Framework

Valentina Casola, Alessandra de Benedictis, Massimiliano Rak and Umberto Villano

(11:10) A Model-Driven DevOps framework for QoS-aware Cloud applications

Michele Guerriero, Michele Ciavotta, Giovanni-Paolo Gibilisco and Danilo Ardagna

(11:30) Supporting Heterogeneous Pools in a Single Ceph Storage Cluster

Stefan Meyer and John Morrison

(11:50) An Overview of Monitoring Tools for Big Data and Cloud Applications

Iuhasz Gabriel and Ioan Dragan

■ MICAS Workshop (2) (14:40–16:20)

(chair: Massimiliano Rak, room: 045c)

(14:40) AppHub: Showcase your Open Source Project!

Peter Deussen

(15:05) MIKELANGELO – Flexible HPC, Fast Cloud

Daniel Vladusic

(15:30) Developing and Operating Time Critical Applications in Clouds: State of the Art and the SWITCH Approach

Zhiming Zhao

(15:55) The ENTICE Project: dEcentralized repositories for traNsparent and efficienT vIrtual maChine opERations

Radu Prodan

■ MICAS Workshop (3) (16:40–18:00)

(chair: Dana Petcu, room: 045c)

(16:40) SPECS presentations

Massimiliano Rak

Workshops and Tutorials

Tuesday, 22nd September

■ **IAFP Workshop (1)** (10:50–12:10)

(chair: Stefan Maruster, room: 045c)

(10:50) Fixed Point Theorems for Almost Convex Contractive Mappings

Vasile Berinde and Madalina Pacurar

(11:10) Coupled Fixed Point Theorems for Almost Contractive Mappings

Cristina Filis and Vasile Berinde

(11:30) Some Hyers-Ulam Stability Results Related To Fixed Point Theorems

Mihai Monea and Dan-Stefan Marinescu

(11:50) Fixed Point Theorems for Local Almost Contractions

Monica Zakany

■ **MICAS Workshop (4)** (10:50–12:10)

(chair: Florin Fortis, room: A01)

(10:50) Mobile Acceleration Service Infrastructure

Lara Muniz-Lopez

(11:10) DICE Project

Daniel Pop

(11:30) MODAClouds Project

Dana Petcu

(11:50) CloudLightning

Marian Neagul

■ **IAFP Workshop (2)** (14:20–16:00)

(chair: Vasile Berinde, room: 045c)

(14:20) Error Estimations and Convergence Properties of Picard and Mann Iteration
for Strongly Demicontractive Mappings

Stefan Maruster

(14:40) A Comparative Study on Some Recent Iterative Schemes

Faik Gursoy

(15:00) Fixed Point Theorems for non-self Multi-valued Almost Contractions

Corina Cuceu

(15:20) Fixed Point Theorems in Ordered Metric Spaces

Melânia-Iulia Dobrican

(15:40) Common Fixed Points and Coupled Coincidence Points in Fuzzy Metric
Spaces

Dorel Mihet and Claudia Zaharia

■ **IAFP Workshop (3)** (16:10–17:30)

(chair: Dorel Mihet, room: 045c)

(16:10) Iterative Algorithms for Nonself Mappings

Vitorio Colao

(16:30) On the Role of the Coefficients on the Convergence of General Type Iterative Algorithms

Luigi Muglia

(16:50) Improved Genetic Algorithm based on Theorem and Fixed Point and $hJ1$ Triangulation in Euclidean Space

Pop Iulian

(17:10) A Presic-Maia Fixed Point Theorem

Margareta-Eliza Balazs

Workshops and Tutorials

Wednesday, 23rd September

■ IAFP Workshop (4) (10:10–12:10)

(chair: Claudia Zaharia, room: 045c)

(10:10) On the Convergence Results for the Finitely Family of the Multivalued Mappings in CAT(k)-Spaces

Emirhan Hacioglu and Vatan Karakaya

(10:30) Some Common Fixed Point Results for Quasi-contractive Type Operators

Yunus Atalan and Vatan Karakaya

(10:50) A Jungck Type Iteration Process in Convex Metric Spaces

Kadri Dogan and Vatan Karakaya

(11:10) A Common Fixed Point Theorem with Generalized Nonlinear Contractive Condition in Menger PM spaces

Sinisa Jesic, Natasa Cirovic and Rale Nikolic

(11:30) Parallel Solving Systems of Equations – a survey

Liviu-Octavian Mafteiu-Scai, Ioan Bistran and Irina-Maria Terfaloaga

(11:50) Convergence and Fixed Points of Evolutionary Algorithms in Solving Systems of Equations

Liviu-Octavian Mafteiu-Scai, Irina-Maria Terfaloaga and Ioan Bistran

■ NCA Workshop (14:20–15:40)

(chair: Flavia Micota, room: 045c)

(14:20) Investigation on Parameter Effect for Semi-Automatic Contour Detection in Histopathological Image Processing

Catalin Stoean, Ruxandra Stoean, Adrian Sandita, Cristian Mesina, Daniela Ciobanu and Corina-Lavinia Gruia

(14:40) Generating Healthy Menus for Older Adults using a Hybrid Honey Bees Mating Optimization Approach

Cristina-Bianca Pop, Viorica Rozina Chifu, Ioan Salomie, Cristian Prigoana, Tiberiu Boros and Dorin Moldovan

(15:00) NSC-PSO, a Novel PSO Variant without Speeds and Coefficients

George Anescu and Ilie Prisecaru

(15:20) Unsupervised Aspect Level Sentiment Analysis Using Self-organizing Maps

Emil-Stefan Chifu, Tiberiu-Stefan Letia and Viorica-Rozina Chifu

■ **HPC-E5 Workshop** (16:00–17:00)

(chair: Ralf-Peter Mundani, room: A01)

(16:00) Measuring and Comparing the Scaling Behaviour of a High-Performance
CFD Code on Different Supercomputing Infrastructures

Jérôme Frisch and Ralf-Peter Mundani

(16:20) Extensions over OpenCL for latency reduction and critical applications

Grigore Lupescu, Emil Slusanschi and Nicolae Tapus

(16:40) SESAME-NET

Florin Fortis

(17:00) NESUS

Dana Petcu

■ **ACSys Workshop (1)** (16:00–17:00)

(chair: Viorel Negru, room: 045c)

(16:00) A Framework for Integrating Heterogeneous Agent Communication Platforms

Andrei Olaru and Adina-Magda Florea

(16:20) Complex Network Analysis of a Tourism Content Sharing Network

Alex Becheru, Costin Badica and Mihaita Antonie

(16:40) Incremental Reasoning on Strongly Distributed Multi-Agent Systems

Elena Ravve, Zeev Volkovich and Gerhard Weber

■ **GeoInfo Workshop** (17:20–18:40)

(chair: Cosmin Bonchis, room: 045c)

(17:20) Evaluation of Geomorphons as a Basis for Quantifying 2D Contextual
Information

Adriana Sarasan and Lucian Dragut

(17:40) A Comparison of Pixel-Based and Geographic Object-Based Image Analysis
for the Classification of Soil Types

Andrei Dornik

(18:00) Assessing the Potential of Segmentation Methods Applied on Digital Terrain
Models as Support for Soil Mapping

Marinela Chetan

(18:20) The Impact of Using a 4D Data Assimilation Scheme in WRF-ARW Model

Oană Liviu and Spataru Adrian

Workshops and Tutorials

Thursday, 24th September

- **Tutorial** (10:10–11:00)
(chair: Dana Petcu, room: 045c)
(10:10) HPC tutorial
Ralf Peter Mundani

- **Tutorial** (11:20–12:20)
(chair: Dana Petcu, room: 045c)
(11:20) HPC tutorial
Marian Neagul, Silviu Panica

- **ACSys Workshop (2)** (13:20–14:40)
(chair: Costin Badica, room: 045c)
(13:20) Text Mining News System - Quantifying Certain Phenomena Effect on the
Stock Market Behavior
Monica Tirea and Viorel Negru
(13:40) Modeling Design Flaw Evolution Using Complex Systems
George Ganea and Radu Marinescu
(14:00) A Proposed Serious Game Architecture to Self-Management HealthCare for
Older Adults
Ioana-Andra Codreanu, Adina-Magda Florea and Irina Mocanu
(14:20) A Multi-agent Architecture for Ontology-based Diagnosis of Mental Disorders
Todor Ivascu, Bogdan Manate and Viorel Negru

Live status on the web and mobile

The following QRCode contains the URL `http://m.synasc.ro/` for our web application with live status about the current and upcoming presentations and other events.



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Wireless access

Wireless access is available inside the premises of the university, by choosing the network named SYNASC-WiFi. The wireless network is encrypted using WPA/WPA2. The access passphrase is nifojuvaleda (that is nifo juva leda without spaces).



Alternatively **eduroam** is available — provided that it is already properly configured on your device — it should work by default without any further configuration. For additional details please consult the following links: <http://eduroam.uvt.ro/> or <https://www.eduroam.org/>.

Security information

Unsecured SMTP (port 25) is disabled. Instead SMTP over SSL (port 465) can be used. POP3, IMAP for email retrieval can be used. And of course HTTP/HTTPS, FTP and SSH are available.

For more informations and questions please contact the support staff.

City of Timișoara

Highlights

The first record of the city of Timișoara, built on the site of an ancient Roman fortress called Castrum Regium Themes, dates back to 1212. Over the years, Timișoara, the largest city in western Romania, has been influenced by many cultures. The Romans used it as an important crossroads fortress until the Tatars destroyed it in the 13th century. Conquered by Turkish armies in 1552, Timișoara remained under their protection until 1718 when the region of Banat came under Austrian rule for two centuries. Timișoara later became a vital medieval commercial and manufacturing town. Turks, Austrians, Germans and Serbs all left their mark and their influence can be seen in neighborhoods throughout the city even today.

The charm of this city, settled on the northern bank of the Bega River, lies in its distinct architectural character and vibrant cultural life. Frequently referred to as "Little Vienna", Timișoara is home to year-round musical and theatrical performances, art galleries, museums and a buzzing nightlife. A progressive, cosmopolitan place, Timișoara was the first city in Europe and second in the world after New York, to use electricity to illuminate its public streets.

Thanks to a Mediterranean climate, life is best observed outdoors, in the many public squares and lush green retreats. Timișoara is easy to explore on foot. If you get tired, a tram will be along in a moment; the system is fast, frequent and efficient.

Timișoara abounds with churches of several denominations, a Jewish quarter, an elegant baroque square and a pedestrian-only downtown area. Some of the monuments in the heart of the city afford panoramic views, while the many parks in this "city of flowers" provide an idyllic spot to take a break from sightseeing.

Interesting facts: Timișoara was the first European city to introduce horse-drawn trams (in 1869) and electrical street lighting (in 1889); Timișoara was built on a swamp; the Metropolitan Cathedral has 5000 oaks supports underneath it; Johnny Weissmuller, Hollywood's original Tarzan, was born here.

(Information from <http://www.romaniatourism.com/timisoara.html>)

Public transportation

Several bus ("autobuz"), tram ("tramvai") and trolleybus ("troilebuz") routes connect Timișoara's main areas and tourist attractions. The public transportation system runs between 4:45am and 11:15pm. Paper tickets must be purchased before boarding at kiosks near the station, and validated once boarded at the ticket-stamping machine in front of the vehicle. Tickets are interchangeable for all three forms of transport with the exception of express buses, which can be recognized by an **E** prefixing their number.

Taxi companies: City Taxi (+40 256) 949; Grup Taxi (+40 256) 946; Radio Taxi (+40 256) 940; Tudo Taxi (+40 256) 945.

Useful phone numbers

Organizers: Viorel Negru (+40) 755 240 164; Daniela Zaharie (+40) 729 639 576; Isabela Drămnesc (+40) 767 505 308.

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