

The 16th International Symposium on Symbolic and Numerical Algorithms for Scientific Computing

22nd – 25th September 2014
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
(Linz, Austria)*

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Johannes Kepler University (Austria)

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Artificial Intelligence

Andrei Petrovski

Robert Gordon University (UK)

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Distributed Computing

Marc Frîncu

University of Southern California (US)

Karoly Bosa

Johannes Kepler University (Austria)

Advances in the Theory of Computing

Mircea Marin

West University of Timișoara (Romania)

Gabriel Istrate

Institute e-Austria Timișoara (Romania)

Workshops Chairs

Agents for Complex Systems

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Politehnica University of Bucharest (Romania)

Costin Badica

University of Craiova (Romania)

Computational Topology in Image Context

Darian Onchiş

Eftimie Murgu University (Romania)

Pedro Real

University of Sevilla (Spain)

Iterative Approximation of Fixed Points

Vasile Berinde

North University Center at Baia Mare (Romania)

Ioan Rus

Babeş-Bolyai University (Romania)

Ştefan Măruşter

West University of Timișoara (Romania)

Management of Resources and Services in Cloud and Sky Computing

Dana Petcu

West University of Timișoara (Romania)

Natural Computing and Applications

Siby Abraham

University of Mumbai (India)

Catalin Stoean

University of Craiova (Romania)

HPC Research Services

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GIS and Hydrological Modeling

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Invited Speakers

Tetsuo Ida

University of Tsukuba (Japan)

William Langdon

University College London (UK)

Gheorghe Păun

Institute of Mathematics of the Romanian Academy (Romania)

Viorica Sofronie-Stokkermans

University Koblenz-Landau (Germany)

Stefan Takacs

TU Chemnitz (Germany)

Stephen Watt

University of Western Ontario (Canada)

Tutorial Speakers

Carsten Schneider

Johannes Kepler University (Austria)

Adrian Jackson

Edinburgh Parallel Computing Centre (UK)

Danilo Ardagna

Technical University of Milano (Italy)

Marcos Almeida

Softteam (France)

Nicolas Ferry

SINTEF (Norway)

Juan Perez

Imperial College London (UK)

Local Chairs

Isabela Drămnesc

West University of Timișoara (Romania)

Silviu Panica

West University of Timișoara (Romania)

Tracks

Monday, 22nd September

- Registration (08:00)
- Opening (09:00)
(chair: Viorel Negru, room: A11)
- **Invited Talk** (09:20–10:10)
(chair: Franz Winkler, room: A11)
A Modern Software Architecture for Technical Collaboration
Stephen Watt
- Break (10:10)
- **Symbolic Computation** (10:30–12:10)
(chair: Stephen Watt, room: A11)
(10:30) Using the Distribution of Cells by Dimension in a Cylindrical Algebraic
Decomposition
David Wilson, Matthew England, Russell Bradford and James Davenport
(10:50) Branch Differences for Lambert W
Junrui Hu, Julia Jankowski and David Jeffrey
(11:10) On Corank Two Edge-Bipartite Graphs and Simply Extended Euclidean
Diagrams
Marcin Gasiorek, Daniel Simson and Katarzyna Zajac
(11:30) Solving Parametric Sparse Linear Systems by Local Blocking, II
Tateaki Sasaki
(11:50) Point Compression and Coordinate Recovery for Edwards Curves over Finite
Field
Benjamin Justus
- Lunch (12:10)
- **Invited Talk** (13:30–14:20)
(chair: Tudor Jebelean, room: A11)
Hierarchical Reasoning in Local Theory Extensions and Applications
Viorica Sofronie-Stokkermans
- Break (14:20)

■ **Logic and Programming (1)** (14:40–16:00)

(chair: Viorica Sofronie-Stokkermans, room: A11)

(14:40) Implementing Reasoning Modules in Implicit Induction Theorem Provers
Sorin Stratulat

(15:00) Automated Synthesis of Target-Dependent Programs for Polynomial
Evaluation in Fixed-Point Arithmetic
Christophe Moulleron, Amine Najahi and Guillaume Revy

(15:20) Guiding Random Test Generation for Intra-Class Dataflow Coverage
Petru Mihancea, Edit Mercedes Mera-Batiz and Marius Minea

(15:40) Proof Generation from Delta-Decisions
Sicun Gao, Soonho Kong and Edmund Clarke

■ **Break** (16:20)

■ **Logic and Programming (2)** (16:40–17:40)

(chair: Sorin Stratulat, room: A11)

(16:40) Reducing Partial Equivalence to Partial Correctness
Stefan Ciobaca

(17:00) A Heuristic-Based Approach for Reducing the Power Consumption of
Real-Time Embedded Systems
Vlad Radulescu, Stefan Andrei and Albert Cheng

(17:20) Catamorphism Generation and Fusion using Coq
Simon Robillard

■ **Welcome Reception** (18:00)

Tracks

Tuesday, 23rd September

■ **Invited Talk** (09:00–09:50)

(chair: Franz Winkler, room: A11)

Can Tools from Symbolic Computing Help Analyzing Iterative Solvers?

Stefan Takacs

■ **Break** (09:50)

■ **Numerical Computing (1)** (10:10–11:50)

(chair: Stefan Takacs, room: A11)

(10:10) Local Lipschitz Bounds for Noise Robustness in Compressive Sensing: Two Algorithms

Marc Nicodème, Charles Dossal, Flavius Turcu and Yannick Berthoumieu

(10:30) Fast Method for Locating Peak Values of the Riemann-zeta Function on the Critical Line

Norbert Tihanyi

(10:50) A Lowest Level Rule Push-Relabel Algorithm for Sub-Modular Flows and Matroid Optimization

Emanuel-Florentin Olariu and Cristian Frasinaru

(11:10) Efficient Converting of Large Sparse Matrices to Quadtree Format

Ivan Simecek, Daniel Langr and Jan Trdlička

(11:30) Optimal Homotopy Asymptotic Method for Viscous Boundary Layer Flow in Unbounded Domain

Remus-Daniel Ene, Vasile Marinca and Romeo Negrea

■ **Lunch** (11:50)

■ **Invited Talk** (12:50–13:40)

(chair: Viorel Negru, room: A11)

Analysis of Paper Fold Methods by Geometric Algebra

Tetsuo Ida

■ **Break** (13:40)

■ **Numerical Computing (2)** (14:00–15:00)

(chair: Ivan Simecek, room: A11)

(14:00) **New Arithmetic Algorithms for Hereditarily Binary Natural Numbers**

Paul Tarau

(14:20) **On the Computation of Hansen Coefficients**

Petre Bazavan, Lucian Barbulescu and Paul Cefola

(14:40) **Solution of Volterra Integral Equations by Homotopy Perturbation Method via Laplace Transform**

Srinivasarao Thota and Shiv Datt Kumar

■ **Break** (15:20)

■ **Advances in the Theory of Computing** (15:40–16:40)

(chair: Gabriel Istrate, room: A11)

(15:40) **The Quest for Optimal Sorting Networks: Efficient Generation of Two-Layer Prefixes**

Michael Codish, Luís Cruz-Filipe and Peter Schneider-Kamp.

(16:00) **CSPs and Connectedness: P/NP Dichotomy for Idempotent, Right Quasigroups**

Robert McGrail, James Belk, Solomon Garber, Japheth Wood and Benjamin Fish

(16:20) **Analyzing WMSOL Definable Properties on Sum-like Weighted Labeled Trees**

Elena Ravve

■ **Trip and Conference Dinner** (18:00)

Tracks

Wednesday, 24th September

■ Invited Talk (09:00–09:50)

(chair: Daniela Zaharie, room: A11)

Genetic Improvement of Programs

William Langdon

■ Break (09:50)

■ Artificial Intelligence (1) (10:10–12:10)

(chair: William Langdon, room: A11)

(10:10) Simulation Extrapolation Gaussian Processes for Input Noise Modeling
Bócsi Botond, Hunor-Sandor Jakab and Lehel Csato

(10:30) Performance Evaluation of Fuzzy Automata using VHDL Simulation
Daniel-Eugen Butoianu and Doru Todinca

(10:50) Using Domain Specific Hierarchical Good Practice for Ranking Service Composition
Anca Marginean, Ioan-Alfred Letia and Sergiu Zaporozjan

(11:10) A Population-based Incremental Learning Method for Constrained Portfolio Optimisation
Yan Jin, Rong Qu and Jason Atkin

(11:30) Dynamic Clustering of Gene Expression Data using a Fuzzy Approach
Adela-Maria Sirbu, Gabriela Czibula and Maria-Iuliana Bocicor

(11:50) Opinion Influence Analysis in Discussion Forum Threads
Dumitru-Clementin Cercel and Stefan Trausan-Matu

■ Lunch (12:10)

■ Invited Talk (13:10–14:00)

(chair: Stefan Maruster, room: A11)

Spiking Neural P Systems

Gheorghe Paun

■ Break (14:00)

■ Industrial Presentation (14:20–14:50)

(chair: Viorel Negru, room: A11)

The Rise of Cognitive Computing – IBM, Watson & Beyond

Florin Mănăilă

■ **Artificial Intelligence (2)** (14:50–16:10)

(chair: Gheorghe Paun, room: A11)

(14:50) Multispace, Dynamic, Fixed-radius, All Nearest Neighbours Problem

Bartosz Papis and Andrzej Pacut

(15:10) Enhanced Gradient Descent Algorithms for Complex-Valued Neural Networks

Călin-Adrian Popa

(15:30) Central Dogma of Molecular Biology – New Paradigm in Natural Computing

Corina Rotar

(15:50) High-Probability Mutation in Basic Genetic Algorithms

Nicolae-Eugen Croitoru

■ **Break** (16:10)

■ **Artificial Intelligence (3)** (16:30–18:30)

(chair: Daniel Pop, room: A11)

(16:30) Pedestrian Recognition by Using a Kernel-Based Multi-Modality Approach

Adela-Maria Sirbu, Alexandrina Rogozan, Laura Diosan and Abdelaziz Bensrhair

(16:50) Open and Interoperable Socio-technical Networks

Andrei Ciortea, Olivier Boissier, Antoine Zimmermann and Adina-Magda Florea

(17:10) Mining GPS Data to Learn Driver's Route Patterns

Emilian Necula

(17:30) A Practical Guide for Detecting JavaScript-based Malware using Hidden Markov Models and Linear Classifiers

Doina Cosovan, Mihai-Razvan Benchea and Dragos Gavrilit

(17:50) A Practical Approach on Cleaning-up Large Data Sets

Marius Barat, Dumitru-Bogdan Prelipcean and Dragos Gavrilit

(18:10) An Ontology Selection and Ranking System Based on the Analytical Hierarchy Process

Adrian Groza, Irina Dragoste, Iulia Sincai, Ioana Jimborean and Vasile Moraru

■ **Steering Committee Meeting** (18:30)

(chair: Viorel Negru, room: 045c)

Tracks

Thursday, 25th September

- **Tutorial** (09:00–10:30)
(chair: James Davenport, room: A11)

Symbolic Summation in Difference Rings – With Applications in
Combinatorics, Numerics, and Physics

Carsten Schneider
- **Break** (10:30)
- **Distributed Computing (1)** (10:50–11:50)
(chair: Eneia Nicolae Todoran, room: A11)

(10:50) Reliable Management of Virtualized Resources Using Fault Trees
Alexandru Butoi, Alexandru Stan and Gheorghe-Cosmin Silaghi

(11:10) CTL Model Checking in the Cloud Using MapReduce
Matteo Camilli, Carlo Bellettini, Lorenzo Capra and Mattia Monga

(11:30) Views and Updates over Distributed Databases
Elena Ravve
- **Lunch** (12:10)
- **Distributed Computing (2)** (13:10–14:10)
(chair: Lorenzo Capra, room: A11)

(13:10) Correct Metric Semantics for a Biologically-Inspired Formalism
Gabriel Ciobanu and Eneia-Nicolae Todoran

(13:30) Implementing Powerlists with Bulk Synchronous Parallel ML
Frederic Loulergue, Virginia Niculescu and Julien Tesson

(13:50) Load Scheduling in a Cloud Based Massive Video-Storage Environment
Karunakar-Reddy Bayyapu and Paul Fischer
- **Closing** (14:30)
(chair: Viorel Negru, room: A11)

Workshops and Tutorials

Monday, 22nd September

■ MICAS Workshop (1) (10:30–12:10)

(chair: Dana Petcu, room: 045c)

(10:30) A Receding Horizon Approach for the Runtime Management of IaaS Cloud Systems

Danilo Ardagna, Michele Ciavotta and Riccardo Lancellotti

(10:50) Evaluating Weighted Round Robin Load Balancing for Cloud Web Services

Weikun Wang and Giuliano Casale

(11:10) Using Models at Runtime to Support Adaptable Monitoring of Multi-Clouds Applications

Lorenzo Cianciaruso, Francesco di Forenza, Elisabetta DiNitto, Nicolas Ferry, Marco Miglierina and Arnor Solberg

(11:30) Optimal Capacity Allocation for Executing Map Reduce Jobs in Cloud Systems

Marzieh Malekimajd, Alessandro-Maria Rizzi, Danilo Ardagna, Michele Ciavotta, Mauro Passacantando and Ali Movaghar

(11:50) A Distributed File System over Heterogeneous SaaS Storage Platforms

Marco Scavuzzo

■ CTIC Workshop (1) (10:30–12:10)

(chair: Darian Onchis, Mihail Gaiianu, room: A01)

(10:30) Approximation and Convergence of the First Intrinsic Volume

Herbert Edelsbrunner

(11:20) Combinatorial skeletons for algebraic-topological analysis of digital objects

Pedro Real

■ **MICAS Workshop (2)** (14:40–16:20)

(chair: Florin Fortis, room: 045c)

(14:40) Application Deployment and Management in the Cloud

Marco Migliarina

(15:00) Optimization Techniques within the Hadoop Eco-system: a Survey

Giulia Rumi, Claudia Colella and Danilo Ardagna

(15:20) Cloud Provider Independent Configuration Management using Automation with Puppet and CloudML – a Case Study

Alexander Gunka, Harald Kühn and Stepan Seycek

(15:40) OpenStack and CloudStack: Open Source Solutions for Building Public and Private Clouds

Amine Barkat, Alysson Diniz-Dos-Santos and Thi-Thao-Nguyen Ho

(16:00) Early Prediction of the Cost of HPC Application Execution in the Cloud

Massimiliano Rak, Mauro Turtur and Umberto Villano

■ **CTIC Workshop (2)** (14:40–16:20)

(chair: Herbert Edelsbrunner, room: A01)

(14:40) Enhancing Dental Radiographic Images in Spline-Type Spaces

Darian Onchis and Smaranda-Laura Gotia

(15:00) Computing homological information based on directed graphs within discrete objects

Aldo Gonzalez-Lorenzo, Alexandra Bac, Jean-Luc Mari and Pedro Real-Jurado

(15:20) Topological Image Analysis and (Normalised) Representations for Plant Phenotyping

Ines Janusch, Walter Kropatsch and Wolfgang Busch

(15:40) Efficient Computation of Simplicial Homology Through Acyclic Matching

Ulderico Fugacci, Federico Iuricich and Leila DeFloriani

(16:00) Computing Fundamental Group via Forman's Discrete Morse Theory

Piotr Brendel, Paweł Dłotko, Graham Ellis, Mateusz Juda and Marian Mrozek

■ **MICAS Workshop (3)** (16:40–18:00)

(chair: Elisabetta di Nitto, room: 045c)

(16:40) Tutorial: Model Driven Design of Cloud Applications with a priori Quality of Service Guarantees (I)

Danilo Ardagna

■ **CTIC Workshop (3)** (16:40–17:40)

(chair: Walter Kropatsch, room: A01)

(16:40) The Classification of Endoscopy Images with Persistent Homology

Olga Dunaeva, Anton Lukyanov, Michael Machin, Daria Malkova and Herbert Edelsbrunner

(17:00) Auto-completion of Contours in Sketches, Maps and Sparse 2D Images
Based on Topological Persistence

Vitaliy Kurlin

(17:20) CAPD::RedHom – Reduction Heuristics for Homology Algorithms

Mateusz Juda and Marian Mrozek

Workshops and Tutorials

Tuesday, 23rd September

- **MICAS Workshop (4)** (10:10–11:50)
(chair: Danilo Ardagna, room: 045c)
 - (10:10) Tutorial: Model Driven Design of Cloud Applications with a priori Quality of Service Guarantees (II)
Nicolas Ferry, Juan Perez and Marcos Almeida
- **CTIC Workshop (4)** (10:10–11:50)
(chair: Pedro Real, room: A01)
 - (10:10) Multi-phase Identification in Microstructure Images using a GPU Accelerated Fuzzy c-Means Segmentation
Darian Onchis, Doina Frunzaverde, Mihail Gaianu and Relu Ciubotariu
 - (10:30) Methods of Computational Topology for Solar Activity Forecasting
Irina Knyazeva, Nikolay Makarenko and Daria Malkova
 - (10:50) A Linear Time Algorithm for Drawing a Graph in 3 Pages within its Isotopy Class in 3-Space
Vitaliy Kurlin
 - (11:10) Characterizing Configurations of Critical Points through LBP
Rocio Gonzalez-Diaz, Walter Kropatsch, Martin Cerman and Javier Lamar
 - (11:30) The Algorithm for Going Through a Labyrinth by an Autonomous Vehicle
Eugen Raduca, Adrian Paun, Mihaela Raduca, Silviu Draghici, Cornelia Anghel-Drugarin and Cristian Rudolf
- **ACSys Workshop** (14:00–15:20)
(chair: Călin Sandru, room: 045c)
 - (14:00) Expressing BBUFs Lookup Using the pi-Calculus
Gabriel Ciobanu and Dan Cojocar
 - (14:20) Intelligent Stock Market Analysis System – A Fundamental and Macro-economical Analysis Approach
Monica Tirea and Viorel Negru
 - (14:40) Semantic Modeling of Information for Freight Transportation Broker
Lucian Luncean and Costin Badica
 - (15:00) Multi-Agent System Controlled Power Flow for Microgrids
Marius Avramescu and Adina-Magda Florea

■ **NCA Workshop** (14:00–15:20)

(chair: Flavia Micotă, room: 032)

(14:00) Investigation of Alternative Evolutionary Prototype Generation in Medical Classification

Catalin Stoean, Ruxandra Stoean and Adrian Sandita

(14:20) How Good is Genetic Programming at Predicting Changes and Defects?

Cristina Marinescu

(14:40) An Imperialistic Strategy Approach to Continuous Global Optimization Problem

George Anescu

(15:00) Adaptive Techniques for Cloud Resource Provisioning

Iulhasz Gabriel, Victor-Ion Munteanu and Teodor-Florin Fortis

■ **CTIC Workshop (5)** (14:00–15:20)

(chair: Darian Onchis, room: A01)

(14:00) Round Table

Brainstorming and ideas sharing

■ **HPCRes Workshop (1)** (15:40–17:40)

(chair: Alexander Agathos, room: 045c)

(15:40) GPU Tutorial

Adrian Jackson

■ **IAFP Workshop** (15:40–17:40)

(chair: Vasile Berinde, Dorel Miheţ, room: 032)

(15:40) Nonlinear Contraction Theorem in Strictly Convex Menger PM-spaces

Sinisa Jesic, Rale Nikolic and Natasa Cirovic

(16:00) Fixed Point and Common Fixed Point Theorems in Fuzzy Metric Spaces using Altering Distance Function

Tatjana Dosenovic and Dusan Rakic

(16:20) Fixed Point Theorems in Compact Fuzzy Metric Spaces

Dorel Mihet and Claudia Zaharia

(16:40) The Bandwidths of Matrix – Theory and Applications

Liviu-Octavian Mafteiu-Scai

(17:00) Kannan Contractions and Strongly Demicontractive Mappings

Stefan Maruster

(17:20) The Contraction Principle for Nonself Mappings on Banach Spaces Endowed with a Graph

Vasile Berinde

(17:40) Remarks on coupled fixed points for cyclic operators

Mihaela Petric

Workshops and Tutorials

Wednesday, 24th September

■ **HPCRes Workshop (2)** (10:10–11:30)

(chair: Emil Slusanschi, room: 045c)

(10:10) A Distributed-memory Parallelization of a Shared-memory Parallel Ensemble Kalman Filter

Ali Rostami, Martin Buecker, Christian Vogt, Ralf Seidler, David Neuhäuser and Volker Rath

(10:30) Interactive Data Exploration for High-Performance Fluid Flow Computations Through Porous Media

Nevena Perovic, Jérôme Frisch, Ralf-Peter Mundani and Ernst Rank

(10:50) Fault-Tolerant Global Load Balancing in X10

Marco Bungart, Claudia Fohry and Jonas Posner

(11:10) Register Caching for Stencil Computations on GPUs

Thomas Falch and Anne Elster

■ **HPCRes Workshop (3)** (14:50–15:50)

(chair: Ralf-Peter Mundani, room: 045c)

(14:50) Performance Improvements for the 'Linear Nonadiabatic Nonradial Waves' Pulsational Model

Mihai-Ovidiu Tirsă, Emil-Ioan Slusanschi and Marian-Doru Suran

(15:10) NSGA-II: Implementation and Performance Metrics Extraction for CPU and GPU

Florina-Roxana Padurariu and Cristina Marinescu

(15:30) A Parallel, Distributed, High-Performance Architecture for Simulating Particle-based Models

Adrian Sabou and Dorian Gorgan

■ **HydroGIS Workshop (1)** (16:30–18:30)

(chair: Cosmin Bonchis, room: 045c)

(16:30) Predicting Standardized Precipitation Index in Timis County using GIS and Artificial Neural Networks

Marius-Florin Paslaru

(16:50) Optimization of the Ghertenis Accumulation using Hydrodynamic Modeling

Mariana Popescu

(17:10) Implementing a High Resolution Numerical Weather Prediction System for Romania and Surrounding Areas

Liviu Oana and Adrian Spataru

(17:30) Indexing of Geographic Data in Distributed Environments

Adrian Spataru and Dana Petcu

(17:50) Regional Scale Terrestrial Ecological Unit Inventory using OBIA

Marinela Chetan

(18:10) Automated Evaluation of Similarities and Differences Between Two Object-based Classified Models

Ovidiu Csillik

Workshops and Tutorials

Thursday, 25th September

■ HydroGIS Workshop (2) (10:50–12:30)

(chair: Marcel Torok, room: 045c)

(10:50) Predictions Based on an Operational WRF Implementation

Liviu Oana

(11:10) An Object-oriented Methodology Based on Expert-knowledge for Soil Type Prediction

Andrei Dornik, Lucian Dragut and Petru Urdea

(11:30) Identification of the Main Agricultural Land Covers Groups using Object-Oriented Image Analysis

Teodora-Arina Tanasie

(11:50) A Study of Neural Networks for Flood Predictions in the Barzava River Basin

Gabriel Iuhasz, Daniela Zaharie and Cosmin Bonchis

(12:10) Feature Selection for Flood Forecasting Data Sets

Iuhasz Gabriel and Cosmin Bonchis

■ HydroGIS Workshop (3) (13:10–14:10)

(chair: Nicolae Teodorescu, room: 045c)

(13:10) Round Table

Software services in the management of emergency situations

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.



Internet access

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.

Emergencies (police, hospital, fire station): 112.

