CSMR 2012

16th European Conference on Software Maintenance and Reengineering

Conference Program
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Welcome from the Conference Chairs

The Conference on Software Maintenance and Reengineering (CSMR) is the premier European conference on the theory and practice of maintenance, reengineering and evolution of software systems. CSMR promotes discussion and interaction among researchers and practitioners about the development of maintainable systems, and the evolution, migration and reengineering of existing ones.

The 16th edition of this conference, CSMR 2012 takes place in Szeged, Hungary, a unique place in Central Europe, known as the City of Sunshine. The conference is hosted by the University of Szeged, one of the top universities in Hungary and a highly ranked European higher education institution. Szeged is the most important city on the South Great Plain and the economic, scientific and cultural centre of the region. Szeged is located less than 20 km from the Romanian and Serbian borders, at the confluence of two rivers: the Maros and the Tisa. The proximity of the three borders provides Szeged a significant strategic role both for Europe and for Hungary.

As in previous years, the conference hosts a wide range of scientific events: two keynote talks by distinguished researchers, technical research presentations by scientists from all over the world, a co-located workshop, two tutorials, industrial presentations from practitioners in the field, a doctoral symposium for PhD students, tool demonstrations, and presentations of ongoing European projects in the field. In addition to this, we organise for the first time the Early Research Achievements (ERA) track, that gives researchers a forum for discussing novel research ideas in early stages of development. This track aims to provide a stimulating atmosphere where researchers can present and get early feedback on promising work that has not yet been fully evaluated. The Tool Demonstration track returned this year, in which researchers or companies can present the tools they have developed or are currently developing to support developers or researchers in the activities of software maintenance and reengineering.

For the technical research track, we received 124 abstract submissions, that made it into 108 full-paper submissions, thereby beating last year’s record. Each of these submissions was reviewed by 3 members of an international program committee consisting of 66 scientists, chaired by Tom Mens and Anthony Cleve. Out of all submissions, only 30 could be accepted as full paper, corresponding to an acceptance ratio of 27.8% (or 24.2% if one counts on the basis of the abstract submissions). The best long technical paper will be awarded during the conference dinner. In addition, a selection of the best long papers will be invited for submitting an extended version in a special issue of Wiley’s Journal of Software Maintenance and Evolution: Research and Practice.

The satellite events of CSMR 2012 were also more successful than in previous years. For the ERA track we received 43 submissions, for the tool demonstration track 17 submissions, for the industrial track 10 submissions, and for the European track and doctoral symposium both 3 submissions. We traditionally host the International Workshop on Software Quality and Maintainability (SQM), which is already in its sixth edition. CSMR 2012 also offers two tutorials. Massimiliano Di Penta provides his insights in Empirical Studies in Reverse Engineering and Maintenance, and Radu Marinescu shares his knowledge on Pragmatic Design Quality Assessment.

We extend our gratitude to the numerous organisations that helped in making CSMR 2012 a success. We thank our principal sponsors, the Reengineering Forum (REF) and the University of Szeged. We also thank our technical co-sponsors IEEE Computer Society and the Technical Council on Software Engineering (TCSE). We especially thank our industrial sponsor FrontEndART Software Ltd. We are indebted to the many individuals that contributed to the CSMR 2012 conference program: the participants of the conference, the keynote presenters, the authors that submitted a contribution to one or more of the conference events, the program committees of the different events for their excellent reviewing work and their help in promoting the conference, and the CSMR steering committee. A special thanks goes to the different chairs of the conference: Tamás Gergely (workshop chair), Jens Borchers and Hassan Charaf (industrial chairs), Holger Kienle and Mircea Lungu (tool demonstration chairs), Radu Marinescu (European projects chair), Elliot J. Chikofsky (advisor), Jurgen Vinju (doctoral symposium chair), Gerardo Canfora and Florian Deissenböck (ERA chairs), Jens Knodel (tutorial chair), Csaba Nagy and Péter Hagedűs (website and publication chairs), and László Vidács (local chair).

To conclude, we hope you find the conference program enriching and stimulating, and we hope you enjoy reading these conference proceedings!

Rudolf Ferenc
General Chair

Tom Mens
Program Chair

Anthony Cleve
Program Chair
University Congress Centre – Overview map
H-6722 Szeged, Ady tér 10., Hungary

GROUND FLOOR

PASSAGE TO THE FACULTY OF ARTS BUILDING

FIRST FLOOR

UNDERGROUND

PARKING AREA 1

PARKING AREA 2

Congress Hall
Lecture Hall

Seminar Room 2
Seminar Room 3

Atrium

Main entrance

Registration
Exhibition Area
# Program at a Glance

<table>
<thead>
<tr>
<th>Day</th>
<th>Session</th>
<th>Time</th>
<th>Location</th>
<th>Activities</th>
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<tbody>
<tr>
<td>March 27, 2012</td>
<td>Seminar Room 2</td>
<td>9:00 - 9:30</td>
<td>Lecture Hall</td>
<td>Technical Sessions 1a, 1b, 1c</td>
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<td>9:30 - 10:00</td>
<td>Lecture Hall</td>
<td>Coffee Break (Exhibition Area)</td>
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<td>10:00 - 10:30</td>
<td>Lecture Hall</td>
<td>Technical Sessions 2a, 2b, 2c</td>
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<td>10:30 - 11:00</td>
<td>Lecture Hall</td>
<td>Coffee Break (Exhibition Area)</td>
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<td>11:00 - 11:30</td>
<td>Lecture Hall</td>
<td>Technical Sessions 3a, 3b, 3c</td>
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<td>11:30 - 12:00</td>
<td>Lecture Hall</td>
<td>Coffee Break (Exhibition Area)</td>
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<td>12:00 - 12:30</td>
<td>Lecture Hall</td>
<td>Technical Sessions 4a, 4b, 4c</td>
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<td>12:30 - 13:00</td>
<td>Lecture Hall</td>
<td>Lunch (Exhibition Area) + Coffee Break</td>
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<td>13:00 - 13:30</td>
<td>Lecture Hall</td>
<td>Technical Sessions 5a, 5b, 5c</td>
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<td>March 28, 2012</td>
<td>Seminar Room 3</td>
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<td>Lecture Hall</td>
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<td>15:00 - 15:30</td>
<td>Lecture Hall</td>
<td>Technical Sessions 7a, 7b, 7c</td>
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<td>17:00 - 17:30</td>
<td>Lecture Hall</td>
<td>Technical Sessions 9a, 9b, 9c</td>
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<td>Coffee Break (Exhibition Area)</td>
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<td>18:00 - 18:30</td>
<td>Lecture Hall</td>
<td>Technical Sessions 10a, 10b, 10c</td>
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<td>Technical Sessions 11a, 11b, 11c</td>
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<td>20:00 - 23:00</td>
<td>Lecture Hall</td>
<td>Conference Dinner</td>
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CSMR 2012 - 16th European Conference on Software Maintenance and Reengineering
Keynote talk by Harald C. Gall  

**LGTM - Software Sensing and Bug Smelling**

Harald C. Gall  
University of Zurich  
Switzerland

Looks Good To Me (LGTM) is a means to stamp an ‘ok’ on code reviews and then have the code moved to production. One key part of this process is a detailed quality analysis by checking code, looking for potential known bugs, and evaluating the design. As code bases are changed almost every day by many developers, we need to devise means for effective, regular, and focused analysis. In the recent past we have looked into approaches of software sensing and bug smelling. Sensing software is employed by audio-visual and multi-touch interfaces to a code base and its change history. Bug smelling leverages bug prediction on the levels of classes, methods, or change types. Combining both can lead to a more effective quality analysis for reviewing tasks such that the signing off by LGTM is facilitated. In this talk we will present approaches and tools such as SmellTagger or CocoViz for software sensing and bug smelling. We will also discuss current limitations and potential new horizons for software evolution research.

Harald C. Gall is a professor of software engineering in the Department of Informatics at the University of Zurich, Switzerland. He received the MSc and PhD (Dr. techn.) degrees in informatics from the Technical University of Vienna, Austria.

His research interests include software engineering and software analysis, focusing on software evolution, software quality, empirical studies, and collaborative software engineering. He is probably best known for his work on software evolution analysis and mining software archives. Since 1997 he has worked on devising ways in which mining these repositories can help to better understand software development, to devise predictions about quality attributes, and to exploit this knowledge in software analysis tools such as Evolizer.

In 2005, he was the program chair of ESEC-FSE, the joint meeting of the European Software Engineering Conference (ESEC), and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE). In 2006 and 2007 he co-chaired MSR, the International Workshop and now Working Conference on Mining Software Repositories, the major forum for software evolution analysis. He was program co-chair of ICSE 2011, the International Conference on Software Engineering, held in Hawaii. Since 2010 he is an Associate Editor of IEEE’s Transactions on Software Engineering.
Keynote talk by Dániel Varró

A bridge over troubled water - Synergies between model transformation and software maintenance techniques

Dániel Varró is an associate professor at the Budapest University of Technology and Economics where he received his PhD in 2004 and his habilitation in 2011. His main research interest is model-driven software and systems engineering with special focus on model transformations. He published over 100 papers, and received a Springer Best Paper Award and ACM Distinguished Paper Award at the MODELS 2009 conference. He is a member of the editorial board of the Software and System Modeling journal (Springer), and regularly serves in the programme committee of various international conferences in the field. He was the local organizing chair of ETAPS 2008 and EDCC-5 held in Budapest, and he is a PC co-chair of AGTIVE 2011.

Model transformations aim to process one (or more) source model in order to derive one (or more) target model, thus acting in the role of compilers in a model driven engineering context. In actual application scenarios, model transformations play a key role in (1) providing systematic bridges between various domain-specific modeling languages (2) driving the automated derivation of the design artifacts of software-intensive systems (source code, configuration files, documentation, etc.), or simply (3) detecting inconsistencies and design rule violations in an early phase of development.

This talk aims to build a bridge between model transformation techniques and traditional software maintenance. More specifically, I will first overview recent advances in model transformations, which can be easily and efficiently applied for various software maintenance or reengineering problems. Conversely, I will also present recent results where software maintenance approaches significantly improved the state-of-the-art of model transformations. Finally, I will also identify some challenges and research gaps to facilitate future collaboration between the two communities.
Conference information

Registration desk
Registration will be open from 8:00 to 16:00 from Tuesday to Friday.

Program changes
The online program at the CSMR website and the posters in the hallways will always be updated to reflect the latest status of the program.

Lunches
All lunches and coffee breaks are held in the Exhibition Area. Please do not forget to wear your conference badge so that the personnel can verify you are eligible for these lunches.

Internet access
Free WiFi is available at the Congress Centre for conference attendees. All attendees receive personal login information at the registration desk. Eduroam is available as well.

Luggage Depot
Conference attendees can store their luggage in a guarded area. Please contact the registration desk.

Phone numbers
Radio Taxi: +3662-480480 Emergency call: 112
Daytime conference help: Katalin Fogas +3620-4141192, László Vidács + 3630-5860688

Morning conference bus
Conference shuttle busses from the farther hotels (Forrás and Novotel) to the Congress Centre are offered for all participants for free every morning. Please note that there are no shuttle busses in the afternoons.

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<tr>
<th>Morning conference bus</th>
<th>from Hotel Forrás</th>
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<td>Tuesday, March 27</td>
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<td>Wednesday, March 28</td>
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<td>Friday, March 30</td>
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<td>SQM 2012 Workshop</td>
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<td>9:00</td>
<td><strong>Tutorial 1</strong>&lt;br&gt;Empirical Studies in Reverse Engineering and Maintenance: Employing Developers to Evaluate your Approach and Tool&lt;br&gt;Massimiliano Di Penta&lt;br&gt;University of Sannio, Italy</td>
<td><strong>Welcome and introduction</strong>&lt;br&gt;Yiannis Kanellopoulos, Yijun Yu, Miguel Alexandre Ferreira&lt;br&gt;&lt;br&gt;<strong>Invited talk</strong>&lt;br&gt;Effective software maintenance in a global environment&lt;br&gt;David Broderick and Gavin Martin</td>
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<td>11:00</td>
<td><strong>Tutorial 1 Continued</strong></td>
<td><strong>Source Code Analysis and Evolution</strong>&lt;br&gt;Investigating the Evolution of Feature Scattering&lt;br&gt;Theodore Chaikalis and Alexander Chatzigeorgiou&lt;br&gt;&lt;br&gt;Preprocessing Change-Sets to Improve Logical Dependencies Identification&lt;br&gt;Gustavo Ansaldi Oliva, Francisco Santana, Marco Gerosa and Cleidson De Souza&lt;br&gt;&lt;br&gt;JIns: A Source Query Language for Instrumentation&lt;br&gt;Yongjing Tao, Tian Zhang, Yan Zhang and Jianhua Zhao</td>
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<td>Lunch</td>
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<td>14:00</td>
<td><strong>Tutorial 2</strong>&lt;br&gt;Pragmatic Design Quality Assessment&lt;br&gt;Radu Marinescu&lt;br&gt;Universitatea &quot;Politehnica&quot; di Timisoara, Romania</td>
<td><strong>Analysis of Software Development Practices</strong>&lt;br&gt;A feasibility study of quality assessment during software maintenance&lt;br&gt;Naji Habra, Tom Mens, Benoît Vanderose and Flora Kamseu&lt;br&gt;&lt;br&gt;Innovative Modeling of Relevant Test Concepts&lt;br&gt;Andrew Costa, Carlos José Lucena, Viviane Silva, Soeli Fiorini and Gustavo Carvalho&lt;br&gt;&lt;br&gt;Eclipse API Usage: The Good and The Bad&lt;br&gt;John Businge, Alexander Serebrenik and Mark Van Den Brand&lt;br&gt;&lt;br&gt;An Analysis of Dependence on Third-party Libraries in Open Source and Proprietary Systems&lt;br&gt;Steven Raemaekers, Arie Van Deursen and Joost Visser</td>
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<td>16:00</td>
<td><strong>Tutorial 2 Continued</strong></td>
<td><strong>Rotating panel discussion session</strong>&lt;br&gt;Wrap-up&lt;br&gt;Yiannis Kanellopoulos, Yijun Yu, Miguel Alexandre Ferreira</td>
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<td>9:00</td>
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<td>9:30</td>
<td><strong>Keynote talk</strong></td>
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<td>11:00</td>
<td><strong>TP1 – Aiding developers</strong></td>
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<td>12:30</td>
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<td>14:00</td>
<td><strong>Tool Demo 1</strong></td>
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<td>Coffee break</td>
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<td>16:00</td>
<td><strong>TP2 – Refactoring</strong></td>
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<td>16:00</td>
<td><strong>TP3 – Repository mining</strong></td>
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<td>16:00</td>
<td><strong>Industrial Track</strong></td>
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Impact Analysis Using Static Execute After in WebKit  
Judit Jász, Lajos Schrettner, Árpád Beszédes, Csaba Osztrogonác and Tibor Gyimóthy

Identify Impacts of Evolving Third Party Components on Long-Living Software Systems  
Benjamin Klatt, Zoya Durdik, Heiko Kozi olek, Klaus Krogmann, Johannes Stammel and Roland Weiss

Reengineering Experiences  
Analyzing Assembler to Eliminate Dead Functions: An Industrial Experience  
Ian J. Davis, Michael W. Godfrey, Richard C. Holt, Serge Mankovskii and Nick Minchenko

Rebuilding a Unified Database Service via Context Analysis Method  
Woomok Kim, Tae-hyung Kim, Sangtae Kim and Doo-Hwan Bae

Strategic Aspects  
IT Industrialisation as Enabler of Global Delivery  
Daniel Simon and Frank Simon

Industrial Panel Lecture Hall  
Session chairs Jens Borchers and Hassan Charaf

17:30 
- 
18:30 
Sightseeing tour 
18:45 
20:00 
Reception

Sightseeing tour
The sightseeing tour in the downtown of Szeged is free for all participants, no booking is required. The tour departs from the conference venue after the afternoon program and arrives at the CSMR Reception. The tour takes approximately one hour.

Start: University Congress Centre, March 28 Tuesday, 18:45  
End: CSMR Reception (Rector’s Office), March 28 Tuesday, 20:00

Reception
The CSMR 2012 Welcome reception will be held in the newly renovated Rector’s Office of the University of Szeged (the address is 6720 Szeged, Dugonics tér 13.). The event will start at 20:00 and be opened by Prof. Tibor Gyimóthy, Head of the Software Engineering Department, University of Szeged.
Program – Thursday, 29 March 2012

9:00  **Keynote talk** Congress Hall
* A bridge over troubled water - Synergies between model transformation and software maintenance techniques
  Dániel Varró

10:30  Coffee break

11:00  **TP4 – Software anomalies** Congress Hall
Session chair Florian Deißenböck
* Mining Kbuild to Detect Variability Anomalies in Linux
  Sarah Nadi and Ric Holt
* Anomalies in Rule-Adapted Workflows - A Taxonomy and Solutions for vBPMN
  Markus Döhring and Steffen Heublein
* On the Comparison of User Space and Kernel Space Traces in Identification of Software Anomalies
  Syed Shariyar Murtaza, Afrozah Sultana, Abdelwahab Hamou-Lhadj and Mario Couture

12:30  Lunch + **Bullwhip cracking**

14:00  **ERA1 - Refactoring & Reengineering** Lecture Hall
Session chair Massimiliano Di Penta
* Recommending Refactorings to Reverse Software Architecture Erosion
  Ricardo Terra, Marco Tulio Valente, Krzysztof Czarnecki and Roberto S. Bigonha
* A New Software Maintenance Scenario Based on Refactoring Techniques
  Gustavo Villavicencio
* Invertible Program Restructurings for Continuing Modular Maintenance
  Julien Cohen, Rémi Douence and Akram Ajouli
* Towards Applying Reengineering Services to Energy-Efficient Applications
  Jan Jelschen, Marion Gottschalk, Mirco Josefiok, Cosmin Pitu and Andreas Winter
* Making Smart Moves to Untangle Programs
  Syed M. Ali Shah, Jens Dietrich and Catherine McCartin
* A Cohesion Metric Approach to Dividing Source Code into Functional Segments to Improve Maintainability
  Norihiro Yoshida, Masataka Kinoshita, Hajimu Iida

15:30  Coffee break
### Conference dinner
The CSMR 2012 Conference dinner will be hosted by the Fehértó Fishermen's Tavern and Guesthouse. The characteristic dish of the tavern is the “famous Szeged Fish Soup”, but they also offer a wide selection of dishes of both modern and traditional Hungarian cuisine.

There will be an organized bus transfer to the location of the Conference Dinner. Participants can choose an appropriate location to catch the bus: **19:30 Congress Centre**, **19:15 Forras**, **19:20 Széchenyi square**, **19:25 Novotel**.
Program – Friday, 30 March 2012

9:00  
**TP7 – Prediction** Lecture Hall  
Session chair Mircea Lungu  
**Predicting Coding Effort in Projects Containing XML**  
Siim Karus and Marlon Dumas  
**Software Evolution Prediction Using Seasonal Time Analysis: A Comparative Study**  
Miguel Goulão, Nelson Fonte, Michel Wermelinger and Fernando Brito e Abreu  
**Uncovering Causal Relationships between Software Metrics and Bugs**  
Cesar Couto, Christofer Silva, Marco Tulio Valente, Roberto Bigonha and Nicolas Anquetil

10:30  
Coffee break

11:00  
**TP8 – Design patterns and deficiencies** Lecture Hall  
Session chair Naji Habra  
**DPB: A Benchmark for Design Pattern Detection Tools**  
Francesca Arcelli Fontana, Andrea Caracciolo and Marco Zanoni  
**DPJF - Design Pattern Detection with High Accuracy**  
Alexander Binun and Günter Kniesel  
**Archimetrix: Improved Software Architecture Recovery in the Presence of Design Deficiencies**  
Marie Christin Platenius, Markus von Detten and Steffen Becker

12:30  
Lunch

14:00  
**TP9 – Architecture evolution** Lecture Hall  
Session chair Ric Holt  
**ADvISE: Architectural Decay In Software Evolution**  
Salima Hassaine, Yann-Gaël Guéhéneuc, Sylvie Hamel and Giuliano Antoniol  
**On the Relevance of Code Anomalies for Identifying Architecture Degradation Symptoms**  
Isela Macia, Roberta Arcoverde, Alessandro Garcia, Christina Chavez and Arndt von Staa  
**Constraint-Based Consistency Checking between Design Decisions and Component Models for Supporting Software Architecture Evolution**  
Ioanna Lytra, Huy Tran and Uwe Zdun

15:30  
**Closing** Lecture Hall  
16:00  
Coffee break
Conference Organization

Organizing committee

General chair
Rudolf Ferenc, University of Szeged, Hungary

Program Chairs
Tom Mens, University of Mons, Belgium
Anthony Cleve, University of Namur, Belgium

Workshop Chair
Tamás Gergely, University of Szeged, Hungary

Industrial Chairs
Jens Borchers, SCHUFA Holding AG, Germany
Hassan Charaf, Budapest University of Technology and Economics, Hungary

Tool Demonstration Chair
Holger Kienle, Mälardalen University, Sweden
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**Szeged Highlights**

Szeged, as the most important city on the South Great Plain, is the economic, scientific and cultural centre of the region. Szeged offers a unique experience to any of its visitors. Its sights, like the Votive Church, the Synagogue, the Hero’s Arch, and the Móra Ferenc Museum all give such a distinct character to the city that it is safe to say: Szeged is the gem of the Great Plains.

After the disastrous flood (in 1879) Szeged was reborn the most modern town in Hungary with its broad avenues and boulevards, its renovated, grandiose centre (winner of the “Europa Nostra” award) and eclectic-Secessionist mansions, all of which will enchant its visitors.

Please find your map of Szeged in the conference bag.

Szeged is an easily walkable city, however buses, trolley buses, and trams are all available means of transportation. Bus tickets can be purchased almost anywhere in town, in kiosks, in shops, and even on busses. All tickets have to be validated on the vehicle. One ticket is valid for one journey only (single way on the same bus). Upon changing vehicle, another ticket needs to be validated.

**Restaurants**

**John Bull Pub**
- Address: 6720 Szeged, Oroszlán u. 6.
- Opening hours: 11am – 01am
- Category: 1.cat.

**Régi Híd Vendéglő**
- Address: 6720 Szeged, Oskola u. 4.
- Opening hours: 11:30am – 23pm
- Category: 1.cat.

**Alabárdos Étterem**
- Address: 6720 Szeged, Oskola u. 13.
- Opening hours: 11:30am – 24pm
- Category: 1.cat.

**Roosevelt téri halászcsárda**
- Address: 6720 Szeged, Roosevelt tér 14.
- Opening hours: 11am – 23pm
- Category: 1.cat.

**Clubs**

**JATE Klub (official club of University of Szeged)**
- Address: 6720 Szeged, Toldy u. 2.
- Opening hours: 10pm – 4am
- Category: 1.cat.

**Retro Klub**
- Address: 6720 Szeged, Széchenyi tér 3.
- Opening hours: evenings
- Category: 1.cat.

**Gin –Tonic Pub & Dance Hall**
- Address: 6720 Szeged, Wesselényi u. 6.
- Opening hours: 11am – 23pm
- Category: 2.cat.

**Átrium Music Café**
- Address: 6720 Szeged, Kárász u. 9.
- Opening hours: 8am – 24pm
- Category: 2.cat.
Conference Map

CSMR 2012 Locations

- University Congress Centre (CSMR)
- Rector's Office
- Hotel Forás
- Hotel Novotel
- Hotel Tisza
- Railway Station

csmr2012.sed.hu