# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preface</td>
<td>x</td>
</tr>
<tr>
<td>Committees</td>
<td>xii</td>
</tr>
<tr>
<td>Reviewers</td>
<td>xv</td>
</tr>
<tr>
<td>Sponsors</td>
<td>xvii</td>
</tr>
<tr>
<td><strong>Invited Papers</strong></td>
<td></td>
</tr>
<tr>
<td>Metropolis: Multisensory Simulation of a Populated City</td>
<td>1</td>
</tr>
<tr>
<td>Carol O’Sullivan and Cathy Ennis</td>
<td></td>
</tr>
<tr>
<td>A New Hybrid Approach to the Animation of Complex Character Interactions in Games</td>
<td>8</td>
</tr>
<tr>
<td>D. Kravtsov, O. Fryazinov, V. Adzhiev, A. Pasko, and P. Comninos</td>
<td></td>
</tr>
<tr>
<td><strong>Full Papers</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Case Studies</strong></td>
<td></td>
</tr>
<tr>
<td>Towards the Development of a 3D Serious Game for Training in Power</td>
<td>16</td>
</tr>
<tr>
<td>Matheus Rosendo, Tiago Buriol, Klaus de Geus, Sérjio Scheer, and Carlos Felsky</td>
<td></td>
</tr>
<tr>
<td>PlayLOGO 3D: A 3D Interactive Video Game for Early Programming</td>
<td>24</td>
</tr>
<tr>
<td>Ioannis Paliokas, Christos Arapidis, and Michail Mpimpitsos</td>
<td></td>
</tr>
<tr>
<td>Elemental: An Insight into the Development and Evaluation of a Secondary Education Chemistry Game Using XNA</td>
<td>32</td>
</tr>
<tr>
<td>James Birchall and Christos Gatzidis</td>
<td></td>
</tr>
</tbody>
</table>
Virtual Worlds and Games Technology
Virtual and Augmented Reality: Improved User Experience through a Service Oriented Infrastructure ..............................................................40
  Michael Braitmaier and Dimosthenis Kyriazis
A Classification of Scripting Systems for Entertainment and Serious Computer Games ........................................................................47
  Eike Falk Anderson
Approximate Visibility Grids for Interactive Indirect Illumination .................................................................55
  Thomas Bashford-Rogers, Kurt Debattista, Carlo Harvey, and Alan Chalmers

Serious Games Methodologies
Using a Criteria-Based User Model for Facilitating Flow in Serious Games ..................................................63
  Daire Ó Broin
Ageing Well and Learning through Online Immersive Participation Using a Multi-user Web 3D Environment ......................................................70
  Matthew Chilcott and Ann Smith
Building Social Communities around Alternate Reality Games ........................................................................76
  Panagiotis Petridis, Ian Dunwell, Sylvester Arnab, Simon Scarle, Adam Qureshi, Sara de Freitas, Aristidis Protopsaltis, and Kam Star

Serious Games and Virtual Worlds for Cultural Heritage
Using Virtual Environments to Tell the Story: "The Battle of Thermopylae" ..............................................................84
  Dimitrios Christopoulos, Pavlos Mavridis, Anthousis Andreadis, and John N. Karigiannis
The Use of Live Virtual Guides in Educational Applications ........................................................................92
  Vedad Hulusic and Selma Rizvic

Serious Games and Virtual Worlds for Health
Evaluation of Usefulness of the Elinor Console for Home-Based Stroke Rehabilitation ..................................................98
  Per Backlund, Anna-Sofia Alklind Taylor, Henrik Engström, Mikael Johannesson, Mikael Lebram, Angelique Slijper, Karin Svensson, Jesper Poucette, and Katharina Stibrant Sunnerhagen
Assessment of ADHD through a Computer Game: An Experiment with a Sample of Students ..................................................104
  Fabio E. G. Santos, Angela P. Z. Bastos, Leila C. V. Andrade, Kate Revoredo, and Paulo Mattos
Learning in Virtual Worlds

An Exploratory Study of Problem-Based Learning in Virtual Worlds .................................................. 112
Spyros Vosinakis, Panayiotis Koutsabasis, and Panagiotis Zaharias

Format-Store: A Multi-agent Based Approach to Experiential Learning ............................................ 120
Philippe Mathieu, David Panzoli, and Sébastien Picault

Short Papers

Case Studies

Square AR: Using Augmented Reality for Urban Planning ................................................................. 128
Kostas Anagnostou and Panagiotis Vlamos

Integrating a Military Air Traffic Control Simulator with an LMS ..................................................... 132
Tiago Ribeiro, Nuno Faria, Leonel Morgado, Paulo Simões, Paulo Rodrigues,
and Luis Leite

Virtual Worlds and Games Technology

Real-Time Rendering of Dynamic Area and Volume Lights Using Hierarchical Irradiance Volumes ......................................................... 136
Karsten Schwenk

Brain-Controlled NXT Robot: Tele-operating a Robot through Brain Electrical Activity .............................................................. 140
Athanasios Vourvopoulos and Fotis Liarokapis

A Portable Framework Design to Support User Context Aware Augmented Reality Applications ......................................................... 144
Jacek Lewandowski, Hisbel E. Arochena, Raouf N. G. Naguib, and Kuo-Ming Chao

Serious Games Methodologies

Designing Serious Games to Enhance Political Efficacy and Critical Thinking Disposition for College Students: The Case of Taiwan ................................................................. 148
Huang Ling Yi

Interactive Social TV on Service Oriented Environments: Challenges and Enablers ................................. 152
Dimosthenis Kyriazis, George Kousiouris, Andreas Menychtas,
Anastasios Doulamis, and Theodora Varvarigou

Virtual World Presence for Pre-service Teachers: Does the TAM Model Apply? .................................. 156
Vanessa Camilleri and Matthew Montebello
Serious Games and Virtual Worlds for Cultural Heritage

Towards an Online Multiplayer Serious Game Providing a Joyful Experience in Learning Art History .................................................................................................................................................. 160

Josef Froschauer, Max Arends, Doron Goldfarb, and Dieter Merkl

Solis’Curse - A Cultural Heritage Game Using Voice Interaction with a Virtual Agent ..................................................................................................................................................... 164

João N. Neto, Ricardo Silva, João P. Neto, João Madeiras Pereira, and João Fernandes

Serious Games and Virtual Worlds for Health

Animation of 3D Avatars for Rehabilitation of the Upper Limbs .................................................................................................................................................. 168

Sergio Moya, Sergi Grau, Dani Tost, Ricard Campeny, and Marcel Ruiz

Usability of Serious Games for Health .................................................................................................................................................. 172

Grassyara Pinho Tolentino, Claudio Battaglini, Alam Carlos Ventura Pereira, Ricardo Jacó de Oliveria, and Marilene Gesiane Mendes de Paula

Poster Papers

On the Presentation of Byzantine Art in Virtual Environments .................................................................................................................................................. 176

Chrysanthos Voutounos and Andreas Lanitis

Complete Motion Control of a Serious Game against Obesity in Children .................................................................................................................................................. 178

Simon Scarle, Ian Dunwell, Thomas Bashford-Rogers, Elmedin Selmanovic, Kurt Debattista, Alan Chalmers, John Powell, and Wendy Robertson

Incorporating Serious Games in the Classroom of Students with Intellectual Disabilities and the Role of the Educator .................................................................................................................................................. 180

Maria Saridaki and Constantinos Mourlas

On Studying Collaborative Learning Interactions in Massively Multiplayer Online Games .................................................................................................................................................. 182

Iro Voulgaris and Vassilis Komis

The Role of Game Rules in Architectural Design Environments .................................................................................................................................................. 184

Pieter Pauwels, Ronald De Meyer, Maarten Audenaert, and Koen Samyn

Workshop 1 - Natural Interaction and Player Satisfaction in Games

The Importance of Eye Gaze and Head Pose to Estimating Levels of Attention .................................................................................................................................................. 186

Stylianos Asteriadis, Kostas Karpouzis, and Stefanos Kollias

Towards Player Adaptivity in a Serious Game for Conflict Resolution .................................................................................................................................................. 192

Corrado Grappiolo, Yun-Gyung Cheong, Julian Togelius, Rilla Khaled, and Georgios N. Yannakakis
Workshop 2 - Leveraging the Potential of Virtual Worlds

Exploring Behavioural Fidelity of Synthetic Stimuli While Immersed in fMRI Displays .................................................................215
   Katerina Mania, Nick Medford, Giannis Christodoulou, Phil L. Watten,
   Fiona Rivera, Eugenia Radulescu, and Hugo Critchley

Virtual Worlds as Information Spaces: Supporting Semantic and Social Navigation in a shared 3D Environment ........................................220
   Spyros Vosinakis and Ioannis Papadakis

Towards a User-Aware Virtual Museum ..............................................................................................................................228
   Christos Zigkolis, Vassiliki Koutsonikola, Despoina Chatzakou,
   Savvas Karagiannidis, Maria Giatsoglou, Andreas Kosmatopoulos,
   and Athena Vakali

A Service Oriented Architecture Enabling Policy Simulation in Virtual Spaces .................................................................236
   Magdalini Kardara, Omri Fuchs, Fotis Aisopos, Athanasios Papaikonomou,
   Konstantinos Tserpes, and Theodora Varvarigou

Disaster Management Evaluation and Recommendation ........................................................................................................244
   Vassilios Vescoukis and Nikolaos D. Dulamis

Author Index .............................................................................................................................................................................250