

# **2012 6th IEEE International Conference on Digital Ecosystems and Technologies**

**(DEST 2012)**

**Campione d'Italia, Italy  
18 – 20 June 2012**



**IEEE Catalog Number: CFP12DES-PRT  
ISBN: 978-1-4673-1702-3**

## TRACK A: FOUNDATIONS OF DIGITAL ECOSYSTEMS AND COMPLEX ENVIRONMENT ENGINEERING

### Track co-Chairs

- **Pierpaolo Andriani**, *Euromed Management School, France*
- **Pierfranco Ferronato**, *Soluta.net, Italy*
- **Gabriele Gianini**, *Università degli Studi di Milano, Italy*

Track A addresses the foundations of Digital Ecosystems in the context of Complex Environments Engineering. A digital ecosystem is defined as an open, loosely coupled, demand-driven, domain clustered, agent-based self-organized environment where species/agents form short and long-term coalitions for specific purposes or goals, and everyone is proactive and responsive for its own benefit or profit. Interactions among peers in Digital Ecosystems may involve, besides unbridled competition, new modalities of pre-competitive and collaborative partnerships.

Digital ecosystems are characterized by complexity – demanding radically new solutions. This track focuses on the theoretical foundations, that can be drawn upon from various disciplines.

### Track Papers

|  |  |    |
|--|--|----|
| <i>Kevin Lee, David Murray,<br/>David Goodfield and Martin Anda.</i>                   | Experiences and Issues for Environmental Engineering<br>Sensor Network Deployments   | 1  |
| <i>Evangelos Pournaras and Shah Miah.</i>  | From Metaphor towards Paradigm - A Computing<br>Roadmap of Digital Ecosystems  | 7  |
| <i>Noah Sabry and Paul Krause</i>  | A Digital Ecosystem view on Cloud Computing  | 13 |
| <i>Asif Sangrasi and Karim Djemame.</i>  | Assessing Risk in Grids at resource level considering Grid<br>Resources as Repairable using Two State Semi Markov<br>Model       | 19 |
| <i>Sotiris Moschoyiannis, Paul Krause<br/>and Pavlos Georgiou</i>                      | An Animation Tool for Exploring Transactions in a DE   | 25 |
| <i>Andreas Rausch, Jörg Müller, Ursula<br/>Goltz and Dirk Niebuhr</i>                  | IT Ecosystems: A new Paradigm for Engineering Complex<br>Adaptive Software Systems   | 31 |
| <i>Matthew Smith, Benjamin Henne,<br/>Christian Szongott and Gabriele von<br/>Voig</i> | Big Data Privacy Issues in Public Social Media - How can<br>humans monitor their privacy in the face of the big data<br>torrent? | 37 |
| <i>Christian Fabbriatore, Harold Boley<br/>and Achim P. Karduck.</i>                   | Machine Learning for Resource Management in Smart<br>Environments  | 43 |

## TRACK B: TECHNOLOGY INFRASTRUCTURE FOR DIGITAL ECOSYSTEMS

### Track co-Chairs

- **Lionel Brunie**, *INSA-Lyon, France*
- **Harald Kosch**, *University of Passau, Germany*

The ICT infrastructure underlying digital ecosystem must ensure the basis for digital ecosystems' economic operation. Track B will include contributions on how the ICT infrastructure can enable Digital Ecosystems by providing the required connectivity, mobility, availability, and security solutions. Typically, members of an ecosystem employ technological agents to procure products and access services on their behalf in order to achieve collective and individual goals.

The ICT infrastructure needs to provide solution ensuring that the ecosystem's resources are available as and when they are legitimately needed, protecting confidential information from loss and avoiding corruption of information.

### Track Papers

|  |   |     |
|--|---|-----|
| <i>Omar Hussain, Elizabeth Chang and Tharam Dillon</i>   | A Customer Relationship Management Ecosystem that utilizes Multiple Sources and types of Information Conjointly | 49  |
| <i>Jingwei Miao, Omar Hasan, Sonia Ben Mokhtar and Lionel Brunie</i>                                       | A Self-Regulating Protocol for Efficient Routing in Mobile Delay Tolerant Networks                              | 55  |
| <i>Claudio Agostino Ardagna, Ernesto Damiani, Ravi Jhawar and Vincenzo Piuri</i>                           | A Model-Based Approach to Reliability Certification of Services   | 61  |
| <i>Rodrigo Santos and Claudia Werner</i>   | Treating Social Dimension in Software Ecosystems through ReuseECOS Approach                                     | 67  |
| <i>Dirk Eisenbiegler and Florian Feigenbutz</i>  | Schwarzwälder - An Online Test Framework  | 73  |
| <i>Noah Sabry and Paul Krause</i>  | Potential CO2 Reduction Through Use Of Renewable Energy   | 79  |
| <i>Marco Viviani, Lyes Limam, Nadia Bennani, Elöd Egyed Zsigmond and David Coquil</i>                      | Multi-application Personalization: Data Propagation Evaluation on a Real-life Search Query Log                  | 85  |
| <i>Dejan Ilic, Per Goncalves Da Silva, Stamatis Karnouskos and Martin Griesemer</i>                        | An energy market for trading electricity in smart grid neighbourhoods   | 91  |
| <i>Valerio Bellandi, Paolo Ceravolo, Fulvio Frati, Jonatan Maggesi, Gabriela Waldhart, Isabella Seeber</i> | Design Principles for Competence-based Recommender Systems  | 97  |
| <i>Tcjpwo c'Mc/kand Tcrrj Fgvgtu</i>   | O qdkg'GxgpvQtkgpvf 'Gequ{ ugo  | HF€ |

## TRACK C: CYBER-PHYSICAL ENERGY SYSTEMS

### Track co-Chairs

- **Neil Brown**, *Institute of Energy and Sustainable Development (IESD), De Montfort University, UK*
- **Rupert Gammon**, *Institute of Energy and Sustainable Development (IESD), De Montfort University, UK*
- **Peter Palensky**, *Austrian Institute of Technology, Vienna, Austria*
- **Martin Anda**, *Environmental Engineering & Life, Murdoch University, Australia*

Cyber-Physical Energy Systems address the merging of IT and energy infrastructures, with the aim of achieving more energy-efficient and sustainable lifestyles. The coordination of the various stakeholders involved in the future energy market raises many challenges, for example the data-intensive and complex event processing required.

An example is provided by research driven by the need to reduce greenhouse gas emissions, increase the use of new and renewable energy technologies, and provide a high-quality, comfortable, safe and efficient built environment. Such applied research aims to exploit the potential of information technology to boost energy efficiency and minimize our environmental footprint, while preserving or improving the quality of life for every individual in every nation.

### Track Papers

|  |  |     |
|--|--|-----|
| <i>Neil Brown, Rick Greenough,<br/>Konstantin Vikhorev and Sanober<br/>Khattak</i> | Precursors to using Energy data as a Manufacturing<br>Process Variable                     | 103 |
| <i>Atiyah Elsheikh, Edmund Widl and<br/>Peter Palensky</i>                         | Simulating Complex Energy Systems with Modelica: A<br>Primary Evaluation                   | 109 |
| <i>Ioana Ciuciu, Robert Meersman and<br/>Tharam Dillon</i>                         | Social Network of Smart-Metered Homes and SMEs for<br>Grid-based Renewable Energy Exchange | 115 |
| <i>Sergej Proskurin, David A. McMeekin<br/>and Achim P. Karduck</i>                | Smart Camp Building Scalable and Highly Available IT-<br>Infrastructures                   | 121 |
| <i>Tobore Ekwevugbe, Neil Brown and<br/>Denis Fan</i>                              | A Design Model for Building Occupancy Detection Using<br>Sensor Fusion                     | 127 |
| <i>Stamatis Karnouskos, Per Goncalves<br/>Da Silva and Dejan Ilic</i>              | Energy Services for the Smart Grid City  | 133 |
| <i>Neil Brown, Rick Greenough,<br/>Konstantin Vikhorev and Sanober<br/>Khattak</i> | Precursors to using Energy data as a Manufacturing<br>Process Variable                     |     |
| <i>Atiyah Elsheikh, Edmund Widl and<br/>Peter Palensky</i>                         | Simulating Complex Energy Systems with Modelica: A<br>Primary Evaluation                   |     |

## TRACK D: HEALTHCARE AND SUSTAINABLE LIVING

### Track co-Chairs

- **Rémi Bastide**, *ISIS-University Centre for Health Informatics, Carmaux, France*
- **Matthew Smith**, *Leibniz University Hannover, Germany*

eHealth, Telemedicine, and Bio-System Research Systems all describe approaches to improving the capacity of healthcare systems through fundamental and applied research, technology, and services. Researchers and companies are, for example, exploring the use of sensor devices, human-system interfaces, and medical record systems in order to provide radically new solutions for helping patients.

These advances require structural changes as well as technological development. Societies are facing an increase in chronic degenerative diseases that require monitoring and long-term patient management, the growing desire of patients to be treated in a family environment in order to protect their social ties, and, finally, a need to reduce costs. These factors necessitate a new strategic orientation in services offered by healthcare systems, in particular the transfer of a large portion of care activities from the hospital to the patient's residence.

### Track Papers

|   |  |     |
|---|--|-----|
| <i>Matthias Leinweber, Lars Baumgärtner and Bernd Freisleben</i>  | GPU-based Cloud Computing for Comparing the Structure of Protein Binding Sites                   | 139 |
| <i>Sascha Fahl, Marian Harbach and Matthew Smith</i>  | Human-Centric Visual Access Control for Clinical Data Management                                 | 145 |
| <i>Ali Larab, Emmanuel Conchon, Rémi Bastide and Nicolas Singer</i>   | A Sustainable Software Architecture for Home Care Monitoring Applications                        | 113 |
| <i>Dagmar Krefting, Jie Wu, René Siewert, Svenja Specovius, Karl Kesper, Thomas Penzel and Sebastian Canisius</i> | Personal Health Systems for Diagnostics of Sleep Disorders using new Sensors and Grid Technology | 119 |
| <i>Romanus Gruetz, Maximilian Brodhun, Benjamin Löhnhardt and Frank Dickmann</i>                                  | Evaluation of Data Management and Transfer Tools for the biomedical Community                    | 111 |
| <i>Olfa Rejeb, Rémi Bastide, Elyes Lamine, François Marmier and Hervé Pingaud</i>                                 | A Model Driven Engineering approach for Business Continuity Management in e-Health Systems       | 11F |
| <i>Matthias Leinweber, Lars Baumgärtner and Bernd Freisleben</i>  | GPU-based Cloud Computing for Comparing the Structure of Protein Binding Sites                   |     |
| <i>Sascha Fahl, Marian Harbach and Matthew Smith</i>  | Human-Centric Visual Access Control for Clinical Data Management                                 |     |

## TRACK E: DIGITAL HUMANITIES

### Track co-Chairs

- **Tobias Blanke**, *Kings College, UK*
- **Stuart Dunn**, *King's College London, UK*

The digital humanities form a bridge between the traditional practices of scholarship and the opportunities afforded by advances in technology, enabling researchers to reconsider old problems in new ways, and providing the methods, tools and frameworks to support them in developing new modes of enquiry. On the one hand, the humanities are faced with ever greater volumes of complex data and digital resources, for example from the increasing mass digitisation of historical records.

On the other hand, research in the humanities is moving away from the model of individual scholars to one in which international and inter-disciplinary teams of researchers collaborate actively within a diverse ecosystem of digital resources, tools, and services, not forgetting of course the users themselves – the rapid evolution of Web technologies continues to privilege the human as a key agent, both as provider and consumer of content, and this in turn is investing humanities scholarship with an increasing awareness of vast new audiences and potential participants.

### Track Papers

|   |   |     |
|---|---|-----|
| <i>Mark Hedges, Tobias Blanke, Michael Bryant, Stuart Dunn, Gabriel Bodard, Michael Jackson and David Scott</i>                   | Linked Data for Humanities Research --- The SPQR experiment | F11 |
| <i>Mark Hedges, Anna Jordanous, Stuart Dunn, Charlotte Roueche, Marc Kuster, Thomas Selig, Michael Bittorf and Waldemar Artes</i> | New Models for Collaborative Textual Scholarship            | F11 |

## TRACK F: COLLABORATIVE PLATFORMS FOR SUSTAINABLE LOGISTICS AND TRANSPORTATION

### Track co-Chairs

- **Frederick Benaben**, *Ecole de Mines d'Albi-Carmaux, France*
- **Amadou Sienou**, *Abamix Research, Germany*
- **Hervé Pingaud**, *University JF Champollion, France*

Across application domains, organizations and enterprises (such as Small-Medium Enterprises) gain their strengths from flexible market orientation, agile value chains and cluster-based innovation capacity. The changing global (business) environment challenges all organizations to aim for agility and performance-driven management through process-focused thinking. These challenges reach far beyond the business world, affecting for example the formation and coordination of emergency teams in case of environmental disasters.

For the effective collaboration of all the partners in such scenarios, the agility aspect of the Digital Ecosystem paradigm demands explicit support for risk management and collaboration. Agility implies the continuous improvement and reengineering of the business processes involved. However, the outcome of such process management efforts is risky because of the lack of operational information about future processes, so risk management is a key component. Similarly, collaboration support is required to allow real-time information sharing and interaction of the parties involved, for example in case of deviation from the agreed-upon target process.

### Track Papers

|  |   |     |
|--|---|-----|
| <i>Guillaume Macé Ramète, Jacques Lamothe, Matthieu Lauras and Frédérick Bénaben</i> | A road crisis management metamodel for an information decision support system   | FJ€ |
| <i>Matthieu Lauras, Roland Stühmer, Yiannis Verginadis and Frédérick Bénaben</i>     | An event-driven platform to manage agility - Behavior adaptation in delivery context  | FJÍ |
| <i>Samir Amrioui, Nicolas Malhene and Jean-Christophe Deschamps</i>                  | Traceability in Collaborative Logistics : how to use EPCglobal solution in transport reconfiguration                            | 2€F |
| <i>Andrej Eisfeld, David A. McMeekin and Achim P. Karduck.</i>                       | Complex Environment Evolution - Challenges with Semantic Service Infrastructures  | 2€İ |
| <i>Amadou Sienou and Achim P. Karduck</i>  | Logistics Challenges in Developing Countries - An analysis of Burkina Faso's national plan for disaster prevention and response | 2FI |
| <i>Nicolas Malhene, Anna Trentini, Guillaume Marques and Patrick Burlat</i>          | Freight Consolidation Centers for urban logistics solutions: the key role of interoperability                                   | 2Fİ |

## TRACK G: PLATFORMS FOR SOCIAL AND COMMUNITY INVOLVEMENT/ENGAGEMENT

### Track co-Chairs

- **Francois Grey**, *Tsinghua University, China*
- **Margaret Tan**, *Singapore Internet Research Center, Singapore*

The internet, together with other advances in ICT such as the increased take-up of smart mobile devices, is enabling a new era of community engagement. In science, the application of volunteer computing is providing examples of engagement in which members of the public can contribute to scientific advances of social importance. Examples include modelling climate change (ClimatePrediction.net), developing drugs for AIDS (FightAids@home), or simulating the spread of malaria (MalariaControl.net). The participatory ecosystem is becoming still wider with projects such as GalaxyZoo, in which volunteers contribute their "thinking" rather than their computers, and global initiatives to broaden take-up such as Africa@home and Asia@home.

On the social side, we are seeing substantial evidence of the role that digital technologies, especially the "Social Web" such as blogs, Twitter, Facebook, and video sharing sites, can play in community activism. The Social Web is in some quarters becoming the mainstream method for connecting people, sharing information, and influencing developments, particularly in areas where traditional modes of communication operate less effectively. This is reflected in a number of recent geopolitical events that have been referred to as "Twitter Revolutions", and these technologies have played an undeniable role in such events as the "Arab Spring" and humanitarian crises such as the 2010 Haiti earthquake. The use of these technologies has however led to debates concerning the extent to which such digital technologies genuinely promote more democratic community action, and the extent to which they can be exploited by the powerful to reinforce their positions.

### Track Papers

|   |   |      |
|---|---|------|
| <i>Nurhazman Abdul Aziz and Margaret Tan</i>              | Build a Platform for Knowledge Engagement: Sowing Seedlings in Library's New Media        | 2G   |
| <i>Abbas Strommen-Bakhtiar</i>                            | An Essay on the Emerging Political Economy and the Future of the Social Media             | 2H€  |
| <i>Marek Kowalkiewicz</i>                                 | IdeaWall: bridging the digital and non-digital worlds to facilitate distant collaboration | 2Hì  |
| <i>Paul Krause, Aaron Mason and Georgios Michalakidis</i> | Tiger Nation: Empowering Citizen Scientists   | 2I H |
| <i>Sabrina Bresciani</i>                                  | Social Media Platforms for Social Good  | 2I ì |
| <i>Giovanna Sissa</i>                                     | An Agent Based approach for sustainable ICT services toward environmental sustainability  | 2Í I |
| <i>Yinbin Liu and Yixia Zhou</i>                          | Chinese Government Use of Social Media: A case of Shanghai Weibo @ShanghaiCity            | 2Î € |



## TRACK H: CYBER-PHYSICAL ECOSYSTEMS IN ROBOTICS AND TELEMATICS

### Track co-Chairs

- **Michaela Huhn**, *Clausthal University of Technology, Germany*
- **Jörg P. Müller**, *Clausthal University of Technology, Germany*
- **Bernardo Wagner**, *Leibniz University Hannover, Germany*

Cyber-Physical Systems are a synergetic composition of computational control and physical actors. They aim to achieve an enhanced functionality that relies on both, the interaction with and coordination in between the physical and the virtual components.

Cyber-Physical Ecosystems are built as agile networks of cooperating, independently developed subsystems. Cyber-Physical Ecosystems are emerging at the interface between robotics, sensor networks, systems of systems engineering, and multi-agent technologies. Research on theories, architectures, models, methods, and tools are required to form a uniform and integrated perspective to systems engineering for this class of complex systems. They need to be validated and verified in key applications such as micro grids, multi-robot systems, or autonomous traffic. The domain focus of this track will be accordingly on robotics and telematics, but is open to adjacent domains as well.

### Track Papers

|   |  |     |
|---|--|-----|
| <i>Sebastian Smolorz and Bernardo Wagner</i>  | Self-organized Distribution of Tasks inside an Autonomous Mobile Robotic System                | 211 |
| <i>Dennis Klar and Michaela Huhn</i>  | Interfaces and Models for the Diagnosis of Cyber-Physical Ecosystems                           | 219 |
| <i>Jana Görmer and Jörg P. Müller</i>   | Multiagent system architecture and method for group-oriented traffic coordination              | 211 |
| <i>Benjamin Henne, Christian Szongott and Matthew Smith</i>   | Coupled Multi-Agent Simulations for Mobile Security & Privacy Research                         | GF  |
| <i>Benjamin Mensing, Ursula Goltz, Adina Aniculaesei, Sebastian Herold, Andreas Rausch, Stefan Gärtner and Kurt Schneider</i> | Towards Integrated Rule-Driven Software Development for IT Ecosystems                          | Gİ  |
| <i>Nguyen-Thinh Le, Lukas Martin, Christopher Mumme and Niels Pinkwart</i>  | Communication-free Detection of Resource Conflicts in Multi-Agent-based Cyber-Physical Systems | GH  |
| <i>Sebastian Smolorz and Bernardo Wagner</i>  | Self-organized Distribution of Tasks inside an Autonomous Mobile Robotic System                |     |

## BREAK-OUT SESSION: SECURING THE BANKING ECOSYSTEM

### Track co-Chairs

- **Stelvio Cimoto**, *Università degli Studi di Milano, Italy*
- **Ernesto Damiani**, *Università degli Studi di Milano, Italy*
- **Claudio Santacesaria**, *Rototype S.p.A., Italy*

In the Banking and Financial sector's ecosystem, IT Security has traditionally played the role of ensuring the availability, confidentiality, and accuracy of all types of customer and customer-related information.

Many solutions have been proposed regarding availability (e.g., immediate access to required personal data), confidentiality (making sure that only authorized persons could access confidential information) and accuracy (making sure that all information is timely and reliable).

However, the evolution of technology has opened a number of new issues. For instance, cloud and service-oriented computing have raised concerns over sharing of personal information, except in circumstances advised to the customer at the time the customer applies for a new product or service. Traditional assurance techniques need a radical rethinking before being applied to the new generation of banking services, as online monitoring and preventive maintenance are gaining importance. Also, online banking has widened the scope for social engineering attacks. A truly secure banking ecosystem is a partnership between the customer, the bank and a number of third parties.

The international break-out session on Securing the Financial and Banking Ecosystem at IEEE DEST-CEE 2012 is aimed at providing a forum to researchers, security practitioners and users for presenting new ideas and comparing their positions on the perspectives of security in the banking ecosystems.

### Track Papers

*Pietro Colombo and Elena Ferrari*

Towards a Framework to Handle Privacy since the Early Phases of the Development: Strategies and Open Challenges GJJ

*Stelvio Cimoto, Ernesto Damiani and Gabriele Gianini*

Risk Assessment of Credit Securities: The Notion and the Issues HEI