



THE SOCIETY FOR  
MODELING & SIMULATION  
INTERNATIONAL

# SUMMERSIM

Summer Simulation  
Multi-Conference 2016

**JULY 24-27, 2016**

Palais des congrès de Montreal  
Montreal, Quebec, Canada







# *2016 SummerSim*

## PROGRAM BOOK

July 24-27, 2016  
Montreal, Quebec, Canada

General Chair  
Floriano de Rango

General Co-Chair  
José Luis Risco Martín

Program Chairs  
Andrea D'Ambrogio  
Gabriela Nicolescu

*Thank you to our Sponsors Below*



# *Welcome to SummerSim '16*

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## Welcome from the General Chair

Dear Respected Colleagues and Friends,

As a member of the Organizing Committee, I am very proud and delighted to welcome all of you to the Summer Simulation Multi-Conference 2016 (SummerSim'16) in Montreal, Quebec, Canada. The Society for Modeling & Simulation International (SCS) which organizes SummerSim is one of the oldest Modeling and Simulation organizations in the world. It endeavors to promote the advancement of Modeling and Simulation and connect Modeling and Simulation professionals worldwide. The SummerSim'16 program includes a world-class selection of peer-reviewed papers, presentations, distinguished keynote speeches and tutorials. In addition, SummerSim'16 offers a Ph.D. colloquium where students and established professionals can meet and exchange ideas. This year SummerSim'16 is additionally sponsored by University of Calabria (DIMES Dpt.), Spintel Ltd (a European innovative startup company working on IoT technologies and Home and Building Automation). Great thanks to the organizations that have donated money, licenses and books to recognize the best submissions at this conference.

I would also like to thank our keynote speakers Pieter Mosterman, Senior Research Scientist at The MathWorks, Inc., Hans Vangheluwe, University of Antwerp & McGill University, Professor Azzedine Boukerche, University of Ottawa, Professor Gabriel Wainer, Carleton University, Professor Helen Karatza, Aristotle University of Thessaloniki, and François E. Cellier for graciously accepting to share their vast knowledge and experiences with us. My thanks also go to all members of the Organization Committee for their tireless efforts especially in working through the introduction of a new format and editing process. It was truly a team effort. The committee consists of:

General Chair: *Floriano de Rango*, University of Calabria, Italy

General Co-Chair: *José Luis Risco Martín*, Complutense University of Madrid, Spain

Program Chairs: *Andrea D'Ambrogio*, University of Rome "Tor Vergata", Italy;

*Gabriela Nicolescu*, Politechnique, Montreal, Canada

Proceedings Chair: *Miroslav Velez*, Aries Design Automation, USA

Awards Chair: *Saurabh Mittal*, DUNIP Technologies, USA



# *Welcome to SummerSim '16*

I am very grateful for the efforts of all of the volunteers that dedicated their time and effort to review and edit all of the submissions and thus make this gathering possible. I also express my gratitude to authors and tutorial presenters for their important contributions. My sincere appreciation goes to the Conference chairs, whose invaluable efforts in their respective sections were key to the success of the overall multi-Conference. Moreover, thanks to all track chairs that did a good job in promoting the respective research topics and to select the reviewers in the respective tracks.

This year has been organized into three Sub-conferences whose chairs are:

Jose J. Granda and Dean Karnopp, Chairs of the International Conference on Bond Graph Modeling (ICBGM 2016)

Franco Davoli, Univ. of Genoa, Italy and Stefano Giordano, Univ. of Pisa, Italy, Chairs of the International Symposium on Performance Evaluation of Computer and Telecommunication Systems (SPECTS 2016)

José Luis Risco Martín, Complutense University of Madrid, Spain and Floriano de Rango, University of Calabria, Italy, Chairs of the 48th Summer Computer Simulation Conference 2016 (SCSC 2016)

This year SCSC 2016 has been organized into many interesting tracks listed below:

Track 1: Agent-Directed Simulation (ADS) Chaired by Levent Yilmaz and Tuncer Oren

Track 2: Bio-Medical and Population Modeling (BMPM) Chaired by Jacob Barhak

Track 3: Computer Graphics for Simulation (CGS) Chaired by John F. Richardson and Rusty Husar

Track 4: Cyber M&S, Ranges, and Tools (Cyber) Chaired by Suresh K. Damodaran

Track 5: Emergency Management Simulation (EMS) Chaired by Francesco Longo and Letizia Nicoletti

Track 6: Grand Challenges in Modeling and Simulation (GCMS) Chaired by Ali Elkamel, Chandramouli R. Madhuranthakam, and Hedia Fgaier

Track 7: Modeling and Simulation for Intelligent, Adaptive and Autonomous Systems (MSIAAS) Chaired by Saurabh Mittal and Marco Lützenburger

Track 8: Modeling and Simulation for Environmental Systems (MSES) Chaired by Ali Elkamel, and Suad Al-Adwani

# *Welcome to SummerSim '16*

**Track 9: Modeling and Simulation for Sustainability (MSS) Chaired by Björn Johansson**

**Track 10: Simulation for Large Scale Computing Systems (SLSCS) Chaired by Ayse Kivilcim Coskun and José L. Ayala**

**Track 11: Simulation in the System Design Flow (SDF) Chaired by Alberto A. Del Barrio and Seda Ogrenci Memik**

**Track 12: Verification and Validation of Computer Simulation Models (V&V) Chaired by Miroslav Velez**

**Track 13: Work in Progress (WIP) Chaired by Andrea D'Ambrogio and Gabriela Nicolescu**

Special thanks goes to the SCS officers, Oletha Darensburg, Aleah Hockridge and the team for their high level of professionalism, and for the smooth running of all the events. Last but not least, thanks to Prof. José Louis Risco Martin (SummerSim general co-chair) for his hard work and essential support, and Andrea D'Ambrogio and Gabriela Nicolescu (SummerSim Program chairs) for the good coordination with all staff and track chairs.

Montreal is the most populous city in Quebec and the second most populous municipality in Canada. The city is on the Island of Montreal, which took its name from the same source as the city and a few much smaller peripheral islands. Historically the commercial capital of Canada, it was surpassed in population and economic strength by Toronto in the 1970s. It remains an important centre of commerce, aerospace, finance, pharmaceuticals, technology, design, education, culture, tourism, gaming, film, and world affairs. Montreal was also named a UNESCO City of Design. Montreal has hosted multiple international conferences and events throughout its history, including the 1967 International and Universal Exposition and the 1976 Summer Olympic Games. Montreal's museums, landmarks and shopping districts provide plenty of entertainment. For a taste of historic Montreal, spend a day exploring the 18th-century buildings of Vieux-Montréal, which now house small museums and souvenir shops. This city is also a great destination for families, with attractions like the Montreal Biodôme and La Ronde. I wish for all attendees to enjoy Montreal and to enjoy the conference.

**Welcome to SummerSim'16.**

**Floriano De Rango, Ph.D.**

**General Chair SummerSim 2016**

**Prof. in Telecommunications and Networks Technologies at University of Calabria, Rende (ITALY)**

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# **GENERAL INFORMATION**

# **General Information**

## **SummerSim'16 Organizing Committee**

**General Chair:** Floriano de Rango, University of Calabria, Italy

**General Co-Chair:** José Luis Risco Martín , Complutense University of Madrid, Spain

**Awards Chair:** Saurabh Mittal, DUNIP Technologies, USA

**Program Chairs:** Andrea D'Ambrogio, University of Rome "Tor Vergata", Italy; Gabriela Nicolescu, Politechnique, Montreal, Canada

**Proceedings Chair:** Miroslav Velev, Aries Design Automation, USA

**Tutorial Chair:** José Luis Risco Martín

**Student Colloquium:** Miroslav Velev and Zeljko Zilic

## **2016 Summer Computer Simulation Conference (SCSC 2016)**

SCSC 2016 features varied tutorials, tracks, and workshops. The conference focuses on modeling and simulation, tools, theory, methodologies and applications, providing the latest R&D results in academia and industry.

**Chairs:** José Luis Risco Martín, Complutense University of Madrid, Spain and Floriano de Rango, University of Calabria, Italy

**Program Chairs:** Andrea D'Ambrogio, University of Rome "Tor Vergata", Italy and Gabriela Nicolescu, Politechnique, Montreal, Canada

### **Symposia**

- **Agent-Directed Simulation**

Chair: Levent Yilmaz and Tuncer Ören

- **M&S for Intelligent, Adaptive and Autonomous Systems**

Chairs: Saurabh Mittal and Marco Lützenburger

- **M&S for Environmental Systems**

Chairs: Ali Elkamel, Suad Al-Adwani

- **Grand Challenges in Modeling and Simulation**

Chairs: Ali Elkamel, Chandramouli R. Madhuranthakam, Hedia Fgaier

- **Bio-Medical and Population Modeling**

Chair: Jacob Barhak

- **Computer Graphics for Simulation**

Chairs: John F. Richardson and Rusty Husar

# **General Information**

## **2016 Summer Computer Simulation Conference (SCSC 2016) Continued**

- **Work in Progress**  
Chairs: Andrea D'Ambrogio and Gabriela Nicolescu
- **Cyber M&S, Ranges, and Tools**  
Chair: Suresh K. Damodaran
- **Emergency Management Simulation**  
Chairs: Francesco Longo and Letizia Nicoletti
- **Modeling and Simulation for Sustainability**  
Chair: Björn Johansson
- **Simulation for Large Scale Computing Systems**  
Chairs: Ayse Kivilcim Coskun and José L. Ayala
- **Simulation in the System Design Flow**  
Chairs: Alberto A. Del Barrio and Seda Ogrenci Memik
- **Verification and Validation of Computer Simulation Models**  
Chair: Miroslav Velez

## **International Symposium on Performance Evaluation of Computer and Telecommunication Systems (SPECTS 2016)**

This annual international conference is a scientific forum for professionals and scientists involved in performance evaluation of computer and telecommunication systems.

Chairs: Franco Davoli, University of Genoa, Italy and Stefano Giordano, University of Pisa, Italy

## **International Conference on Bond Graph Modeling (ICBGM 2016)**

The 2016 International Conference on Bond Graph Modeling and Simulation brings together research paper presentations, panel sessions, tutorials, workshops, seminars, industrial applications, and software demonstrations that use Bond Graph modeling methods.

Chairs: Jose J. Granda, California State University, Sacramento USA and Dean Karnopp, University of California, Davis, USA

# General Information

## Registration

Your registration for the 2016 Summer Simulation Multi-conference (SummerSim'16) includes AM and PM breaks, the Monday evening reception and all social mixers, and access to all sessions, tutorials and special presentations (unless otherwise noted). Please visit the SCS Registration Desk in the 5th Floor Foyer for any questions you have during the conference.

Registration Hours (5th Floor Foyer):

Sunday, July 24th – 8:00-10:00\*

Monday, July 25th – 7:00–17:00

Tuesday, July 26th – 7:00–17:00

Wednesday, July 27th – 7:30–15:00

*Please note that the Registration Desk will be closed for lunch Mon and Tues, 12:00-13:30 and Wednesday 12:30-14:00)*

## Breaks and Lunches

Coffee Breaks (524BC):

Monday, July 25th :

Breaks: 10:00–10:30 | 15:30-16:00 | Lunch: 12:00-13:30 (on your own)

Tuesday, July 26th:

Breaks: 10:00–10:30 | 15:30-16:00 | Sponsored Lunch by Spintel Ltd and University of Calabria  
DIMES Department: 12:00-13:30 Located in 524BC

Wednesday, July 27th:

Breaks: 10:00-10:30 | 15:30-16:00 | Lunch: 12:30-14:00 (on your own)

## Speakers' Breakfasts

Speakers' breakfasts will be held Monday – Wednesday from 7:15 – 8:00, located in the (524BC) room. The presenters for each day are invited to join their session chairs at a breakfast on the morning of their presentation.

## Meetings

SCS Board of Directors Meeting—Sunday, July 24 at 09:00 in Room 522A.

\* Badge pickup for pre-registered attendees only

# **General Information**

## **Sunday Welcome Mixer**

Attendees who are in town on Sunday are invited to mix and mingle with other attendees at our Welcome Mixer on Sunday, July 24 from 17:30-18:30 at the Reporter Bar (3rd floor) at the Westin Montreal, located at 270 Rue Saint Antoine O, Montréal, QC H2Y 0A3, Canada. Snacks and sodas will be provided.

## **Monday Evening Social**

There will be a welcome social with drinks and light appetizers in Room 524BC on Monday, July 25 from 17:30-19:00. All attendees and their guests are invited to attend.

## **Plenary/Keynotes**

Plenary Session and Keynotes (Room 524A)

- Monday Plenary: 08:00-08:30: Welcome and Opening  
08:30-09:15: Keynote: Gabriel Wainer  
09:15-10:00: Keynote: Pieter Mosterman
- Tuesday Plenary: 08:30-09:15: Keynote: Helen Karatza  
09:15-10:00: Keynote: Hans Vangheluwe
- Wednesday Plenary: 08:30-09:15: Keynote: Azzedine Boukerche  
09:15-10:00: Keynote: François E. Cellier

**MAP**



**Mezzanine 6**

**Rooms 519 to 525**

638 640 / 642 644 / 646 648 650 / 654 656  
641 643 645 647 649 651 653 655 657

510-511 Foyer

517 Foyer

510a 510b 510c 510d 510e 510f

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**All sessions and events will be located on the 5th Floor**

# KEYNOTES

# Keynote Speaker

**TITLE:** Recent Advances on Discrete-Event Modeling and Simulation for Development of Embedded and Real-Time Systems

**AUTHOR:** Gabriel Wainer, Professor and Associate Chair, Graduate Studies, Department of Systems and Computer Engineering, Carleton University

**DATE/TIME:** Monday, July 25th, 2016 | 08:30-09:15

**ABSTRACT:**

Embedded real-time software construction has usually posed interesting challenges due to the complexity of the tasks executed. Most methods are either hard to scale up for large systems, or require a difficult testing effort with no guarantee for bug-free software products. Formal methods have showed promising results; nevertheless, they are difficult to apply when the complexity of the system under development scales up. Instead, systems engineers have often relied on the use of modeling and simulation (M&S) techniques in order to make system development tasks manageable. Construction of system models and their analysis through simulation reduces both end costs and risks, while enhancing system capabilities and improving the quality of the final products. M&S let users experiment with “virtual” systems, allowing them to explore changes, and test dynamic conditions in a risk-free environment. This is a useful approach, moreover considering that testing under actual operating conditions may be impractical and in some cases impossible.

In this talk, we will present a Modeling and Simulation-based framework to develop embedded systems based on the DEVS (Discrete Event systems Specification) formalism. DEVS provides a formal foundation to M&S that proved to be successful in different complex systems. This approach combines the advantages of a simulation-based approach with the rigor of a formal methodology. We will discuss how to use this framework to incrementally develop embedded applications, and to seamlessly integrate simulation models with hardware components. One of the main aspects of the methodology is that it can be integrated seamlessly with models of the environment in which the embedded controller will act. In particular, we can interface the embedded controllers with cellular models. We will show how the Cell-DEVS formalism can be used in this task. We will introduce the main characteristics of the Cell-DEVS formalism, and will show how to model complex cell spaces. We will introduce an integrated environment that deals with these issues, orchestrating a cellular-based simulator (CD++), a GIS (GRASS) and data visualization (Google Earth), to simulate behavior and analyze results supporting the decision making for varied environmental scenarios.

Our approach does not impose any order in the deployment of the actual hardware components, providing flexibility to the overall process. The use of DEVS improves reliability (in terms of logical correctness and timing), enables model reuse, and permits reducing development and testing times for the overall process. Consequently, the development cycle is shortened, its cost reduced, and quality and reliability of the final product is improved.

**SHORT BIO:**

Gabriel A. Wainer, FSCS, SMIEEE, received his M.Sc. (1993) at the University of Buenos Aires, Argentina, and his Ph.D. (1998, with highest honors) at the Université d’Aix-Marseille III, France. In July 2000 he joined the Department of Systems and Computer Engineering at Carleton University (Ottawa, ON, Canada), where he is now Full Professor and head of the Advanced Real-Time Simulation Lab. He is the author of three books and over 320 research articles; and is one of the founders of the Symposium on Theory of Modeling and Simulation, SIMUTools and SimAUD. Prof. Wainer is a member of the Board of Directors and a Fellow of SCS, the Special Issues Editor of SIMULATION, and a member of the Editorial Board of IEEE Computing in Science and Engineering, Wireless Networks (Elsevier), Journal of Defense Modeling and Simulation (SCS). He has been the recipient of various awards, including the Carleton University’s Mentorship Award (2013), the SCS Distinguished Professional Award (2013), and the SCS Distinguished Service Award (2015).



# Keynote Speaker

**TITLE:** Value Drivers in a Changing Landscape of Modeling & Simulation

**AUTHOR:** Pieter J. Mosterman, Senior Research Scientist, MathWorks and McGill University

**DATE/TIME:** Monday July 25th, 2016 | 09:15-10:00

**ABSTRACT:**

When the personal computer started its rapid proliferation around the beginning of the Eighties, desktop modeling and simulation followed in its wake. Over the following decades, tools quickly became better and computation increasingly became accepted as a primary technology with unmatched utility in analysis, design, and implementation tasks that are part of Science and Engineering. As the field of modeling and simulation matured, it was met by changing realities in enabling technology. On the one hand, microprocessors for desktop computing started to move to multi core architectures and are becoming increasingly heterogeneous (e.g., including graphics processing units and field programmable gate arrays). On the other hand, almost every computing device became network enabled with first connections on a local scale to now high bandwidth global connections. While the underlying computer platforms changed, in Engineering the characteristics of the systems that are coming online are rapidly evolving as well. Machines are increasingly becoming adaptive, autonomous, connected, and collaborative, distinctly enabled by the pervasive use of software. These developments have an important bearing on the field of Modeling & Simulation in terms of supporting abstractions, definition of computational semantics, and live connections with exogenous resources. Finally, Modeling & Simulation as it started on a desktop has grown to increasingly require support for enterprise-wide processes with entire ecosystems of computational artifacts that involve end product vendors as well as their suppliers. This presentation will give an overview of the changing landscape along the various axes and highlight some emerging value drivers to advance the use of Modeling & Simulation in the engineering of technical systems.



**SHORT BIO:**

Pieter J. Mosterman is a Senior Research Scientist at MathWorks in Natick, Massachusetts, where he works on computational modeling, simulation, and code generation technologies. He also holds an adjunct professor position at the School of Computer Science at McGill University. Prior to this, he was a research associate at the German Aerospace Center (DLR) in Oberpfaffenhofen. He earned his PhD in Electrical and Computer Engineering from Vanderbilt University in Nashville, Tennessee, and his M.Sc. in Electrical Engineering from the University of Twente, the Netherlands. His primary research interests are in Computer Automated Multiparadigm Modeling (CAMPaM) with principal applications in design automation, training systems, and fault detection, isolation, and reconfiguration. Dr. Mosterman designed the Electronics Laboratory Simulator that was nominated for The Computerworld Smithsonian Award by Microsoft Corporation in 1994. In 2003, he was awarded the IMechE Donald Julius Groen Prize for his paper on the hybrid bond graph modeling and simulation environment HyBrSim. In 2009, he received the Distinguished Service Award of The Society for Modeling and Simulation International (SCS) for his services as editor in chief of SIMULATION: Transactions of SCS. Dr. Mosterman was guest editor for special issues on CAMPaM of SIMULATION, IEEE Transactions on Control Systems Technology, and ACM Transactions on Modeling and Computer Simulation. He has chaired over 30 scientific events, served on more than 100 international program committees, published over 100 peer reviewed papers, and is the inventor on over 80 awarded patents.

# Keynote Speaker

**TITLE:** Cloud Computing – Issues, Trends, Problems and Solutions

**AUTHOR:** Helen Karatza, Department of Informatics  
Aristotle University of Thessaloniki, Greece

**DATE/TIME:** Tuesday July 26th, 2016 | 08:30-09:15

**ABSTRACT:**

Cloud computing is an emerging computing paradigm which offers computational services to scientists, consumers and enterprises as utilities, on a pay-per-use approach.

However, there are important issues that must be addressed for cloud systems, such as: performance, resource allocation, efficient scheduling, energy conservation, reliability, protection of sensitive data, security and trust, cost, availability, quality. Furthermore, due to the cost of electrical power consumption and the environmental impact, energy efficiency in cloud systems is a global IT concern. Effective management of cloud resources is crucial to use effectively the power of these systems and achieve high system performance.

The cloud computing paradigm can offer various types of services, such as computational resources for complex applications, web services, social networking, urban mobility, health care, environmental science, etc. Resource allocation and scheduling is a difficult task in clouds where there are many alternative heterogeneous computers. The scheduling algorithms must seek a way to maintain a good response time to leasing cost ratio. Furthermore, adequate data security and availability are critical issues that have to be considered along with energy-efficient solutions that are required to minimize the impact of cloud computing on the environment.

Recently, the enormous growth of cloud computing together with the advance in mobile technology have led to the new era of Mobile Cloud Computing. Efficient and reliable management of distributed resources in mobile clouds became more important as more and more users collaborate computationally over the Internet via powerful mobile devices. Furthermore, the simultaneous usage of services from different Clouds can have additional benefits such as lower cost and high availability.

In this talk we will present state-of-the-art research covering a variety of concepts on cloud computing, based on existing or simulated cloud systems, that provide insight into problems solving and we will provide future directions in the cloud computing area. Advanced modelling and simulation techniques are a basic aspect of performance evaluation that is needed before the costly prototyping actions required for cloud systems.

**SHORT BIO:**

Helen Karatza is a Professor in the Department of Informatics at the Aristotle University of Thessaloniki, Greece. Dr. Karatza's research interests include Computer Systems Modeling and Simulation, Performance Evaluation, Grid and Cloud Computing, Energy Efficiency in Large Scale Distributed Systems, Resource Allocation and Scheduling and Real-time Distributed Systems.

Professor Karatza has authored or co-authored over 200 publications including four papers that earned best paper awards at international conferences. She is senior member of SCS, IEEE and ACM, and she served as an elected member of the Board of Directors at Large of the Society for Modeling and Simulation International (2009-2011). She has served as General Chair, Program Chair and Keynote Speaker in International Conferences. She has also been Editor and Guest Editor in International Journals. <http://agent.csd.auth.gr/~karatza/>



# Keynote Speaker

**TITLE:** Co-simulation: Serving Multiple Masters

**AUTHOR:** Hans Vangheluwe, University of Antwerp, Belgium and McGill University, Montreal, Canada

**DATE/TIME:** Tuesday, July 26th, 2016 | 09:15-10:00

**ABSTRACT:**

The relationship between system integrators and their suppliers puts ever increasing demands on modelling and simulation technology. The supplier wants (1) to evaluate, using modelling and simulation, the suitability/optimality of a single component available from multiple suppliers and (2) to perform early system integration and evaluation of multiple heterogeneous components developed by different suppliers. The evaluation may cover both functional and non-functional (e.g., safety, energy efficiency) properties. The challenge is to evaluate while keeping supplier IP protected.

In this presentation, different alternative solutions will be investigated, with a particular focus on co-simulation. In co-simulation, suppliers share only pre-compiled components, known as Functional Mockup Units (FMUs). The FMUs hide IP, but do expose sufficient information in their API to allow for meaningful orchestrated co-simulation. The current Functional Mockup Interface (FMI) standard defines both a model-simulation solver interface and an interface between the FMU (a model/simulation solver combination) and the context in which it is used. FMUs are commonly combined using a "master" simulator which orchestrates the interleaving of the individual simulators.

An obvious challenge with pre-compiled components which expose only limited information is to guarantee overall correct simulation results. Correctness ranges from numerical stability to satisfying domain (e.g., physics conservation) laws. At the root of this is the need for compositionality of the components.

The presentation will further explore some research challenges: optimizing overall simulation performance by constructing optimal master algorithms; the combination of multiple modelling formalisms (in particular, continuous-discrete combinations); the inclusion of models at different levels of abstraction in a single FMU; support for dynamic-structure models, including possible changes in computational causality; the introduction of non-deterministic models, to for example model the environment in which a system operates.

**SHORT BIO:**

Hans Vangheluwe is a Professor in the department of Mathematics and Computer Science at the University of Antwerp in Belgium, an Adjunct Professor in the School of Computer Science at McGill University, Montreal, Canada and an Adjunct Professor at the National University of Defense Technology in Changsha, China.

In a variety of projects, often with industrial partners, he develops and applies the theory, techniques and tools of Multi-Paradigm Modelling (MPM) in application domains as diverse as waste water treatment and automotive software. MPM promotes explicit modelling of all aspects, including the development process, of a problem, using most appropriate formalisms and abstractions.

Main enablers are modelling language engineering, including meta-modelling and model transformation. He is an Associate Editor of ACM's Transactions on Modeling and Computer Simulation (TOMACS), of the International Journal of Critical Computer-Based Systems, and of the International Journal of Adaptive, Resilient and Autonomic Systems. He is the chair of the EU COST Action Multi-Paradigm Modelling for Cyber-Physical Systems (MPM4CPS).





# Keynote Speaker

**TITLE:** Connected Vehicles Meet Smart Transportation for Smart Cities

**AUTHOR:** Professor Azzedine Boukerche, FEIC, FCAE, FAAAS, Canada  
Research Chair Tier-1, DIVA Strategic Research Network, University of Ottawa,  
Canada

**DATE/TIME:** Wednesday July 27th, 2016 | 08:30-09:15

**ABSTRACT:**

Recent UN report estimates a continuing population growth and urbanization will add 2.5 billion people to the world's urban population by 2050 and 2.9 billion vehicles in the world and at most likely two billion of that will be in new emerging developing countries. If you think traffic jam is bad, just wait.

As a consequence, in order to be the most livable, sustainable and competitive, cities around the world are actively experimenting with smart technologies to pave the way for a smart transportation system (ITS).

This talk will consist in an overview about the major research projects related to the design of "cognitive" cars and smart roads applications, which we are currently investigating at the DIVA Strategic Research Network and TRANSIT Network and PARADISE Research Laboratory, University of Ottawa. Next we shall focus on the main challenges, modeling, simulation and design issues and discuss some results obtained recently. Finally, if time permits, we will talk about LIVE testbed, a convergence of distributed simulation, wireless multimedia and vehicular sensor technologies we are developing at DIVA and PARADISE Research Laboratory for an urban vehicular grid. This testbed will facilitate and enable us to evaluate and design new protocols and applications for future generations of connected vehicular and sensor network technologies.

**SHORT BIO:**

Azzedine Boukerche is a Full Professor and holds a Canada Research Chair Tier-1 position at the University of Ottawa. He is the Scientific Director of NSERC-DIVA Strategic Research Network and NSERC TRANSIT Research Network, and a Director of PARADISE Research Laboratory at University of Ottawa. Prior to this, he held a faculty position at the University of North Texas, USA. He worked as a Senior Scientist at the Simulation Sciences Division, Metron Corporation located in San Diego. He spent a year at the JPL/NASA-California Institute of Technology where he contributed to a project centered about the specification and verification of the software used to control interplanetary spacecraft operated by JPL/NASA Laboratory.

Dr. Boukerche is a Fellow of IEEE, a Fellow of the Engineering Institute of Canada, a Fellow of the Canadian Academy of Engineering, a Fellow of the American Association for the Advancement of Science, the recipient of the Ontario Distinguished Researcher Award, the Premier of Ontario Research Excellence Award, the G. S. Glinski Award for Excellence in Research, The IEEE Computer Society Golden Core Award, The IEEE CS- Meritorious Award, the University of Ottawa Award for Excellence in Research, IEEE Canada G. Gotlieb Computer Silver Medal Award, the Spanish Catedra de Excelencia, IEEE ComSoc Outstanding Technical Achievement Award, the IEEE Computer Society TCPP Technical Achievement and Contributions Award. Dr. A. Boukerche serves as an Associate Editor for several IEEE Transactions and ACM journals, as well as a Steering Committee Chair for several IEEE and ACM international conferences.

His current research interests include smart city, smart transportation, vehicular networks, sensor networks, mobile ad hoc networks, wireless multimedia and pervasive computing, performance evaluation and modeling of large-scale distributed systems, and large-scale distributed interactive simulation. Dr. Boukerche has published extensively in these areas, and he is the recipient of several best research paper awards for his work on smart transportation, vehicular and sensor networking and mobile computing. He is the Editor of three books on mobile computing, wireless ad hoc and sensor networks.



# Keynote Speaker

**TITLE:** The Role of Bond Graphs in Modeling Cyber-physical Systems

**AUTHOR:** Professor François E. Cellier, ETH (Swiss Institute of Technology)

**DATE/TIME:** Wednesday July 27th, 2016 | 09:15-10:00

**ABSTRACT:**

The last decade has seen great advances in the modeling of cyber-physical systems. These were enabled by the development of Modelica, a modeling language primarily based on the former Dymola language specification and tool. The Modelica language specification is being maintained by the Modelica Association and, contrary to the former Dymola language, which was proprietary, Modelica, as a language specification, is in the public domain. While the modern Dymola tool is still the most advanced of all Modelica implementations and continues to be proprietary, OpenModelica, an implementation available to anyone at no cost, is already quite competitive thanks to generous funding obtained by the European Community over the last decade.

Equally important as the language specification is the Modelica Standard Library (MSL), also maintained by the Modelica Association, that offers a very large repository of well-tested component models from the mechanical, electrical, thermal, and fluid dynamics domains. Domain experts with only limited knowledge of modeling methodology and/or simulation technology are able to make use of the MSL to construct models of complex physical systems painlessly and reliably.

Modelica has meanwhile become the de facto industry standard for all modeling endeavors involving lumped parameter models of physical systems, and the Modelica Conferences, organized by the Modelica Association in 18 months intervals, draw regularly 500 and more attendees from academia, industry, and the government sector, who wish to hear about the newest developments in the Modelica language and tools. These are high-caliber events of great impact.

Although Modelica is capable of supporting bond graph modeling easily and conveniently, there are no bond graphs used in the development of the MSL. Very few of the Modelica designers have any knowledge of bond graph technology whatsoever. Have bond graphs become obsolete? Can the community of bond graph modelers continue to contribute valuable knowledge to the modeling of cyber-physical systems? Are there features that bond graphs have to offer that other modeling methodologies lack? Is it possible to convince the community of Modelica modelers of the value of bond graphs? These are some of the questions that will be pondered in this presentation.

**SHORT BIO:**

François E. Cellier received his BS degree in electrical engineering in 1972, his MS degree in automatic control in 1973, and his PhD degree in technical sciences in 1979, all from the Swiss Federal Institute of Technology (ETH) Zurich. Dr. Cellier worked at the University of Arizona as professor of Electrical and Computer Engineering from 1984 until 2005. He returned to his home country of Switzerland and his alma mater in the summer of 2005. He subsequently worked in the Computer Science Department of ETH Zurich until his retirement in 2013.

Dr. Cellier's main scientific interests concern modeling and simulation methodologies and the design of advanced software systems for simulation, computer-aided modeling, and computer-aided design. Dr. Cellier has authored or co-authored more than 200 technical publications, and he has edited several books. He published a textbook on Continuous System Modeling in 1991 and a second textbook on Continuous System Simulation in 2006, both with Springer-Verlag, New York. He is a fellow of the Society for Modeling and Simulation International (SCS), and a member of the Swiss Academy of Technical Sciences (SATW).



# **Tutorials**

# Tutorial I

## **On the Basics of Model-Free Stock Trading Including Algorithms and Simulation**

**Speaker:** B. Ross Barmish, University of Wisconsin

**Time:** Sunday, 09:00-10:30

**Location:** Room 521C

### **Abstract**

This tutorial will describe both the theory and computational aspects associated with a new direction of research: development of model-free algorithms for stock trading and portfolio management. In contrast to existing literature, the methods which we describe exploit the adaptive power and robustness of feedback loops. By “model-free,” we mean the following: Neither an explicit nor a parameterized model of the stock price dynamics is used to determine the time-varying investment level. Instead, by using feedback in what we call a “reactive” manner, the trading algorithm rebalances the investment level over time based on the observed pattern of gains and losses. In this setting, we seek to establish certain robustness properties of the resulting closed loop trading system. This work falls under the umbrella of “technical analysis” in nearly its purest form.

Once the central ideas have been introduced, the emphasis in the tutorial will be shifted from theory to practice. To this end, we will describe a number of Matlab-based software implementations which are used for back-testing simulations using both historical and synthetic data. For the case of historical data, the algorithms are implemented using low frequency daily closing prices and higher frequency tick data. For the case of synthetic data, performance is benchmarked using samples paths from a well-known stochastic process such as geometric Brownian motion. Finally, attention will be also paid to other significant practical considerations such as the inclusion of brokerage and transaction costs, leverage and margin.

# **Tutorial II**

## **The Micro Simulation Tool (MIST) How to Create Basic Disease Models**

**Speaker: Dr. Jacob Barhak**

**Time: Sunday, 10:30-12:00**

**Location: Room 521C**

### **Abstract**

The Micro Simulation Tool is free software that supports modeling, simulation, and result viewing of chronic disease models. The tutorial will consist of guided creation of several simple disease model examples, their simulation, and creation of reports. The tutorial will give examples of parameter definition, and the use of the strict Domain Specific Language MIST uses and its role within creation of Monte Carlo Simulations.

In this 90' tutorial attendees will also learn about advanced MIST capabilities such as population generation with Evolutionary Computation and running simulations on High Performance Computing Environments such as the Amazon Elastic Compute Cloud.

# Tutorial III

## Bioinformatics Knowledge Modeling Framework

**Speaker:** Dr. Moroccan Massoud Yassa, Cairo University

**Time:** Sunday, 13:30—15:00

**Location:** Room 521C

### Abstract

The information, generated by Bioinformatics research, is increasing in a rapidly manner, care provisioned to the patients relies on complex medical documentation consisting of data of different nature. Also, opportunity exists in utilizing these vast amounts of valuable information for benefit in fitness and the disease conditions. Currently, health informatics is going through fundamental changes due to several developments such as large scale projects, the challenges related to the integration of different health care providers/facilities. This state of affairs means that the success of health informatics initiatives and of health care delivery relies on the cooperation of several health caregivers and their exchange of patient information at the right time, in the format, and at the right place. Therefore, if one agrees that within medical documentation lies the very heart of clinical impressions and planning, what if a computer can (i) correctly parse and annotate medical documentation; (ii) build high semantic structures out of unstructured documents from various electronic sources, and (iii) predict clinical contexts.

Health Virtual Communities present several advantages; many challenges are still ahead and opportunities as well. The challenge is in representation, integration, analysis, interpretation of the available knowledge and data, management of heterogeneous data, the integration and transfer of enriched data, the effective use of knowledge-based decision systems, sharing of knowledge automatically from huge volumes of data. The above challenge arise the need for Bioinformatics Knowledge Modeling Framework, which should provide an answer for the question "How collection, sharing and re-uses of biomedical Big Data should be regulated?"

This 90' tutorial addresses the above challenges by presenting an ontological framework for medical documentation processing and analysis, whereby the document is no longer inert to information technology, but a rich source for knowledge acquisition and a road map to drive a wide range of software processes which range from collaborative treatment planning to just-in-time decision support. In particular, we present a new approach to combining benefits of Model Driven Software Development, knowledge modeling, ontology engineering, and context processing to address current challenges of medical documentation processing for healthcare collaboration.



# **Tutorial IV**

## **Intelligent Transportation Systems and Vehicular Ad Hoc Networks: From Modeling to Simulation of Networked Vehicles, Mobility Models and Performance Parameters in Future Smart Cities**

**Speaker:** Dr. Floriano De Rango, University of Calabria

**Time:** Sunday, 15:30—17:00

**Location:** Room 521C

### **Abstract**

Intelligent Transportation Systems are becoming a strategic sector in the new generation of Smart Cities. In the future smart vehicles will be able to support drivers during the trip avoiding accidents and reducing the CO2 emissions in the city. Smart Vehicles will contribute to obtain a sustainable mobility maintaining some grade of comfort for people that travel every day for their work, for shopping or other daily activities. In this scenario, it is important to offer advanced services to public transportation and to manage in complex city a mix of public and private transportation vehicles. At this purpose the new technologies related to Vehicular Ad Hoc Networks (VANET), 5G networks and Internet of Things can provide interesting support in building innovative and advances services attributing to each single vehicle much more than classical functionality of transportation. Smart Vehicles can be autonomous, can be active part in the communication in infrastructured networks, can be a network of mobile multi-task sensors or can be a social element in the complex social networks.

In this 90' tutorial attendees will learn about advanced VANET technologies, new modeling techniques to design and simulate smart vehicles integrating more ICT technologies and advanced communication paradigm going for IoT devices inside vehicles, to multi-task sensors, from smart cameras to cloud of vehicles, from single car movement to platooning strategies and mobility model characterization. Some simulation tools will be also shown in order to assess realistic mobility models, coverage plans and communication among vehicles for Freeway Streets and Dense Urban Centers.

# **Tutorial V**

## **Continuous Modeling Simulation**

**Speaker: Roberto Ciani and Agostino Bruzzone, DIME, University of Genoa**

**Time: Sunday, 13:30—15:00**

**Location: Room 522B**

### **Abstract**

This tutorial, mainly addressed to young researchers and PhD students, illustrates the use of PDE (partial differential equation) techniques to solve diffusion problems of interest in the field of contaminant control for security purposes.

Applications of continuous modelling simulation techniques related to the study of the partial differential equation (PDE) of diffusion are illustrated by use of a case study related to the analysis of contaminant transport in porous media. This case is important in environmental and mechanical engineering, soil physics, chemical and petroleum engineering. The space-time concentration of a reactant pollutant in groundwater can be computed with the advection-dispersion equation (ADE). Usually the solution of this equation in three-dimensional problems requires the use of discretized numerical algorithms. However, a great number of analytical solutions of the ADE have been proposed and the importance on these solutions is high due to their ease of use and limited costs. In literature various ADE analytical solutions have been presented in open and closed form.

These analytical solutions are useful to study the effects of chemical-physical parameters for pollutant transport, for furnishing pollution scenarios in risk analysis and also to validate the numerical computations. Multi-dimensional exact analytical solutions in semi-finite or finite domain are usually expressed in open form and include integrals to be numerically evaluated, or contain infinite series. Here by considering a semi-finite domain for a reacting solute under first order decay and linear absorption described by a retardation factor, we propose an original closed form analytical solution of the one-dimensional ADE. The contamination source is described by a third-type boundary condition, representing a combined production-decay release mechanism. The most used methods to find the analytical solutions are Fourier analysis, Laplace transform and expansion in Bessel or Hankel functions.

# **Tutorial VI**

## **Getting Started with Bond Graph Method for Modeling and Simulation**

**Speaker:** Jose J. Granda, California State University, Sacramento

**Time:** Sunday, 15:00—17:00

**Location:** 522B

### **Abstract**

This tutorial is designed for those who do not know the bond graph method but would like to learn it. Intended for those who have never used it or those who are curious what this technology is. The intention is to start at ground zero and give the audience a good start on the bond graph modelling method and simulation. Computer Models of Mechanical, Electrical, and Hydraulic systems play a central role on the design of current electromechanical devices. This introductory tutorial will present fundamental concepts of the different components and how with the aid of software such as CAMPG (Computer Aided Modelling Program), engineers and scientists can get information that reveals how computer models and simulation can predict the behaviour of dynamic systems in real life. The Bond Graph modelling method is ideal for Mechatronics systems since it can process systems in several energy domains mechanical, electrical, hydraulic, and thermodynamic or a combination of them.

### **TUTORIAL TOPICS:**

**What are bond graphs?**

**How they model a real physical dynamic system.**

**Basic Definitions. Bond Graphs, vs Block Diagrams**

**Basic Physical Elements and fundamental laws**

**Modelling and simulation in the time domain.**

**Mechanical Systems**

**Electrical Systems**

**Hydraulic Systems**

**Simulation of Models using the package CAMPG/MATLAB**

**Computer generated differential equations,, transfer functions and state space form for the time and frequency domain.**

# **Student Colloquium**

# **Student Colloquium**

## **Student Colloquium Schedule**

**Monday, 16:00-17:30, Room 521C**

**Chair: Gabriela Nicolescu**

The colloquium is intended to bring together students in both early and advanced stages of their careers who are working on any modeling and simulation topics, to provide them a friendly forum and an opportunity to present, discuss and illustrate their ongoing research in a constructive and enjoyable atmosphere. Each student will have 10 minutes to present. All conference registrants are welcome to attend.

**1. “Partitioned Scheduling of Full Mission Simulators on Heterogeneous Parallel Architectures using NSGA-II”**

**By Rabeh Ayari, Imane Hafnaoui, Giovanni Beltrame and Gabriela Nicolescu**

**2. “Data Criticality of Real-Time Systems based on Error Propagation”**

**By Imane Hafnaoui, Rabeh Ayari, Gabriela Nicolescu and Giovanni Beltrame**

**3. “Accelerating Influence Maximization on Social Networks in the Continuous-time Domain”**

**By Zissis Poulos and Andreas Veneris**

**4. “A generic simulation-based multi-objective optimization approach: production and logistics optimization considering the production layout”**

**By Enrique Ruiz Zúñiga, Matias Urenda Moris and Anna Syberfeldt**

**5. “Agent based simulation of forced displacement: Case of Iraq”**

**By Maria Chiara Curinga and Luigi Emanuele Alessio**

**6. “Agent based modeling of vulnerability and resilience of airline routes”**

**By Luigi Emanuele Alessio and Maria Chiara Curinga**

**7. “A Simulator for DRONES Management in Agriculture Applications”**

**By Giuseppe Potrino, Antonello Venturino and Nunzia Palmieri**

**8. “A Simulator for Early-Warning Systems Management at Global Level”**

**By Luigi Fragale, Giuseppe Campisano and Floriano De Rango**

# Notes



# **Conference at-a-Glance**

# Conference at a Glance

Monday, July 25th		8:00-10:00		10:30-12:00		13:30-15:30		16:00-17:30
	ADS	Welcome (Room 524A)  Keynote 1/Plenary (Room 524A)  Keynote 2/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:00-13:30	No Sessions	Break: 15:30-16:00	No Sessions
	MSIAAS	Welcome (Room 524A)  Keynote 1/Plenary (Room 524A)  Keynote 2/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:00-13:30	No Sessions	Break: 15:30-16:00	No Sessions
	MSES	Welcome (Room 524A)  Keynote 1/Plenary (Room 524A)  Keynote 2/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:00-13:30	[523A] •Solving on-Demand Transport Problem through Negotiation •Modeling of Responsibility Supply Chain Management in Industry—Industrial Pollution and its Effect •Cyber Paper: See Page 37	Break: 15:30-16:00	No Sessions
	GCMS	Welcome (Room 524A)  Keynote 1/Plenary (Room 524A)  Keynote 2/Plenary (Room 524A)	Break: 10:00-10:30	[Room 523B] •Multi-agent Systems for Air Traffic Conflicts Resolution by Using a Casual Analysis of Spatio-temporal Interdependencies •Modeling Decisions in Layered Queueing Networks •Simulation-based Schedulability Assessment for Real-Time Systems	Lunch: 12:00-13:30	[Room 523B] •Architecture-based Simulation for System Evaluation •Simulating Restaurant Traffic Using Wi-Fi Data •A Thermal Driven Floorplanning Algorithm for Three Dimensional Network-on-Chip Systems •Modeling-to-Simulation: Transformation Approaches to Boost Automation in Modeling & Simulation	Break: 15:30-16:00	[Room 523B] •Resource-based Modeling and Simulation of Business Processes •Modeling Side-Channel Cache Attacks on AES •A Directional MAC Module Extending Omnet++ Simulator

# Conference at a Glance

	8:00-10:00		10:30-12:00		13:30-15:30		16:00-17:30	Monday, July 25th
BMPM	Welcome (Room 524A)  Keynote 1/Plenary (Room 524A)  Keynote 2/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:00-13:30	No Sessions	Break: 15:30-16:00	No Sessions	
CGS	Welcome (Room 524A)  Keynote 1/Plenary (Room 524A)  Keynote 2/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:00-13:30	No Sessions	Break: 15:30-16:00	No Sessions	
WIP	Welcome (Room 524A)  Keynote 1/Plenary (Room 524A)  Keynote 2/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:00-13:30	No Sessions	Break: 15:30-16:00	No Sessions	
Cyber	Welcome (Room 524A)  Keynote 1/Plenary (Room 524A)  Keynote 2/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:00-13:30	[Room 523A] ●MSES Papers: See Page 34 ●The Impact of Hierarchy on Bluetooth-Based Malware Spread in Mobile Tactical Networks	Break: 15:30-16:00	No Sessions	

# Conference at a Glance

Monday, July 25th		8:00-10:00		10:30-12:00		13:30-15:30		16:00-17:30
	EMS	Welcome (Room 524A)  Keynote 1/Plenary (Room 524A)  Keynote 2/Plenary (Room 524A)	Break: 10:00-10:30	<i>[Room 521C]</i> •Use of Simulation in Managing Reusable Medical Equipment Inventory in Surgical Services •Simulating Campus Evacuation: Case of York University •EXTENDED WIFI Network Formal Design Model for Ubiquitous Emergency Events	Lunch: 12:00-13:30	<i>[Room 521C]</i> •Stroke Prediction Context-Aware Health Care System •SURVEY of Health Care Context Models; Prototyping of Healthcare Context Framework •Innovative Simulation for Scenario Analysis and Operational Planning •A Simulation of One Dimensional Contaminant Transport	Break: 15:30-16:00	<i>No Sessions</i>
	MSS	Welcome (Room 524A)  Keynote 1/Plenary (Room 524A)  Keynote 2/Plenary (Room 524A)	Break: 10:00-10:30	<i>[Room 523A]</i> •Second order GDEVS Abstraction of Electronic Circuits •A Simplified Hourly Calculation Code to Evaluate the Buildings Heating Load: A Case Study for Italian Climatic Conditions •A Simulation Approach to the Decision Making Structures Analysis to Support Curriculum Quality for Higher Education Sustainability (WIP)	Lunch: 12:00-13:30	<i>No Sessions</i>	Break: 15:30-16:00	<i>No Sessions</i>
	SLCS	Welcome (Room 524A)  Keynote 1/Plenary (Room 524A)  Keynote 2/Plenary (Room 524A)	Break: 10:00-10:30	<i>No Sessions</i>	Lunch: 12:00-13:30	<i>No Sessions</i>	Break: 15:30-16:00	<i>[Room 523A]</i> •Formal Verification of DECS Simulation: Web Search Engine Model Case Study •Critical Nodes Count Algorithm for Accurate Input Vectors Reliability Ranking •Performance Impact of Packet Multiplexing on massive Multiplayer Online Games
	SDF	Welcome (Room 524A)  Keynote 1/Plenary (Room 524A)  Keynote 2/Plenary (Room 524A)	Break: 10:00-10:30	<i>No Sessions</i>	Lunch: 12:00-13:30	<i>No Sessions</i>	Break: 15:30-16:00	<i>No Sessions</i>

# Conference at a Glance

	8:00-10:00		10:30-12:00		13:30-15:30		16:00-17:30	
V&V	Welcome (Room 524A)  Keynote 1/Plenary (Room 524A)  Keynote 2/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:00-13:30	No Sessions	Break: 15:30-16:00	No Sessions	
SCSC	Welcome (Room 524A)  Keynote 1/Plenary (Room 524A)  Keynote 2/Plenary (Room 524A)	Break: 10:00-10:30	[Room 523A] •MSS Papers: See Page 38	Lunch: 12:00-13:30	[Room 523A] •MSES Papers: See Page 36 •Cyber Papers: See Page 37	Break: 15:30-16:00	[Room 523A] •SLCS Papers: See Page 38	
ICBGM	Welcome (Room 524A)  Keynote 1/Plenary (Room 524A)  Keynote 2/Plenary (Room 524A)	Break: 10:00-10:30	[Room 525B] •Numerical Integration Solution of Stationary Power Systems Induced by the Port-based Approach •Structuring Residuals by Faults Structural Decoupling from Bicausal Diagnostic Bond Graph •Extension of Lagrangian-Hamiltonian Mechanics: Umbra Poisson Bracket using Bond <i>Graphs</i>	Lunch: 12:00-13:30	[Room 525B] •Bond Graph Models for Reconstruction of Vehicle Barrier Equivalent Speeds •A Physically Intuitive Yaw-Plane Bond Graph Model for Vehicle Active Safety System Design •Modeling Ground Vehicles with Active Suspension Kinematics using Bond Graphs	Break: 15:30-16:00	[Room 525B] •Bond Graph Analysis of an Electromechanical Actuator for use in Automotive Suspensions •Analysis of Stick-Slip Friction between the Drillstring and Borehole Wall in Horizontal Wells •Practical Considerations of Bond Graph Causality for Physical Systems with Nonlinear Geometry	
SPECTS	Welcome (Room 524A)  Keynote 1/Plenary (Room 524A)  Keynote 2/Plenary (Room 524A)	Break: 10:00-10:30	[Room 525A] •Signaling Overhead and Feedback Delay Reduction in Heterogeneous Multicell Cooperation Networks •Improved Self Pruning for Broadcasting in Ad Hoc Wireless Network •Bandwidth and Power Efficiency Analysis in Fading Communication Link	Lunch: 12:00-13:30	[Room 525A] •Optimizing the Energy Efficient VM Placement by IEFWA and Hybrid IEFWA/BBO Algorithms •Automatic Scheduling of Deadline-Constrained Bag of Tasks in Hybrid Clouds •A Priority Based Resource Scheduling Technique for Multitenant Storm Clusters •Scheduling Real-Time Parallel Applications in SaaS Clouds in the Presence of Transient Software Failures	Break: 15:30-16:00	[Room 525A] •Integrated Fuzzy Analytic Hierarchy Process and VIKOR method in the performance evaluation System •Coordination Techniques of Mobile Robots with Energy Constraints •Consensus in Dynamic Networks with Hybrid Faults	

Monday, July 25th

# Conference at a Glance

Tuesday, July 26th		8:30-10:00		10:30-12:00		13:30-15:30		16:00-17:30
	ADS	Keynote 3/ Plenary (Room 524A)  Keynote 4/Plenary (Room 524A)	Break: 10:00-10:30	[Room 523A] ●(SDF Papers: See Page 42)	Lunch: 12:00-13:30	[Room 523A] ●(SDF Papers: See Page 42) ●Agent-Based Ecological Risk Simulation of Malware Epidemics in Tactical Mobile Ad Hoc Networks ●Metamorphic Validation for Agent-Based Simulation Models	Break: 15:30-16:00	[Room 523A] ●Higher Order Synergies Among Agents, Simulation, and Model-Driven Engineering ●Understanding Impact of Stress on Workplace Outcomes Using and Agent Based Simulation ●Towards Modeling Factors that Enable an Attacker
	MSIAAS	Keynote 3/ Plenary (Room 524A)  Keynote 4/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:00-13:30	No Sessions	Break: 15:30-16:00	No Sessions
	MSES	Keynote 3/ Plenary (Room 524A)  Keynote 4/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:00-13:30	No Sessions	Break: 15:30-16:00	No Sessions
	GCMS	Keynote 3/ Plenary (Room 524A)  Keynote 4/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:00-13:30	No Sessions	Break: 15:30-16:00	No Sessions

# Conference at a Glance

	8:30-10:00		10:30-12:00		13:30-15:30		16:00-17:30	
<b>BMPM</b>	Keynote 3/ Plenary (Room 524A) Keynote 4/Plenary (Room 524A)	Break: 10:00-10:30	<i>[Room 523B]</i> •Population Modelling by Examples II •The Kidney Transplant Process Model (KTPM): Simulation Tool for the Transplant Process •A Mathematical Model of Ebola Virus Disease: Using Sensitivity Analysis to Determine Effective Intervention Targets	Lunch: 12:00-13:30	<i>[Room 523B]</i> •A Prediction Model to Identify Acute Myocardial Infarction (AMI) Patients at Risk for 30-Day Readmission •Simulation of Tumor Necrosis in Primary Melanoma •Smart Wearable Device for Health Monitoring in the Internet of Things Domain •Creating Populations with Partnerships for Large-Scale Agent-Based Models– a Comparison of Methods	Break: 15:30-16:00	<i>[Room 523B]</i> •Ecological Effects of Cyclically Fluctuating Resources •Investigating the Fidelity of an Improvement – Assessment Tool After One Vacuum Bell Treatment Session •Sharing Formats for Disease Models	
<b>CGS</b>	Keynote 3/ Plenary (Room 524A) Keynote 4/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:00-13:30	No Sessions	Break: 15:30-16:00	No Sessions	
<b>WIP</b>	Keynote 3/ Plenary (Room 524A) Keynote 4/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:00-13:30	No Sessions	Break: 15:30-16:00	<i>[Room 521C]</i> •Model and Identification of a Nonlinear Servo-Mechanical System •Asynchronous Approximate Simulation Algorithm for Stream Processing Platforms •6 DoF Aircraft Simulation Model Capable of Handling Maneuver Events •Design of an Agent-Based Model to Predict Crime	
<b>Cyber</b>	Keynote 3/ Plenary (Room 524A) Keynote 4/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:00-13:30	No Sessions	Break: 15:30-16:00	No Sessions	

Tuesday, July 26th

# Conference at a Glance

Tuesday, July 26th		8:30-10:00		10:30-12:00		13:30-15:30		16:00-17:30
	EMS	Keynote 3/ Plenary (Room 524A)  Keynote 4/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:00-13:30	No Sessions	Break: 15:30-16:00	No Sessions
	MSS	Keynote 3/ Plenary (Room 524A)  Keynote 4/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:00-13:30	No Sessions	Break: 15:30-16:00	No Sessions
	SLCS	Keynote 3/ Plenary (Room 524A)  Keynote 4/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:00-13:30	No Sessions	Break: 15:30-16:00	No Sessions
	SDF	Keynote 3/ Plenary (Room 524A)  Keynote 4/Plenary (Room 524A)	Break: 10:00-10:30	[Room 523A] •Simulating a Multicore Scheduler of Real-Time Control Systems in Simulink •A Distributed HW-SW Platform for Fireworks •A Simulation-Based Model Generator for Software Performance Estimation	Lunch: 12:00-13:30	[Room 523A] •Real-Time Hardware/ Software Co-Design using DEVS-Based Transparent M&S Framework •Modeling and Simulation of Optical Integrated Networks for Early-Stage Design Exploration (WIP) •(ADS Papers: See Page 40)	Break: 15:30-16:00	[Room 523A] •(ADS Papers: See Page 40)



# Conference at a Glance

	8:30-10:00		10:30-12:00		13:30-15:30		16:00-17:30	
V&V	Keynote 3/ Plenary (Room 524A) Keynote 4/Plenary (Room 524A)	Break: 10:00-10:30	<i>[Room 521C]</i> <ul style="list-style-type: none"> <li>On Simulation-based Metrics that Characterize the Behavior of RTL Errors</li> <li>Design of a Modeling and Validation Platform for Closed Loop Glucose Control</li> <li>Adaptive Parametric Tuning of Glucose-Insulin Kinetics Models Using Multilayer Perceptrons</li> </ul>	Lunch: 12:00-13:30	<i>[Room 521C]</i> <ul style="list-style-type: none"> <li>Rollback-Based Simulation for the Design of Continuous/Discrete Simulation Tools</li> <li>Simulation &amp; the Song Rule as Spotters and Validators of Analytical Results—A Note Correcting “System Reliability Results” in a Review of the Literature</li> <li>DEM Simulation of Enhancing Drilling Penetration using Vibration and Experimental Validation</li> </ul>	Break: 15:30-16:00	No Sessions	
SCSC	Keynote 3/ Plenary (Room 524A) Keynote 4/Plenary (Room 524A)	Break: 10:00-10:30	<i>[Room 523A]</i> <ul style="list-style-type: none"> <li>SDF Papers: See Page 42</li> </ul>	Lunch: 12:00-13:30	<i>[Room 523A]</i> <ul style="list-style-type: none"> <li>SDF Papers: See Page 42</li> <li>ADS Papers: See Page 40</li> </ul>	Break: 15:30-16:00	<i>[Room 523A]</i> <ul style="list-style-type: none"> <li>ADS Papers: See Page 40</li> </ul>	
ICBGM	Keynote 3/ Plenary (Room 524A) Keynote 4/Plenary (Room 524A)	Break: 10:00-10:30	<i>[Room 525B]</i> <ul style="list-style-type: none"> <li>Active Vibration Control Modeling in Bond Graph for Underwater Flexible Single Arm Robotic Manipulator</li> <li>Morpheus Planetary Lander Liquid Propellant Fluid SLOSH Modeling and Simulation Methods</li> <li>Multi-body Dynamics Modeling &amp; Control of Quadrotor Helicopter using Bond Graph</li> </ul>	Lunch: 12:00-13:30	<i>[Room 525B]</i> <ul style="list-style-type: none"> <li>Modeling and Simulation of Cervical Region of Spine using Bond Graphs</li> <li>Design of an Anti-tip-over Control for Counterbalance Fork Lifts using Bond Graph Models</li> </ul>	Break: 15:30-16:00	<i>[Room 525B]</i> <ul style="list-style-type: none"> <li>Definition of Essential Order on Descriptor Systems and its Bond Graph Determination</li> <li>Implementation and Simulation of Dynamic Models A Concise Reading of the Relationships Bond Graphs-Bock Diagrams</li> <li>Paynter Collected Work</li> </ul>	
SPECTS	Keynote 3/ Plenary (Room 524A) Keynote 4/Plenary (Room 524A)	Break: 10:00-10:30	<i>[Room 525A]</i> <ul style="list-style-type: none"> <li>Distributed Cached and Segmented Video Download for Video Transmission in Cellular Networks</li> <li>Evaluation of Capacity and Power Efficiency in Millimeter-Wave Bands</li> <li>Using Elected Coordination Stations for CSI Feedback on CoMP Downlink Transmissions</li> </ul>	Lunch: 12:00-13:30	<i>[Room 525A]</i> <ul style="list-style-type: none"> <li>A Cloud-based Service for Generating ns-3 network Simulation Programs</li> <li>A Generic and Open Simulation Tool for Large Multi-tiered Hierarchical Storage Systems</li> <li>Simulating Node Selfishness in Opportunistic Networks</li> <li>[Title 4]</li> </ul>	Break: 15:30-16:00	<i>[Room 525A]</i> <ul style="list-style-type: none"> <li>Enhanced User Security and Privacy Protection in 4G LTE Network</li> <li>Software-based Computing Platform as an Experimental Topology Assembled to Detect and Mitigate DDoS Attacks using Virtual Environments</li> <li>Meaningful Attack Graph Reconstruction Through Stochastic Marking Analysis</li> </ul>	

Tuesday, July 26th

# Conference at a Glance

Wednesday, July 27th		8:30-10:00		10:30-12:30		14:00-15:30		16:00-17:30
	ADS	Keynote 5/Plenary (Room 524A)  Keynote 6/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:30-14:00	No Sessions	Break: 15:30-16:00	No Sessions
	MSIAAS	Keynote 5/Plenary (Room 524A)  Keynote 6/Plenary (Room 524A)	Break: 10:00-10:30	<b>[Room 523A]</b> <ul style="list-style-type: none"> <li>• DEVSMML Studio: A Framework for Integrating Domain-Specific Languages for Discrete and Continuous Hybrid Systems into DEVS-Based M&amp;S Environment</li> <li>• A WESS-based Method for Anti-Submarine Simulation through Planning Waypoints of Helicopter (WIP)</li> <li>• Energy Consumption of Traditional Simulation Protocol Over SmartPhone: An Empirical Study (WIP)</li> <li>• Engineering IoT Applications by Means of Software Technology and Computer-Aided Simulation (WIP)</li> </ul>	Lunch: 12:30-14:00	No Sessions	Break: 15:30-16:00	No Sessions
	MSES	Keynote 5/Plenary (Room 524A)  Keynote 6/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:30-14:00	No Sessions	Break: 15:30-16:00	No Sessions
	GCMS	Keynote 5/Plenary (Room 524A)  Keynote 6/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:30-14:00	No Sessions	Break: 15:30-16:00	No Sessions

# Conference at a Glance

	8:30-10:00		10:30-12:30		14:00-15:30		16:00-17:30	Wednesday, July 27th
BMPM	Keynote 5/Plenary (Room 524A) Keynote 6/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:30-14:00	No Sessions	Break: 15:30-16:00	No Sessions	
CGS	Keynote 5/Plenary (Room 524A) Keynote 6/Plenary (Room 524A)	Break: 10:00-10:30	[Room 523B] ●Linking Virtual Environmental Conceptual Model Descriptions ●Centroidal Particles for Incentive Crowd Simulation ●GPU-Based Monte-Carlo Simulation for a Sea Ice Load Application	Lunch: 12:30-14:00	[Room 523B] ●Dynamic 3D Graph Visualizations in Julia ●Real-Time Anomaly Detection Along the Outer Walls of Circular Objects	Break: 15:30-16:00	No Sessions	
WIP	Keynote 5/Plenary (Room 524A) Keynote 6/Plenary (Room 524A)	Break: 10:00-10:30	[Room 521C] ●Production Logistics Design and Development Support Through Simulation-Based Optimization ●Developing an Interface between ANSY and Abaqus to Simulate Blast Effects on High Security Vehicles ●Aural Spatial Mapping Tool: Constraining the Signal Sphere of Influence Validation ●The Use of Simulation in Determining Operational Needs	Lunch: 12:30-14:00	No Sessions	Break: 15:30-16:00	No Sessions	
Cyber	Keynote 5/Plenary (Room 524A) Keynote 6/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:30-14:00	No Sessions	Break: 15:30-16:00	No Sessions	

# Conference at a Glance

Wednesday, July 27th		8:30-10:00		10:30-12:30		14:00-15:30		16:00-17:30
	EMS	Keynote 5/Plenary (Room 524A)  Keynote 6/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:30-14:00	No Sessions	Break: 15:30-16:00	No Sessions
	MSS	Keynote 5/Plenary (Room 524A)  Keynote 6/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:30-14:00	No Sessions	Break: 15:30-16:00	No Sessions
	SLCS	Keynote 5/Plenary (Room 524A)  Keynote 6/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:30-14:00	No Sessions	Break: 15:30-16:00	No Sessions
	SDF	Keynote 5/Plenary (Room 524A)  Keynote 6/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:30-14:00	No Sessions	Break: 15:30-16:00	No Sessions

# Conference at a Glance

	8:30-10:00		10:30-12:30		14:00-15:30		16:00-17:30	
V&V	Keynote 5/Plenary (Room 524A) Keynote 6/Plenary (Room 524A)	Break: 10:00-10:30	No Sessions	Lunch: 12:30-14:00	No Sessions	Break: 15:30-16:00	No Sessions	
SCSC	Keynote 5/Plenary (Room 524A) Keynote 6/Plenary (Room 524A)	Break: 10:00-10:30	[Room 523A] ●MSIAAS Papers: See Page 44	Lunch: 12:30-14:00	No Sessions	Break: 15:30-16:00	No Sessions	
ICBGM	Keynote 5/Plenary (Room 524A) Keynote 6/Plenary (Room 524A)	Break: 10:00-10:30	[Room 525B] ●A New Convention Bond Element for Multiphase Flow Through a Channel ●Modeling of Selective Catalytic Reduction Injection System using Bond Graphs for Real Time Solutions	Lunch: 12:30-14:00	[Room 525B] ●Bond Graph Modeling and Simulation of Liquid Metal Sloshing in Ladle ●Bond Graph Representation of Convection by Fluid Flow Along an Elastic Surface ●Dynamic Analysis of a Deep Water Riser using Bond Graphs	Break: 15:30-16:00	[Room 525B] ●Bond Graphs Aided Development of Mechanical Power Transmission for Aerospace Electromechanical Actuators ●Bond Graph for Modeling and Diagnostics of Proton Exchange Membrane Fuel Cell	
SPECTS	Keynote 5/Plenary (Room 524A) Keynote 6/Plenary (Room 524A)	Break: 10:00-10:30	[Room 525A] ●DASH-based Peer-to-Peer Video Streaming in Cellular Networks ●Subjective Video Quality Assessment of VP9 Compression Standard for Full HD Resolution ●Employing the Neural Networks to Parametrically Assess the Quality of a Voice Call ●[Title 4]	Lunch: 12:30-14:00	[Room 525A] ●Performance Evaluation of Energy Saving MAC Protocols in WSN Operating Systems ●Energy aware Communication between Smart IoT Monitoring Devices ●A Dynamic Monitoring for Energy Consumption Reduction of a Trust-Based Intrusion Detection System in Mobile Ad-hoc Networks	Break: 15:30-16:00	No Sessions	

Wednesday, July 27th

# Notes

# **Agendas**

# GCMS 2016 Agenda

Monday, 25 July 2016

8:00-10:00 (Room 524A): Opening Session & Keynote Speech (Plenary)

## Session 1

10:30-12:00 (Room 523B) Chair: Andrea D'Ambrogio

- *Multi-agent Systems for Air Traffic Conflicts Resolution by Using a Causal Analysis of Spatio-Temporal Interdependencies* by Miquel Angel Piera, Marko Radanovic and Xavier Leal
- *Modeling Decisions in Layered Queueing Networks* by Lianhua Li and Greg Franks
- *Simulation-based Schedulability Assessment for Real-Time Systems* by Rabeh Ayari, Imane Hafnaoui, Giovanni Beltrame and Gabriela Nicolescu

12:00-13:30 Lunch

## Session 2

13:30-15:30 (Room 523B) Chair: José L. Risco-Martin

- *Architecture-based Simulation for System Evaluation* by Bahram Yousefi and Alexander Levis
- *Simulating Restaurant Traffic Using Wi-Fi Data* by Jennifer Polack, Mary Clark and John Evan May
- *A Thermal Driven Forplanning Algorithm for Three Dimensional Network-on-Chip Systems* by Ranjita Kumari Dash, José L. Risco-Martin, Ashok Kumar Turuk and Jose L. Ayala
- *Modeling-to-Simulation: Transformation Approaches to Boost Automation in Modeling & Simulation* by Paolo Bocciarelli and Andrea D'Ambrogio

## Session 3

16:00-17:30 (Room 523B) Chair: Floriano De Rango

- *Resource-based Modeling and Simulation of Business Processes* by Andrea D'Ambrogio and Gregory Zacharewicz
- *Modeling side-channel cache attacks on AES* by Samira Briongos, Pedro Malagon, José L. Risco and José M. Moya
- *A Directional MAC module extending Omnet++ Simulator* by Vincenzo Inzillo and Floriano De Rango



# BMPM 2016 Agenda

Tuesday, 26 July 2016

8:30-10:00 (Room 524A): Keynote Speech (Plenary)

## Session IV

10:30-12:00 (Room 523B) Chair: Jacob Barhak

- *Population Modelling by Examples II* by Robert Smith? representing the Population Modelling Working Group
- *The Kidney Transplant Process Model (KTPM): Simulation Tool for the Transplant Process* by Christine Harvey
- *A Mathematical model of Ebola Virus Disease: Using Sensitivity Analysis to Determine Effective Intervention Targets* by Danny Salem and Robert Smith?

12:00-13:30 Lunch

## Session V

13:30-15:30 (Room 523B) Chair: Robin Gras

- *A Prediction Model to Identify Acute Myocardial Infarction (AMI) Patients at Risk for 30-Day Readmission* by Carl Asche, Jinma Ren, Minchul Kim, Kirkness Carmen, Yi Dong and Stephen Hippler
- *Simulation of Tumor Necrosis in Primary Melanoma* by Adrian KLusek, Witold Dzwinel and Arkadiusz Dudek
- *Smart Wearable Device for Health Monitoring in the Internet of Things Domain* by Amilcare Francesco Santamaria, Abdon Serianni, Pierfrancesco Raimondo, Floriano De Rango and Marco Froio
- *Creating Populations with Partnerships for Large-Scale Agent-Based Models - a Comparison of Methods* by Stefan Scholz, Bastian Surmann, Svenja Elkenkamp, Manuel Batram and Wolfgang Greiner

## Session VI

16:00-17:30 (Room 523B) Chair: Robert Smith?

- *Ecological Effects of Cyclically Fluctuating Resources* by Ryan Scott, Maryam Karim Pour and Robin Gras
- *Investigating the Fidelity of an Improvement-Assessment Tool After One Vacuum Bell Treatment Session* by Mohammad F. Obeid, Robert Obermeyer, Nahom Kidane, Robert Kelly and Frederic McKenzie
- *Sharing Formats for Disease Models* by Lucian Smith, Maciej Swat and Jacob Barhak

# CGS 2016 Agenda

Wednesday, 27 July 2016

8:30-10:00 (Room 524A): Keynote Speech (Plenary)

Session VII

10:30-12:30 (Room 523B) Chair: Gabriel Wainer

- *Linking Virtual Environment Conceptual Model Descriptions* by Lee Lacy, Christopher Van Duyne and David Batz
- *Centroidal Particles for Interactive Crowd Simulation* by Omar Hesham and Gabriel Wainer
- *GPU-Based Monte-Carlo Simulation for a Sea Ice Load Application* by Sara Ayubian, Shadi Alawneh and Jan Thijssen

12:30-14:00 Lunch

Session VIII

14:00-15:00 (Room 523B) Chair: Agostino Bruzzone

- *Dynamic 3D Graph Visualizations in Julia* by Chirag Jamadagni, Abhijith Anilkumar, Kevin Thomas Mathew, Manjunath Mulimani and Shashidhar Koolagudi
- *Real-time Anomaly Detection Along the Outer Walls of Circular Objects* by Benjamin Staar, Michael Lütjen and Michael Freitag

# WIP 2016 Agenda

Tuesday, 26 July and Wednesday, 27 July 2016

## Session VI: Tuesday 26 July

16:00-18:00 (Room 521C) Chair: Andrea D'Ambrogio

- *Model and Identification of a Nonlinear Servo-mechanical System (WIP)* by Xiang Zhang, Peiqing Ye and Hui Zhang
- *Asynchronous Approximate Simulation Algorithm for Stream Processing Platforms (WIP)* by Emilio Tapia, Veronica Gil-Costa and Mauricio Marin
- *6 DoF Aircraft Simulation Model Capable of Handling Maneuver Events (WIP)* by Seon Han Choi, Jun Hee Lee, Sang Hyun Lee, Do Dong Yoo, Jung Koo and Tag Gon Kim
- *Design of an Agent-Based Model to Predict Crime (WIP)* by Raquel Rosés Brüngger, Cristina Kadar and Irena Pletikosa Cvijikj

## Session VII: Wednesday 27 July

10:30-12:30 (Room 521C) Chair: Gabriela Nicolescu

- *Production Logistics Design and Development Support Through Simulation-based Optimization (WIP)* by Enrique Ruiz Zúñiga, Matias Urenda Moris and Anna Syberfeldt
- *Developing an Interface between ANSYS and Abaqus to Simulate Blast Effects on High Security Vehicles (WIP)* by Arash Ramezani, Enrico Hansen and Hendrik Rothe
- *Aural Spatial Mapping Tool: Constraining the Signal Sphere of Influence Validation (WIP)* by Merate Barakat
- *The Use of Simulation in Determining Operational Needs (WIP)* by Irene Collin and Richard McCourt

# V&V 2016 Agenda

Tuesday, 26 July 2016

8:30-10:00 (Room 524A): Keynote Speech (Plenary)

## Session IV

10:30-12:00 (Room 521C) Session Chair: Gabriela Nicolescu

- *On Simulation-based Metrics that Characterize the Behavior of RTL Errors* by Zissis Poulos, Ryan Berryhill, John Adler and Andreas Veneris
- *Design of a Modeling and Validation Platform for Closed Loop Glucose Control* by Ari Ramdial and Zeljko Zilic
- *Adaptive Parametric Tuning of Glucose-Insulin Kinetics Models Using Multilayer Perceptrons* by Ari Ramdial and Zeljko Zilic

12:00-13:30 Lunch

## Session V

13:30-15:30 (Room 521C) Session Chair: Zeljko Zilic

- *Rollback-Based Simulation for the Design of Continuous/Discrete Simulation Tools* by Luiza Gheorghe Iugan, Gabriela Nicolescu and Hanifa Boucheneb
- *Simulation & the Song Rule as Spotters and Validators of Analytical Results ---A Note Correcting "System Reliability Results" in a Review of the Literature* by Wheyming Song
- *DEM Simulation of Enhancing Drilling Penetration using Vibration and Experimental Validation* by Jinghan Zhong, Jianming Yang and Stephen Butt

# EMS 2016 Agenda

Monday, 25 July 2016

8:00-10:00 (Room 524A): Opening Session and Keynote Speech (Plenary)

Session I

10:30-12:00 (Room 521C) Session Chair: Francesco Longo & Agostino Bruzzone

- *Use of Simulation in Managing Reusable Medical Equipment Inventory in Surgical Services* by Tannaz Khaleghi, Alper Murat and Hakimmudin Kneemuchwala
- *Simulating Campus Evacuation: Case of York University* by Ali Asgary and Priscilla Lan Chung Yang
- *EXTENDED WIFI Network Formal Design Model for Ubiquitous Emergency Events* by Zayan Elkhalel, Hamid Mcheick and Hicham Ajami

12:00-13:30 Lunch

Session II

13:30-15:30 (Room 521C) Session Chair: Francesco Longo & Agostino Bruzzone

- *Stroke Prediction Context-Aware Health Care System* by Hamid Mcheick
- *SURVEY of Health Care Context Models; prototyping of Healthcare Context Framework* by Hicham Ajami, Hamid Mcheick and Zayan Elkhalel
- *Innovative Simulation for Scenario Analysis and Operational Planning* by Agostino Bruzzone, Marina Massei, Roberto Cianci, Francesco Longo, Matteo Agresta, Riccardo Di Matteo, Giovanni Luca Maglione and Roberta Sburlati
- *A Simulation of One Dimensional Contaminant Transport* by Roberto Cianci, Agostino Bruzzone and Roberta Sburlati

# SCSC General 2016 Agenda

Monday, 25 July 2016

8:00-10:00 (Room 524A): Opening Session and Keynote Speech (Plenary)

## Session I: Modeling and Simulation for Sustainability

10:30-12:00 (Room 523A) Session Chair: Björn Johansson

- *Second Order GDEVS Abstraction of Electronic Circuits* by Nesrine Driouche, Maamar El Amine Hamri and Norbert Giambiasi
- *A Simplified Hourly Calculation Code to Evaluate the Buildings Heating Load: A Case Study for Italian Climatic Conditions* by Natale Arcuri, Roberto Bruno and Gianluca Pizzuti
- *A Simulation Approach to the Decision Making Structures Analysis to Support Curriculum Quality for Higher Education Sustainability (WIP)* by Anatoly Kurkovsky

12:00-13:30 Lunch

## Session II: Modeling and Simulation for Environmental Systems - Cyber M&S, Ranges and Tools

13:30-15:30 (Room 523A) Session Chair: Zeljko Zilic

- *Solving On-Demand Transport Problem through Negotiation* by Anas Malas, Salah El Falou, Mo-hamad El Falou, Mhamed Itmi and Alain Cardon
- *Modeling of Responsible Supply Chain Management in Industry- Industrial Pollution and its Effects* by FATIMA ZAKIR, ALI REHMAN and Sultana Easmin Siddika
- *The Impact of Hierarchy on Bluetooth-Based Malware Spread in Mobile Tactical Networks* by Brian Thompson and James Morris-King

## Session III: Simulation for Large-Scale Computing Systems

16:00-17:30 (Room 523A) Session Chair: José L. Ayala

- *Formal Verification of DEVS Simulation: Web Search Engine Model Case Study* by Alonso In-ostrosa-Psijas, Veronica Gil-Costa, Gabriel Wainer and Mauricio Marin
- *Critical Nodes Count Algorithm for Accurate Input Vectors Reliability Ranking* by Walid Ibrahim and Hoda Amer
- *Performance Impact of Packet Multiplexing on Massive Multiplayer Online Games* by Marwa Dammak, Yassine Boujelben, Noura Sellami and Iryna Andriyanova

# SCSC General 2016 Agenda

Tuesday, 26 July 2016

8:30-10:00 (Room 524A): Keynote Speech (Plenary)

## Session IV: Simulation in the System Design Flow

10:30-12:00 (Room 523A) Session Chair: Seda Ogrenci Memik

- *Simulating a Multicore Scheduler of Real-Time Control Systems in Simulink* by Wei Li, Ramamurthy Mani, Pieter Mosterman and Teresa Hubscher-Younger
- *A Distributed HW-SW Platform for Fireworks* by Jesus Martin and Alberto Del Barrio
- *A Simulation-based Model Generator for Software Performance Estimation* by Imane Hafnaoui, Rabeh Ayari, Gabriela Nicolescu and Giovanni Beltrame

12:00-13:30 Lunch

## Session V: Simulation in the System Design Flow - Agent-Directed Simulation

13:30-15:30 (Room 523A) Session Chair: Alberto A. Del Barrio

- *Real-time Hardware/Software Co-design Using DEVS-based Transparent M&S Framework* by José L. Risco-Martín, Saurabh Mittal, Juan Carlos Fabero, Pedro Malagón and José L. Ayala
- *Modelling and Simulation of Optical Integrated Networks for Early-Stage Design Exploration (WIP)* by Felipe Gohring de Magalhaes, Fabiano Hessel, Odile Liboiron-Ladouceur and Gabriela Nicolescu
- *Agent-Based Ecological Risk Simulation of Malware Epidemics in Tactical Mobile Ad Hoc Networks* by James Morris-King
- *Metamorphic Validation for Agent-based Simulation Models* by Megan Olsen and Mohammad Raunak

## Session VI: Agent-Directed Simulation

16:00-17:30 (Room 523A) Chair: Levent Yilmaz

- *Higher Order Synergies among Agents, Simulation, and Model-Driven Engineering* by Levent Yilmaz
- *Understanding Impact of Stress on Workplace Outcomes Using an Agent Based Simulation* by Mayuri Duggirala, Meghendra Singh, Harshal Hayatnagarkar, Sachin Patel and Vivek Balaraman
- *Towards Modeling Factors that Enable an Attacker* by Daniele Vernon-Bido, Jose Padilla, Saikou Diallo, Hamdi Kayak and Ross Gore

# SCSC General 2016 Agenda

Wednesday, 27 July 2016

8:30-10:00 (Room 524A): Keynote Speech (Plenary)

Session: Modeling and Simulation for Intelligent, Adaptive and Autonomous Systems

10:30-12:30 (Room 523A) Chair: Marco Lützenberger

- *DEVSML Studio: A Framework for Integrating Domain-specific Languages for Discrete and Continuous Hybrid Systems into DEVS-based M&S Environment* by Saurabh Mittal and José L. Risco-Martín
- *A WESS-based Method for Anti-submarine Simulation through Planning Waypoints of Helicopter (WIP)* by Zhi Zhu, Yifan Zhu, Yonglin Lei and Hessam Sarjoughian
- *Energy Consumption of Traditional Simulation Protocol Over SmartPhone: An Empirical Study (WIP)* by ASAD MALIK, IMRAN MAHMOOD and AAKASH PERKASH
- *Engineering IoT Applications by means of Software Technology and Computer-Aided Simulation (WIP)* by Marco Lützenberger and Sahin Albayrak



# Notes

# ICBGM 2016 Agenda

Monday, 25 July 2016

**8:00-10:00** (Room 524A): Opening Session and Keynote Speech (Plenary)

## Technical Session 1: Bond Graph Theory 1

**10:30-12:00** (Room 525B) Session Chair: Geoff Rideout, Canada

- *Numerical Integration Solution of Stationary Power Systems Induced by the Port-based Approach* by Israel Núñez-Hernandez, Peter C. Breedveld, Gilberto Gonzalez-Avalos, Paul B.T. Weustink
- *Structuring Residuals by Faults Structural Decoupling from Bicausal Diagnostic Bond Graph* by Sia Kamel, Naamane Aziz, M'Sirdi Nacer
- *Extension of Lagrangian-Hamiltonian Mechanics: Umbra Poisson Bracket using Bond graphs* by Vikas Rastogi

**12:00-14:00** Lunch

## Technical Session 2: Vehicles and Transportation Systems

**14:00-15:30** (Room 525B) Session Chair: Jesús Félez, Spain

- *Bond Graph Models for Reconstruction of Vehicle Barrier Equivalent Speeds* by Jose Granda, Toby Gloekler
- *A Physically Intuitive Yaw-Plane Bond Graph Model for Vehicle Active Safety System Design* by D. Geoff Rideout, Payam Pooyafar
- *Modeling Ground Vehicles with Active Suspension Kinematics using Bond Graphs* by Alex Beckerman, Francis Assadian

## Technical Session 3: Mechanical Systems

**16:00-17:30** (Room 525B) Session Chair: Eilif Pedersen, Norway

- *Bond Graph Analysis of an Electromechanical Actuator for use in Automotive Suspensions* by Dean Karnopp
- *Analysis of Stick-Slip Friction between the Drillstring and Borehole Wall in Horizontal Wells* by Mejbahul Sarker, Geoff Rideout, Stephen Butt
- *Practical Considerations of Bond Graph Causality for Physical Systems with Nonlinear Geometry* by Donald Margolis

# ICBGM 2016 Agenda

Tuesday, 26 July 2016

8:30-10:00 (Room 524A): Keynote Speech (Plenary)

## Technical Session 4: Robotics

10:30-12:00 (Room 525B) Session Chair: Donald Margolis, USA

- *Active Vibration Control Modeling in Bond Graph for Underwater Flexible Single Arm Robotic Manipulator* by Sunil Kumar, Vikas Rastogi, Pardeep Gupta
- *Morpheus Planetary Lander Liquid Propellant Fluid Slosh Modeling and Simulation Methods* by Jose Granda, Louis. H Nguyen, Thomas Carlson, Solange Brocker, Gianmarco Sahragard-Monfared, Eric Fornalski,
- *Multi-body Dynamics Modeling & Control of Quadrotor Helicopter using Bond Graph* by Mohamed Raju Hossain, Nicholas Krouglicof

12:00-14:00 Lunch

## Technical Session 5: Control Systems and Electronics

14:00-15:30 (Room 525B) Session Chair: Forbes Brown, USA

- *Modeling And Simulation Of Cervical Region Of Spine Using Bond Graphs* by Pratibha Tyagi, Vikas Rastogi, Ajat Shatru Arora
- *Design of an anti-tip-over control for counterbalance forklifts using bond graph models* by Alvaro Bermejo, Jesús Felez

## Technical Session 6: Bond Graph Theory II

16:00-17:30 (Room 525B) Session Chair: Peter Breedveld, Netherlands

- *Definition of Essential Order on Descriptor Systems and its Bond Graph Determination* by Julien Lagnier, Damien Eberard, Michael Di Loreto, Didier Remond, Wilfrid Marquis-Favre
- *Implementation and Simulation of Dynamic Models A concise reading of the relationships Bond graphs - Block diagrams* by Abdennasser Fakri, Patrick Poulichet
- *The Theory of Bond Graphs in Distributed Systems and Simulations* by Stian Skjong, Eilif Pedersen

# ICBGM 2016 Agenda

Wednesday, 27 July 2016

**8:30-10:00** (Room 524A): Keynote Speech (Plenary)

**Technical Session 7: Thermodynamics and Energy**

**10:30-12:00** (Room 525B) Session Chair: Joe Juarez, USA

- *A New Convection Bond Element for Multiphase flow Through a Channel* by Forbes Brown
- *Modeling of Selective Catalytic Reduction Injection System using Bond Graphs for Real Time Simulations* by Francis Assadian
- *Paynter Collected Work* by Joseph Juarez, Jr.

**12:00-14:00** (ROOM TBA): Lunch

**Technical Session 8: Fluidics**

**14:00-15:30** (Room 525B) Session Chair: Belkacem Ould-Bouamama, France

- *Bond Graph Modeling and Simulation of Liquid Metal Sloshing in Ladle* by Abhijit Roy, Prof. Anup Kumar Saha
- *Bond graph representation of convection by fluid flow along an elastic surface* by Peter Breedveld
- *Dynamic Analysis of a Deep Water Marine Riser using Bond Graphs* by Rosanna A Reyes, Geoff Rideout, Stephen Butt

**Technical Session 9: Energy Generation**

**16:00-17:30** (Room 525B) Session Chair: Vikas Rastogi, India

- *Bond Graphs Aided development of Mechanical Power Transmission for Aerospace Electromechanical Actuators* by Clément Coïc, Jian Fu, Jean-Charles Maré
- *Bond Graph for Modeling and Diagnostics of Proton Exchange Membrane Fuel Cell* by Belkacem Ould-Bouamama, M.S. Jha, Mathieu Bressel, Mickael Hilairet, Daniel Hissel

# Notes

# SPECTS 2016 Agenda

Monday, 25 July 2016

8:00-10:00 (Room 524A): Opening Session and Keynote Speech (Plenary)

Session I: Wireless Communications and Networking (I)

10:30-12:00 (Room 525A)

- *Signaling Overhead and Feedback Delay Reduction in Heterogeneous Multicell Cooperative Networks* by Baha Uddin Kazi, Mohammad Etemad, Gabriel Wainer and Gary Boudreau
- *Improved Self Pruning for Broadcasting in Ad Hoc Wireless Network* by Raqeebir Rab, Shaheed Ahmed Dewan, Nazmus Sakib, Ahasanul Haque, Majedul Islam and Ashikur Rahman
- *Bandwidth and Power Efficiency Analysis in Fading Communication Link* by Abdulbaset Hamed and Raveendra Rao

12:00-13:30 Lunch

Session II: Scheduling in Cloud Computing

13:30-15:30 (Room 525A)

- *Optimizing the Energy Efficient VM Placement by IEFWA and Hybrid IEFWA/BBO Algorithms* by Hafiz Munsub Ali and Daniel Lee
- *Autonomic Scheduling of Deadline-Constrained Bag of Tasks in Hybrid Clouds* by Víctor Peláez, Antonio Campos, Daniel F. García and Joaquín Entrialgo
- *A Priority Based Resource Scheduling Technique for Multitenant Storm Clusters* by Rudraneel Chakraborty and Shikharesh Majumdar
- *Scheduling Real-Time Parallel Applications in SaaS Clouds in the Presence of Transient Software Failures* by Georgios L. Stavrinos and Helen D. Karatza

Session III: Modeling, Analysis, Simulation and Performance Evaluation (I)

16:00-17:30 (Room 525A)

- *Integrated fuzzy analytic hierarchy process and VIKOR method in the performance evaluation system* by Chia-Chi Sun and Chen-Chun Lin
- *Coordination Techniques of Mobile Robots with Energy Constraints* by Nunzia Palmieri, Xin-She Yang and Salvatore Marano
- *Consensus in Dynamic Networks with Hybrid Faults* by Azad Azadmanesh, Mengmeng Gai and Tuanjie Li

# SPECTS 2016 Agenda

Tuesday, 26 July 2016

8:30-10:00 (Room 524A): Keynote Speech (Plenary)

Session IV: Wireless Communications and Networking (II)

10:00-11:30 (Room 525A)

- *Distributed Cached and Segmented Video Download for Video Transmission in Cellular Networks* by Ala'a Al-Habashna, Gabriel Wainer, Gary Boudreau and Ronald Casselman
- *Evaluation of Capacity and Power Efficiency in Millimeter-Wave Bands* by Abdulbaset Hamed and Raveendra Rao
- *Using Elected Coordination Stations for CSI Feedback on CoMP Downlink Transmissions* by Baha Uddin Kazi, Mohammad Etemad, Gabriel Wainer and Gary Boudreau

12:00-13:30 Lunch

Session V: Modeling, Analysis, Simulation and Performance Evaluation (II)

13:30-15:00 (Room 525A)

- *A Cloud-based Service for Generating ns-3 Network Simulation Programs* by Adrian Conway
- *A Generic and Open Simulation Tool for Large Multi-tiered Hierarchical Storage Systems* by Gougeaud Sebastien, Zertal Soraya, Lafoucriere Jacques-Charles and Deniel Philippe
- *Simulating Node Selfishness in Opportunistic Networks* by Annalisa Socievole, Floriano De Ran-go, Antonio Caputo and Salvatore Marano

Session VI: Security Protocols and Techniques

16:00-17:30 (Room 525A)

- *Enhanced User Security and Privacy Protection in 4G LTE Network* by Ekene Okoye, Ron Ruhl and Pavol Zavorsky
- *Software-based Computing Platform as an Experimental Topology Assembled to Detect and Mitigate DDoS Attacks using Virtual Environments* by Walter Fuertes, Miguel Morales, Hernán Aules and Theofilos Toulkeridis
- *Meaningful Attack Graph Reconstruction Through Stochastic Marking Analysis* by Peppino Fazio, Mauro Tropea, Salvatore Marano and Miroslav Voznak

# SPECTS 2016 Agenda

Wednesday, 27 July 2016

8:30-10:00 (Room 524A): Keynote Speech (Plenary)

Session VII: Quality in multimedia systems and networks

10:30-12:30 (Room 525A)

- *DASH-based Peer-to-Peer Video Streaming in Cellular Networks* by Ala'a Al-Habashna, Stenio Fernandes and Gabriel Wainer
- *Subjective Video Quality Assessment of VP9 Compression Standard for Full HD Resolution* by Miroslav Uhrina, Juraj Bienik, Martin Vaculik and Miroslav Voznak
- *Employing the Neural Networks to Parametrically Assess the Quality of a Voice Call* by Miroslav Voznak, Jan Rozhon, Martin Mikulec, Filip Rezac, Dan Komosny, Jerry Chun-Wei Lin and Philippe Fournier-Viger

12:30-14:00 Lunch

Session VIII: Energy efficiency in networking systems and IoT

14:00-15:30 (Room 525A)

- *Performance Evaluation of Energy Saving MAC Protocols in WSN Operating Systems* by Mike Ojo, Davide Adami and Stefano Giordano
- *Energy Aware Communication between Smart IoT Monitoring Devices* by Floriano De Rango, Domenico Barletta and Alessandro Imbrogno
- *A Dynamic Monitoring for Energy Consumption Reduction of a Trust-Based Intrusion Detection System in Mobile Ad-hoc Networks* by Andrea Lupia and Salvatore Marano



# **Things to Do in Montreal**

# Things to Do in Montreal

## **Parc du Mont Royal**

Address: 1260 Chemin Remembrance, Montreal

Website: <http://www.lemontroyal.qc.ca/en/learn-about-mount-royal/homepage.sn>

This 761-foot hill from which Montreal got its name is the largest of the city's parks. Towering over central Montreal (and accessible from the Green Line's Peel métro station or the Orange Line's Mont-Royal métro station), Parc du Mont-Royal is frequented by joggers, picnickers, dog walkers and bicyclists throughout the year. During the warmer months, you'll find swimmers in the park's *Lac des Castors* (Beaver Lake), while the Chalet du Mont-Royal offers breathtaking park and city views any time of year.

## **Jean-Talon Market**

Address: 7075 Casgrain Ave, Montreal

Phone: 514 937-7754

Website: <http://www.marchespublics-mtl.com/en/marches/jean-talon-market/>

In a world dominated by overly refrigerated, fluorescently lit supermarkets, the Jean-Talon Market is literally a breath of fresh air and one of the largest public markets in North America. Located a block or so off Boulevard Saint-Laurent (accessible from the Blue Line's De Castelnau métro station), this open-air market entices with the aromas of grilled sausages, Quebecois cheeses, mounds of fresh produce, home-grown spices and handmade chocolates. Even if you're not looking to buy, recent visitors recommend that you take a stroll through the market to meet and mingle with Montrealers.

## **Old Montreal (Vieux-Montréal)**

Address: St-Antoine St south to the St Lawrence River, Montreal

Website: <http://www.vieux.montreal.qc.ca/>

As the site of the original city of Montreal, Vieux-Montréal (accessible from the Orange Line's Place-d'Armes métro station) is the hub of the city's culture. Horse-drawn carriages traverse cobblestone streets and meander past such notable sites as the Basilique Notre-Dame, the Hôtel de Ville (Town Hall), the Vieux-Port (Old Port) and the Marché Bonsecours (Bonsecours Market). Here, you'll mingle with Montrealers at sidewalk cafes while overlooking the river, or enjoy the summertime street performers at Place Jacques-Cartier. This is also a popular shopping area, and numerous bars and clubs bring Vieux-Montréal to life come sundown.

# **Things to Do in Montreal**

## **Montreal Botanical Gardens**

Address: 4101 Sherbrooke St E, Montreal

Website: <http://espacepouurlavie.ca/en>

Thanks to 10 large greenhouses – each tailored to a specific theme – the 185-acre Botanical Gardens is home to more than 22,000 species of flora and offers scenic year-round respite from the metropolis' downtown core. Spend some time strolling through the tranquil bonsai trees in the Japanese Zen garden or learn about the principles of yin and yang in the Chinese Garden, which showcases designs from the 14th to 17th century Ming Dynasty. Located in northern Plateau Mont-Royal in Parc Maisonneuve (accessible via the Green Line's Station Pie-IX métro station), the botanical gardens open every day at 9 a.m. and stay open until 5 or 8 p.m., depending on the time of year. Entry costs vary by age.

## **Montreal Museum of Fine Arts**

Address: 1380 Sherbrooke W, Montreal

Phone: 514-285-2000

Website: <https://www.mbam.qc.ca/en/>

Montreal's most prestigious museum has been building its collection of fine arts for more than a century. Feast your eyes on an impressive assortment of Canadian and international works, including pieces by such renowned artists as Rembrandt, El Greco, Renoir, Cézanne and Picasso. Nestled a few blocks south of Mont-Royal in downtown Montreal (accessible from the Green Line's Peel and Guy-Concordia métro stations), the Musée des Beaux-Arts is open Tuesday through Sunday from 10 a.m. to 5 p.m. On Wednesdays, the museum stays open until 9 p.m.

## **Museum of Archaeology and History (Pointe-à-Callière Museum)**

Address: 350 Place Royale, Montreal

Phone: 514 872-9150

Website: <http://www.pacmusee.qc.ca/en/home>

Many say that this is the best place to begin discovering Montreal. While the modern architecture may not be typical of a history museum, the real reason to come here is to hop in the elevator and head underground. Here, an archaeological dig revealed the foundations of the city's original settlement, established in the 17th century. You can follow the development of Montreal from its days as a fledgling colony and on up through the present day to an exhibit showing the city's multicultural lifestyle. During the summer, the museum hosts numerous period fairs and festivals. Open Tuesday through Friday from 10 a.m. to 5 p.m. and on Saturday and Sunday from 11 a.m. to 5 p.m.

# **Nearby Restaurants**

## ***Presse Café***

Phone: 514 876-8008

Website: <http://www.pressecafe.com/en/>

Tasty sandwiches, specialized coffee, wraps, salads, pastries and more are offered up at this welcoming café.

## ***Tim Horton's***

Phone: 514 871-1509

Website: <http://www.timhortons.com/>

Stop here for coffee and donuts in the morning and return at lunch for delicious soups and sandwiches.

## ***Sushi Shop***

Phone: 514 868-6686

Website: <http://www.sushishop.com/en/>

Irresistible! Delicately wrapped rolls of rice with raw fish served with flair. Increasingly popular, Japanese cuisine is definitely here to stay. Quickly made and good for you! A wide selection of sushi, soups and salads to satisfy.

## ***La Popessa***

Phone: 514 868-6699

Website: <http://www.popessa.ca/>

Upscale fast food featuring mouth-watering pasta and sauces.

## ***Les Galeries du Palais***

Visitors can find everything they need right in the heart of the Palais des congrès! Les Galeries du Palais is a commercial mall home to approximately 20 service locations and stores, including restaurants.

The shopping promenade links directly with the city's underground pedestrian network and the Place-d'Armes metro station.

*A few restaurant choices at the Les Galeries du Palais:*

# **Nearby Restaurants**

## **Mon Nan Restaurant**

Address: 43 Rue de la Gauchetière Est, Montreal

Phone: 514 866-7123

Website: <http://restaurantmonnan.com/en/>

Opened since 1982, this restaurant serves delicious Chinese food. Try our Pekin Duck, you can't find better elsewhere in Montreal! Our Chefs also highly recommend our seafood: Oysters, Scallops, Lobsters, Crabs, Snails, Razor Clams & much more! Lunch Special starting from 11:00 AM to 3:00 PM on Monday and from 11:00 AM to 4:00 PM during rest of the week.

## **Xavier Artisan**

Address: 503, Place d'Armes, Montreal

Phone: 514 439-6675

Website: <http://www.xavier-artisan.com/>

Xavier Artisan offers artisanal coffee, ice cream and sandwiches, delicious and comforting soups and healthy salads – all made in-house. Xavier Artisan uses local, authentic, simple and delicious ingredients to make their food. Located on Place d'Youville d'Armes, corner Notre Dame O., beside the Basilica Notre Dame, Xavier Artisan is ideal for eating on the go, taking out and enjoying on your favorite public bench.

## **Restaurant Brisket Montreal**

Address: 1093 Cote du Beaver Hall, Montreal

Phone: 514 878-3641

Website: <http://briskets.ca/home.html>

For almost 25 years, clientele from all 4 corners of the world have been coming to savour Brisket's famous Montreal smoked meat! Its secret doesn't only reside in the incomparable taste of the smoked meat: family ambiance, the decor and the impeccable services also contribute to its international reputation. For all these reasons, Briskets, Salon Krausmann has become an essential destination in Montreal.







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Applications accepted from October 1, 2016 to January 15, 2017