# ANNSIM'23 Agenda

## Tuesday - May 23, 2023

**ANNSIM 2023 Opening (9:00-9:30)**
*Opening, Introduction, Awards*

**Keynote Address (9:30-10.30)**
*Prof. Kathleen M. Carley, Institute for Software Research, Carnegie Mellon University, Pennsylvania, USA*
**Simulating Societal Systems: Issues in linking the micro and the macro**

**Coffee Break 10:30 – 11:00**

| SimAUD (11:00-12:30) *Session 1:* | HSAA (11:00-12:30) *Session 1:* | TMS (11:00-12:30) *Session 1* |
|---|---|---|
| (33) Micro-Scale Urban Simulation of Pedestrian Heat Stress: A Case Study of Cardiff, Wales, UK<br>Authors: Jianxiang Huang, Xu Tang and Phil Jones | Opening Talk | (60) Facilitating the Interoperability and Reuse of Extensions of Fuzzy Cognitive Maps<br>Authors: Ryan Schuerkamp, Philippe Giabbanelli and Nicolas Daclin |
| (111) Modeling and Calibrating Digital Twin of Automatic Garbage Collection System in Sejong City<br>Authors: Tae-Sub Yun, Minsang Park and Il-Chul Moon | (142 - WIP) Using Agent Based Modelling and Participatory Systems Modelling to Create Serious Games with an Artificial Intelligence Simulating Component<br>Authors: David Wurster, Elisabeth Späth, Blanca Luque-Capellas, Petra Ahrweiler, Massimo Rusconi and Jesús Siqueiros | (85) Energy and Power Evaluation of Parallel DEVS Simulations on Multicore Architectures<br>Authors: Guillermo Trabes, Veronica Gil Costa and Gabriel Wainer |
| (74) UrbanFlow: Designing Comfortable Outdoor Areas<br>Authors: Daoming Liu, Florian Rist and Dominik Michels" | (136 - WIP) Challenges of using a Microsimulation-based Model for the Cost of Living Crises<br>Authors: Kashif Zia, Andreas Hoehn, Corinna Elsenbroich and Alison Heppenstall | (63) A New Family of xDEVS Simulators for Enhanced Performance<br>Authors: Roman Cardenas, Patricia Arroba and Jose L. Risco-Martin |
| | (145 - WIP) Coordination Failure As Barrier To Economic Development<br>Authors: Isaak Mengesha | |

**Lunch on your Own 12:30 – 14:00**

| SimAUD (14:00-15:30) *Session 2:* | HSAA (14:00-15:30) *Session 2:* | CPS (14:00-15:30) *Session 1* |
|---|---|---|
| (39) Communication Patterns<br>Authors: Saqib Aziz, Giovaani Betti, Felix Deiters, Iris Inokhosa and Markus Jacobi | (42) Binary Opinion Dynamics with Mesophilic Agents<br>Authors: Patrick Shepherd, Anh Ngo, Said Maalim and Isaac Gray | (70) Formalizing Cyber-Physical System Interfaces Using DEVS<br>Authors: Gabriel Wainer and Rishabh Jiresal |
| (58) Integrating Conditional Shape Embedding with Generative Adversarial Network to Assess Raster Format Architectural Sketch<br>Authors: Han Tu, Yichao Shi and Meng Xu" | (57) An Agent-based Modeling of Mobs Using Theoretical Constructs of Collective Action<br>Authors: Samer Al-khateeb, Jack Burright, Nitin Agarwal and Rebecca Murray | (48) Synthesizing ORCHESTRATION ALGORITHMS FOR FMI 3.0<br>Authors: Simon Hansen, Claudio Gomes and Zahra Kazemi " |
| (94) Sensing Behavior Framework: Acquisition and communication of occupancy behavior data.<br>Authors: Panagiota Pouliou, Martin Tamke, Paul Nicholas and Kare Stockholm Poulsgaard | (51) The Effect of Empathy on Happiness in Social Networks: An Agent-Based Simulation Study<br>Authors: Nicholas Bishop and Hamdi Kavak | (123) Development Of QSS and PID Control Algorithm inside RT-DEVS Framework<br>Authors: Mahya Shahmohammadimehrjardi and Gabriel Wainer |

**Coffee Break 15:30 – 16:00**

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**SimAUD (16:00-17:30)**
*Session 3*

(45) Game Engines as a Performance-Aware Participatory and Interactive Design Platform: A Prototypical Workflow
Authors: Arman Khalilbeigi Khameneh and Alicia Nahmad Vazquez

(76) Algorithms for Voxel-based Architectural Space Analysis
Authors: Rhys Goldstein, Kean Walmsley, Nigel Morris and Alexander Tessier

(98) Aesthetics as a Criterion: Navigating solution spaces utilizing Computer Vision, the Aesthetic Measure, and Artificial Neural Networks.
Authors: Victor Sardenberg and Mirco Becker

**HSAA (16:00-17:30)**
*Session 3*

(86) Developing a Large-Scale Agent-Based Model Using the Spiral Software Development Process
Authors: Maxim Malikov, Fahad A. Aloraini, Andrew Crooks, Hamdi Kavak and William Kennedy

(68) Identifying the Building Blocks of Social Simulation Models: A qualitative analysis using open-source codes in NetLogo
Authors: Shannon Cheng, Philippe Giabbanelli and Zaiyi Kuang

(113) Firm-level Propagation of the Effect of Disruption of International Trade through Domestic Supply Chains
Authors: Hiroyasu Inoue and Yasuyuki Todo

**TMS – TUTORIAL (16:00-17:30)**
*Session 2*

A Tutorial on Bayesian Sequential Data Assimilation for DynamicData-Drivenn Simulation
Xiaolin Hu

## Wednesday -May 24, 2023

**Keynote Address (9:00-10:00)**
*Prof. Dawn M. Tilbury, Mechanical Engineering, University of Michigan, Ann Arbor Michigan, USA*
**Digital Twins for Manufacturing Systems: Leveraging real-time information through modeling and simulation**

**Coffee Break 10:00 – 10:30**

**SimAUD (10:30-12:00)**
*Session 4:*

(50) A Case Study on Generating Eco-Conscious Office Buildings Using a Data-Informed Optimization Framework
Authors: Gen Karoji

(84) Urban Design Optimizer: A Comparative User Interface Study for a Web-Embedded Tool
Authors: F. Peter Ortner, Anna Claudia Yenardi and Jing Zhi Tay

(104) Comparing Apartment Balcony Design Options in Toronto for Useability, Healthy Lighting, and Daylight Availability
Authors: Fion Ouyang, Terri Peters, Alstan Jakubiec and Ted Kesik

**MSM (10:30-12:00)**
*Session 1: Healthcare Simulation and Neural Networks*

(99) Study on Mild Cognitive Impairment and Alzheimer's Disease Classification using a New Ontogenic Neural Architecture, the Supervised Reconfigurable Growing Neural Gas
Authors: Ylermi Cabrera-León, Patricio García Báez, Pablo Fernández-López and Carmen Paz Suarez-Araujo

(116) On the necessity of human decision-making errors to explain vaccination rates for COVID-19: an agent-based modeling study
Authors: Philippe Giabbanelli, Jack T. Beerman and Gwendal G. Beaumont

(118) Vaccination Accessibility Analysis: Modeling Historical Patterns of Redlining and Access to Healthcare Services
Authors: Suncica Milosevic and Ajla Aksamija

**DT (10:30-12:00)**
*Session 1: Foundations*

(72) Modeling and Synchronizing Digital Twin Environments
Authors: Juan Alberto Llopis, Paula Munoz, Javier Criado, Javier Troya, Luis Iribarne and Antonio Vallecillo

(128) Formal Approach to Digital Twin Specification
Authors: Mama Diakité and Mamadou Traore

(66) Examining Model Qualities and Their Impact on Digital Twins
Authors: Bentley Oakes, Claudio Gomes, Joachim Denil, Julien Deantoni, João Cambeiro, John Fitzgerald and Peter Gorm Larsen

**Lunch on your Own 12:00 – 13:30**

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| | **MSM II (13:30-15:30)**<br>*Session 2: Computer-Assisted Therapy and Physiology Simulation* | **DT (13:30-15:30)**<br>*Session 2: Invited Talk and Panel* |
|---|---|---|
| | (95) Towards a Patient-Specific Obstetric Simulator Through Opensim Musculoskeletal and Bash Skinned Human Modeling<br>Authors: Bahador Dodge, Hunter J. Bennett, Oleksandr Kravchenko, Von Jamora, Marco Parente, Renato Natal Jorge, Dulce Oliveira, Marlies Nitschke, Anne D. Koelewijn, Andrew Moore, Menachem Miodovnik and Michel Audette | Invited Talk: A DEVS-based engine for building digital quadruplets<br>Presenter: Gabriel Wainer" |
| | (124) Multi-Material, Approach-Guided, Controlled-Resolution Breast Meshing for Fe-Based Interactive Surgery Simulation<br>Authors: Motaz Alqaoud, John Plemmons, Eric Feliberti, Krishnanand Kaipa, Gabor Fichtinger, Yiming Xiao, Tanweer Rashid and Michel Audette | Panel: Interoperability of Digital Twins<br>Panelists: Claudio Gomes (Aarhus University, Denmark) – Academia, Guodong Shao (NIST, US) – Government, Dawn Tilbury (University of Michigan, US) – Academia, Bassam Zarkout (IGnPower Inc., Canada) – Industry" |
| | (80) Design and Implementation of a Generic Circuit Solver for Physiological Lumped-Parameter Modeling<br>Authors: Jeffrey Webb, Aaron Bray and Rachel Clipp | |
| | (92) Elucidating the Role of the His-Purkinje System during Long QT Mediated Arrhythmias<br>Authors: Anthony Owusu-Mensah, Omer Berenfeld and Michel Audette | |

**Coffee Break 15:30 – 16:00**

| **SimAUD (16:00-17:30)**<br>*Session 5* | **MSM II (16:00-17:30)**<br>*Session 3: Panel* | **Tutorials (16:00-17:30)**<br>*Session 2* | **DT III/ CPS II(16:00-17:45)**<br>*Session 3: Applications* |
|---|---|---|---|
| (36) Stochastic Assessment for Model-Predictive Control of a Variable Refrigerant Flow System<br>Authors: Seo-Hee Choi, Seongkwon Cho and Cheol Soo Park | Panel | Introductory Tutorial on Agent-Based Modeling and Simulation<br>Charles Macal | (119) Digital Twin and Agent-Based Simulation: Co-Simulation to Support Intelligent Navigation of Healthcare Mobile Robot<br>Authors: Ginikachi Anyene, Anthony Nepomuceno, Celeste Schultz and Inki Kim |
| (62) Uncertainty Quantification of Overall Heat Transfer Coefficient(U-Value) for a Glazing System with External Venetian Blind<br>Authors: JeongYun Lee and Cheol-Soo Park | | | (100) Building A Digital Twin of an Automated Robot Workcell<br>Authors: Deogratias Kibira, Guodong Shao and Rishabh Ventekesh |
| (131 - WIP) Generative Design for a Complete Community Park. A Work in Progress<br>Authors: Samah Kamalmaz, Sara Diamond, Jeremy Bowes, Greg Van Alstyne, Robert Wright, Matthew Roorda, Sara Wagner, Rhys Goldstein and Jacky Bibliowicz | | | (77) A Statechart Template Library for IoT System Modelling<br>Authors: Clyde Rempillo and Sadaf Mustafiz |
| (151 - WIP) Comparing Results of Measured and Simulated Glare in Learning Environments<br>Authors: Julia Di Giorgio and Terri Peters | | | (161 - WIP) Co-Simulation For Controlled Environment Agriculture<br>Authors: Pascal Archambault, Istvan David, Eugene Syriani and Houari Sahraoui |

**17.30 – 18.30 SIMULATION Meeting (by Invitation)**

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## Thursday -May 25, 2023

| SPECTS/CNS (09:00-10:30)<br>*Session 1* | ANSS (09:00-10:30)<br>*Session 1: Methods and Tools* | Tutorials (09:00-10:30)<br>*Session 3* |
|---|---|---|
| (101) Machine Learning Models for Channel Status Classification in M-MIMO Systems Using Limited CSI Feedback<br>Benjamin Earle, Ala'a Al-Habashna, Gabriel Wainer, Xingliang Li and Guoqiang Xue | (29) Agent-Based Model Output Analysis – A Comprehensive Statistical Framework.<br>Authors: Janani Venugopalan, Gaurav Deshkar, Jayanta Kshirsagar, Divye Singh, Justin Jose and Harshal Hayatnagarkar | Defining DEVS and Real-Time DEVS Models Using DEVS-Graphs Online Environment<br>Cristina Ruiz Martin and Gabriel Wainer |
| (106) PO-MAC: A Software Defined Performance-Optimized MAC Strategy for Optical Data Center Networks<br>David Georgantas and Peristera Baziana | (83) Modeling Forced Migration: A System Dynamic Approach.<br>Authors: Troy Curry, Arie Croitoru and Andrew Crooks | |
| (135 - WIP) Human-out-of-the-Loop Swarm-Based IoT Network Penetration Testing by IoT Devices<br>Authors: Thomas Schiller and Sean Mondesire | (105) Hybrid Agent-Based and Discrete Event Simulation in MASON.<br>Authors: Giuseppe D'Ambrosio and Sean Luke | |

**WIP Posters & Coffee Break (10:30-11:00)**

**PhD Colloquium (11:00 – 15:00)**

**PhD Colloquium Presentations (11.00 – 12.30)**

(Yon Vanommeslaeghe) Co-Optimization of Cyber-Physical Systems: Leveraging domain knowledge in multi-domain system development processes

(Jorge Lopez) Accelerating the Training of Artificial Neural Networks using Data Parallelization and CPU Affinity on CPUS and GPUS

(Candace Sapp) An Agent-Based Model and Simulation to Explore Possible Solutions to Food and Nutrition Insecurity for College Students in the United States

(Guillermo Trabes) A High-Performance DEVS Simulator for Multi-GPU Platforms

(Clark Petri) Electrical Distribution System Resilience Improvements Via Customer Preference for Bidirectional Charging Electric Vehicles

(Chris Prather) Deep ABM for Agent Actions and Interaction for Southwest Border Interdictions

**PhD Colloquium Panel** (Over Lunch) **(12.30 – 14.00)**

**PhD Colloquium Keynote (14.00 – 15.00)**

**WIP Posters & Coffee Break (15:00-15:30)**

| Simulation and Education (15:30-16:30)<br>*Session 1* | ANSS (15:30-17:00)<br>*Session 2: Methods and Tools* | Tutorials (15:30-17:00)<br>*Session 4* |
|---|---|---|
| (55) An Open Source Video Analytics Tool for Analyzing Learner Navigation in Immersive Simulated Environment<br>Authors: Noah Soriano, Ashkan Negahban, Sabahattin Gokhan Ozden and Omar Ashour | (90) Simulation and Optimization Techniques for Mitigation of Disruptions to Supply Chains.<br>Authors: Rajhersh Patel, Abhisekh Rana, Sean Luke, Carlotta Domeniconi, Andrew Crooks, Hamdi Kavak and James Jones | Tutorial on Tools and Applications using Cosys-AirSim: A Real-Time Simulation Framework Expanded for Complex Industrial Applications |
| (59) A Project-Based Approach for Teaching Numerical Integration in Continuous Simulation<br>Authors: Yuzhong Shen and Masha Sosonkina | (71) Error Estimators for Adaptive Scheduling Algorithm for Serial Co-simulation.<br>Authors: Emin Oguz Inci, Claudio Gomes, Jan Croes and Wim Desmet | Authors: Jean-Edouard Blanquart, Erik Verreycken, Wouter Jansen, Anthony Schenck, Nico Huebel, Connor Verhulst and Jan Steckel |

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**MS&CS (16:30-17:30)**
*Session 1*

(81) GreenThread --- Blockchain, Non-Fungible Token(NFT), Model Cards, Self-Sovereign Identity and IPFS enabled Sustainable Circular Fashion Platform
Authors: Eranga Bandara, Nadini Sahabandu, Sachin Shetty, Ravi Mukkamala, Abdul Rahman, Xueping Liang and Peter Foytik

(102) Modeling and Simulation of the Human Firewall against Phishing Attacks in Small and Medium-sized Businesses
Authors: Jeongkeun Shin, Geoffrey B. Dobson, L. Richard Carley and Kathleen M. Carley

(67) Decision Support Framework for Automating the Optimization ff Edge Computing Federations.
Authors: Antonio F. Rodríguez-Liria, Román Cárdenas, Patricia Arroba, José M. Moya, José L. Risco-Martín and Gabriel Wainer

## Friday, May 26, 2023

**WIP Presentations (09:00-10:30)**
*Session 1*

(149) Modeling Multimodal CO2 Transportation for Carbon Capture, Utilization, and Storage
Authors: Robin J. Clark, Majbah Uddin, Michael R. Hilliard, Josh Thompson, Matthew H. Langholtz and Erin Webb

(146) A Multiplayer Human-in-the-Loop Autonomous Driving Simulation Framework with Virtual Reality Technology
Authors: Defu Cui and Yuzhong Shen

(140) Extending Eclipse Ecore Metamodel with Iterative Specifications for Modeling and Simulation Support
Authors: Abdurrahman Alshareef, Maria Blas, Doohwan Kim and Bernard Zeigler

(139) Simulating the Activities in the Transformational Model - Battle Management as Parallel Discrete Event System
Authors: Abdurrahman Alshareef, Doohwan Kim and Bernard Zeigler

(133) Towards a digital twin of a retail loyalty scheme
Authors: James Battye, Peter Baudains and Jonathan A. Ward

**ANSS (09:00-10:30)**
*Session 3: Real World Applications*

(122) Predictive Modeling and Simulation System for the Management of Harmful Cyanobacteria Blooms.
Authors: Beatriz Herguedas, José L. Risco-Martín, Segundo Esteban, José A. López-Orozco and Eva Besada-Portas

(65) A Survey of Visualization Capabilities for Simulation Environments.
Authors: Bruno St-Aubin and Gabriel Wainer

(87) A Generic Modeling Approach Towards Simulating an Urban Primary And Secondary Healthcare Facility Network.
Authors: Najiya Fatma and Varun Ramamohan

**Tutorials (09:00-10:30)**
*Session 5*

A Tutorial Introduction to Colored Petri Nets (CPNs) Based Modeling and Simulation
Vijay Gehlot

**WIP Posters & Coffee Break (10:30-11:00)**

**MLS (11:00-12:00)**
*Session 1*

(93) A Simulation Environment for Reducing Food Waste Via Reinforcement Learning
Authors: Sebastian Pilarski, Aman Sidhu and Daniel Varro

**ANSS (11:00-12:30)**
*Session 4: Real World Applications*

(64) Cosys-AirSim: A Real-Time Simulation Framework Expanded for Complex Industrial Applications.
Authors: Wouter Jansen, Erik Verreycken, Anthony Schenck, Jean-Edouard Blanquart, Connor Verhulst, Nico Huebel and Jan Steckel"

**Tutorials (11:00-12:30)**
*Session 6*

Is your model valid?
Joachim Denil and Hans Vangheluwe

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(107) Preserving Simulation Insight while Removing Data: Verification of Compressed Simulation Traces Via Machine Learning
Authors: My Nguyen, Duc Vu, Anh Vo, Luke Liang and Philippe Giabbanelli

(117) Model-Based Systems Engineering and Simulation of a Molten Salt Reactor Power Plant for Requirements Analysis.
Authors: Stephen Pair and Michael Jones

(96) DEVS-Based Modeling and Simulation of Data-Driven Exploration Algorithms of Lentic Water Bodies with an ASV.
Authors: Samuel Ferrero-Losada, Eva Besada-Portas, José L. Risco-Martín and José A. López Orozco