



SPRINGSIM

Spring Simulation Conference 2020

MAY 18-21, 2020



SpringSim 2020

Registration

Registration is still open visit <https://scs.org/springsim/> . If you would like to sample our conference for a day and you are new to our events, please contact us at 858-277-3888 or scs@scs.org for a daily rate.

Sponsors

We would like to thank those who registered for the SpringSim 2020 Virtual Conference, Chalmers University of Technology, which contributed the Zoom Licensing and Rooms, Virginia Modeling, Analysis & Simulation Center (VMASC), VMASC Industry Association, and KaDSci LLC, the SpringSim'20 sponsors.

Conference Summary

The 2020 Spring Simulation Conference (SpringSim'20) Virtual Conference will take place over the course of four days from Monday, May 18, 2020 through Thursday, May 21, 2020.

SpringSim'20 will present five tutorials, one Demo Session, one DEVS Dissertation Awards Session, eighteen track sessions, and five panels for eighty-nine presentations in total.

Tutorials, Demo Session, and DEVS Dissertation Awards will take place on Monday, May 18, 2020. Tracks CNS, HPC, HSAA, AIS, CIAAS, ANSS, CSE, MSM, TMS, and MSSES will take place from Tuesday, May 19, 2020 to Thursday, May 21, 2020.

Topics covered range from Hybrid Modeling and Simulation of Complex Data Networks, Artificial Social Ethics: Simulating Culture, Conflict, Cooperation, and Reinforcement Learning for Traffic Signal Optimization and On the Influence Blocking Maximization for Minimizing the Spreading of Fake Information in Social Media.

The SpringSim 2020 Virtual Conference is open to all paid attendees from May 18, 2020 to May 21, 2020 and will be available to the public beginning May 25, 2020. Session times are ET (Eastern Time, UTC-4).

Thank You!

Thank you all for coming together and participating in the SpringSim 2020 Virtual Conference. It could not have been possible without all of you who came together. Organizers and attendees such as you are the reason we were able accomplish our goal of this virtual event announcing the cancellation of the in-person event at George Mason University. So, thank you all again for giving us the opportunity to have the SpringSim 2020 Conference through this Virtual Conference. **We look forward to seeing you next year!**

SpringSim 2020 Virtual Conference Agenda

May 18, 2020

Parallel Meeting One

Location: Zoom Room: Peacock

Tutorial Session One

- 11:00am-11:50am ET: **Tutorial:** *Comparing Models Rather Than Simulation Outputs: An Introduction To Network Science For Model Comparison* by Philippe Giabbanelli
- 11:50am-12:00pm ET: **Question and Answer**

Break: 12:00pm-12:30pm ET

Tutorial Session Three

- 12:30pm-1:20pm ET: **Tutorial:** *How Valid Is Your Simulation Model? Learn To Apply Metamorphic Testing To Increase Confidence On Your Simulation* by Mohammad Raunak and Megan Olsen
- 1:20pm-1:30pm ET: **Question and Answer**

Break: 1:30pm-2:00pm ET

Tutorial Session Five

- 2:00pm-2:50pm ET: **Tutorial:** *Strategic Management and Simulation: A Live Interactive Experience For Experiencing The Methodology* by Agostino Bruzzone and Kirill Sinelshchikov
- 2:50pm-3:00pm ET: **Question and Answer**

Break: 3:00pm-3:30pm ET

DEMO Session

Chair: Salim Chemlal

- 3:30pm-3:48pm ET: *Simulation Demonstration Of Telehealth Supply And Demand* by Matthew Henchey, Deborah Ercolini and Sybil Klaus
- 3:48pm-4:06pm ET: *The MITRE Maternal Mortality Interactive Dashboard (3MID)* by Kevin Comer, Abdul Sheikhnureldin, Rachel Mayer and Sybil Klaus
- 4:06pm-4:24pm ET: *A Simulation Software For Hybrid Agent-Based Models And Fuzzy Cognitive Maps* by Nuo Xu, Yujia Chen, Bingfan Tian, Haosong Hong and Philippe Giabbanelli

- 4:24pm-4:42pm ET: *Energetics And Thermodynamics Of Polymer Condensed Phases From The Adaptive Tempering Monte Carlo* by Greg Helmick, Yoseph Abere and Estela Blaisten-Barojos
- 4:42pm-5:00pm ET: *Demonstrating PyMAPP And Auto_Diff: Simulating A Ring Oscillator* by Parth Nobel

SpringSim 2020 Virtual Conference

May 18, 2020

Parallel Meeting Two

Location: Zoom Room: Goose

Tutorial Session Two

- 11:00am-11:50am ET: **Tutorial:** *Implementing DEVS Models With Cadmium Simulator* by Cristina Ruiz Martin and Gabriel Wainer
- 11:50am-12:00pm ET: **Question and Answer**

Break: 12:00pm-12:30pm ET

Tutorial Session Four

- 12:30pm-1:20pm ET: **Tutorial:** *Prototyping For Extended Reality: Game Engines, Open Source, And Toolkits For Modeling And Simulation Spatial Software* by John Shull
- 1:20pm-1:30pm ET: **Question and Answer**

Break: 1:30pm-2:00pm ET

DEVS Dissertation Awards

Chair: Claudia Frydman

- 2:00pm-2:20pm ET: *Hybrid Modeling And Simulation Of Complex Data Networks* by Matias Bonaventura
- 2:20pm-2:40pm ET: *Activity Specification For Time-Based Discrete Event Simulation Models* by Abdurrahman Alshareef
- 2:40pm-3:00pm ET: *A Simulation Model For Studying Cloud Applications Through Software Architecture Evaluation* by Maria Blas
- 3:00pm-3:20pm ET: *Complex System Modeling By Composition: A Hierarchical Approach For Heterogeneous Component Co-Simulation* by Thomas Paris

SpringSim 2020 Virtual Conference

May 19, 2020

Parallel Meeting One

Location: Zoom Room: Peacock

Communications and Networking Symposium (CNS)

Chairs: Abdolreza Abhari and Ala'a Al-Habashna

Using Deep Learning for Edge Computing in Smart Cities

- 11:00am-11:18am ET: *Scalable Object Detection, Tracking And Pattern Recognition Model Using Edge Computing* by Dipak Pudasaini and Abdolreza Abhari
- 11:18am-12:12pm ET: **Panel: A Review Of The Architectures Of Deep Convolutional Neural Networks** by Yan Lu, Abdolreza Abhari

Break: 12:30pm-1:00pm ET

Communications and Networking Symposium (CNS)

Chairs: Abdolreza Abhari and Ala'Al-Habashna

Network Simulation

- 1:00pm-1:18pm ET: *Generating High-Quality Synthetic Graphs For Community Detection In Social Networks* by Arman Ferdowsi and Abdolreza Abhari
- 1:18pm-1:36pm ET: *A Deploy Mechanism For Virtual Machine Based Vehicular Ad Hoc Network Simulation* by Akihito Kohiga and Yoichi Shinoda
- 1:36pm-1:54pm ET: *SBDC: Smart Building Data Center For IOT, Edge, And 5G* by Hassan Rajaei, Bhargav Kanumuri and Nishitha Narreddi
- 1:54pm-2:12pm ET: *Studying Malware Propagation In Wireless Sensor Networks With Cell-DEVS* by Ala'a Al-Habashna and Gabriel Wainer
- 2:12pm-2:30pm ET: *Integrated Simulator Of Mobile Ad-Hoc Network-Based Infrastructure: A Case Study* by Aznam Yacoub

Break: 2:30pm-3:00pm ET

High Performance Computing (HPC)

Chair: Dongyoon Lee

High Performance Computing Optimization

- 3:00pm-3:18pm ET: *Managing Computationally Expensive Blackbox Multi-Objective Optimization Problems With Libensemble* by Tyler Chang, Jeffrey Larson, Layne Watson and Thomas Lux

- 3:18pm-3:36pm ET: *Simulator-Based Framework Towards Improved Cache Predictability For Multi-Core Avionic System* by Jean-Baptiste Lefoul, Alexy Torres Aurora Dugo, Felipe Magalhaes, Dahman Assal, Nicolas Ulysse and Gabriela Nicolescu
- 3:36pm-3:54pm ET: *An Algorithm For Constructing Monotone Quintic Interpolating Splines* by Thomas Lux, Layne Watson, Tyler Chang, Li Xu, Yueyao Wang and Yili Hong
- 3:54pm-4:12pm ET: *Robustness Of Multidimensional Optimization Outcomes: A General Approach And A Case Study* by Negin Forouzesh, Layne Watson and Alexey Onufriev
- 4:12pm-4:30pm ET: *Parallel Execution Of DEVS In Shared-Memory Multicore Architectures* by Juan Lanuza, Guillermo Trabes and Gabriel Wainer

SpringSim 2020 Virtual Conference

May 19, 2020

Parallel Meeting Two

Location: Zoom Room: Goose

Humans, Societies and Artificial Agents (HSAA)

Chairs: Andrew Crooks and Philippe J. Giabbanelli

Advances in the Theory and Design of Agent-Based Models

- 11:00am-11:18am ET: *Humans VS. Bots: Investigating Models Of Behavior In The Iterated Prisoner's Dilemma* by Samarth Swarup, Mark Orr, Gizem Korkmaz and Kiran Lakkaraju
- 11:18am-11:36am ET: *Artificial Social Ethics: Simulating Culture, Conflict, and Cooperation* by F. LeRon Shults and Wesley J. Wildman
- 11:36am-11:54am ET: *Exploring the Effects Of Link Recommendations On Social Networks: An Agent-Based Modeling Approach* by Ciara Sibley and Andrew Crooks
- 11:54am-12:12pm ET: *Creating Perceptual Uncertainty In Agent-Based Models With Social Interactions* by Philippe Giabbanelli and Ethan Grantham
- 12:12pm-12:30pm ET: *Transparent AI For Organizational Research: Using Fuzzy Cognitive Maps As Cognitive Architecture In Agent Based Models* by Christopher Davis, Philippe Giabbanelli and Antonie Jetter

Break: 12:30pm-1:00pm ET

Humans, Societies and Artificial Agents (HSA)

Chairs: Andrew Crooks and Philippe J. Giabbanelli

Applications of Agent-Based Models

- 1:00pm-1:18pm ET: *Modeling and Simulating Pedestrian Social Group Behavior With Heterogeneous Social Relationships* by Manon Prédhumeau, Julie Dugdale and Anne Spalanzani
- 1:18pm-1:36pm ET: *Using Agent Based Modeling To Interpret Underlying Factors Of Underrepresentation of Minorities In Hollywood Films* by Carmen Iasiello
- 1:36pm-1:54pm ET: *Modeling Marginalization: Emergence, Social Physics, And Social Ethics Of Bullying* by Themis Dimitra Xanthopoulou, Ivan Puga-Gonzalez, F. LeRon Shults and Andreas Prinz
- 1:54pm-2:12pm ET: *Utilizing Agents To Explore Urban Shrinkage: A Case Study Of Detroit* by Na Jiang and Andrew Crooks
- 2:12pm-2:30pm ET: *Along The Border: An Agent-Based Model Of Migration Along The United States-Mexico Border* by Amira Al-Khulaidy and Melanie Swartz

Break: 2:30pm-3:00pm ET

Humans, Societies and Artificial Agents (HSA)

Chairs: Andrew Crooks and Philippe J. Giabbanelli

Agent-Based Modeling as a Community of Practice

- 3:00pm-3:18pm ET: *How Do Modelers Code Artificial Societies? Investigating Practices And Quality Of Netlogo Codes From Large Repositories* by Christopher Vendome, Dhananjai Rao and Philippe Giabbanelli
- 3:18pm-3:36pm ET: *Digital Modelling And Simulation In French Social Sciences And Humanities Research: An Exploratory Study* by Nathalie Pinede, Bruno Vallespir, Mamadou Kaba Traore, Saikou Diallo and Greg Zacharewicz
- 3:36pm-4:30pm ET: TBD

SpringSim 2020 Virtual Conference

May 20, 2020

Parallel Meeting One

Location: Zoom Room: Peacock

AI, and Simulation (AIS)

Chairs: Andreas Zülfe and Joon-Seok Kim

Reinforcement Learning

- 11:00am-11:54am ET: **Panel: Reinforcement Learning For Traffic Signal Optimization** by Sanjay Chawla
- 11:54am-12:12pm ET: *Reinforcement Learning From Simulated Environments: An Encoder Decoder Approach* by Benjamin Choo, Graham Crannel, Stephen Adams, Faraz Dadgostari, Peter Beling, Ann Bolcavage and Roy McIntyre
- 12:12pm-12:30pm ET: *Feature Transformation And Simulation Of Short Term Price Variability In Reinforcement Learning For Portfolio Management* by Yen-Chih Lin and Jeremy Blum

Break: 12:30pm-1:00pm ET

AI, and Simulation (AIS)

Chairs: Joon-Seok Kim and Andreas Zülfe

Artificial Intelligence and Simulation

- 1:00pm-1:18pm ET: *A Synergistic Approach For Deep Learning And Knowledge Engineered Solutions* by Joshua Haley, Richard Pazda, Ross Hoehn and Robert Wray
- 1:18pm-1:36pm ET: *Towards Real-Time Cyber-Physical Systems Instrumentation For Creating Digital Twins* by Joost Mertens, Moharram Challenger, Ken Vanherpen and Joachim Denil
- 1:36pm-1:54pm ET: *A Simulator For Trading Traffic Privileges By Selfish Driving Cars* by Zhan Tu, Anastasios Dimas, Mehmet Necip Kurt, Anastasia Mavrommati, Pieter J. Mosterman, Akshay Rajhans and Roberto Valenti

Break: 2:30pm-3:00pm ET

Complex, Intelligent, Adaptive and Autonomous Systems (CIAAS)

Chair: Xiaolin Hu

- 3:00pm-3:18pm ET: *Prediction of Autonomous Vehicle Inventory Requirements for Ride Hailing Services Using Agent-Based Modeling* by Evan Masters
- 3:18pm-3:36pm ET: *Scalability Of Sensor Simulation In Ros-Gazebo Platform With And Without Using GPU* by Ahmet Saglam and Yiannis Papelis

- 3:36pm-4:30pm ET: **Panel: *The Crossroads Between Modeling And Simulation and Machine Learning*** by Scott Rosen, Xiaolin Xu and Jie Xu

SpringSim 2020 Virtual Conference

May 20, 2020

Parallel Meeting Two

Location: Zoom Room: Goose

Annual Simulation Symposium (ANSS)

Chair: Erika Frydenlund

Novel Uses of M&S in Real World Applications

- 11:00am-11:18am ET: *Studying Communications Resiliency In Emergency Plans* by Cristina Ruiz Martin, Adolfo Lopez Paredes and Gabriel Wainer
- 11:18am-11:36am ET: *A Simulation-Aided Lean Application To An Automated Production Line* by Raid Al-Aomar, Arin Alshwailat, Aseel Alfarraj and Tulip Odeh
- 11:36am-11:54am ET: *Estimating Effects Of The Decision Support System On Educational Agents With Simulations* by Ajay Kulkarni and Michael Eagle
- 11:54am-12:12pm ET: *Strategic Airlift Operationalizing Constructive Simulations* by Rob Barwell and Gabriel Wainer
- 12:12pm-12:30pm ET: *Coupling WEAP And LEAP Models Using Interaction Modeling* by Mostafa Fard and Hessam Sarjoughian

Break: 12:30pm-1:00pm ET

Annual Simulation Symposium (ANSS)

Chair: José Luis Risco Martin

Dealing with Complexity in Modeling & Simulation

- 1:00pm-1:18pm ET: *Scenario-Based Generation Of Ontologies For Domain-Specific Languages* by Bharvi Chhaya and Shafagh Jafer
- 1:18pm-1:36pm ET: *Exploratory Analysis To Address Deep Uncertainty – Using Calibratable System Models For Exploratory Simulation Of Complex Missions* by Andreas Tolk, Kevin Comer, Khuong Dinh and Steve Scott
- 1:36pm-1:54pm ET: *Modeling The Modeler: An Empirical Study On How Modelers Learn To Create Simulations* by Hamdi Kavak, Jose Padilla, Saikou Diallo and Anthony Barraco
- 1:54pm-2:12pm ET: *Model Thinking: An Approach For Coping With An Increasingly Complex World* by Saikou Diallo and Samarth Swarup

- 2:12pm-2:30pm ET: *Experimental Wargames To Address The Complexity--Scarcity Gap* by Kiran Lakkaraju, Jason Reinhardt, Joshua Letchford, Bethany Goldblum and Andrew Reddie

Break: 2:30pm-3:00pm ET

Cyber Security Engineering (CSE)

Chairs: Sarada Prasad and Danda B. Rawat

- 3:00pm-3:18pm ET: *An Event Study Of The Effects Of Cryptocurrency Thefts On Cryptocurrency Prices* by Michael Brown and Barry Douglass
- 3:18pm-3:36pm ET: *Enforcing Security And Privacy In Distributed Ledgers Using Intel SGX* by Xueping Liang, Sachin Shetty, Peter Foytik and Deepak Tosh
- 3:36pm-3:54pm ET: *A Blockchain Simulator For Evaluating Consensus Algorithms In Diverse Networking Environments* by Peter Foytik, Deepak Tosh, Sachin Shetty, Sarada Prasad Gochhayat, Eranga Herath and Laurent Njilla
- 3:54pm-4:12pm ET: *On The Comparative Study Of Prediction Accuracy For Credit Card Fraud Detection With Imbalanced Classifications* by Tahani Baabdullah, Amani Alzahrani and Danda Rawat
- 4:12pm-4:30pm ET: *On The Influence Blocking Maximization For Minimizing The Spreading Of Fake Information In Social Media* by Dema Aorini, Ghaida Alorini and Danda Rawat

SpringSim 2020 Virtual Conference

May 21, 2020

Parallel Meeting One

Location: Zoom Room: Peacock

M&S in Medicine (MSM)

Healthcare Support

Chairs: Jerzy Rozenblit and Minsik Hong

- 11:00am-11:18am ET: **Panel: Supporting Healthcare Governance With Simulation** by Andreas Tolk, Michel Audette, Maria Mayorga, Sybil Klaus and Jerzy Rozenblit
- 11:54am-12:12pm ET: *Simulation Of New Healthcare Delivery To Evaluate Impacts On Patient Access To Care: A Telehealth Supply And Demand Use Case* by Matthew Henchey, Deborah Ercolini and Sybil Klaus

Break: 12:30pm-1:00pm ET

M&S in Medicine (MSM)

Learning, Tools and Data

Chairs: Minsik Hong and Jerzy Rozenblit

- 1:00pm-1:18pm ET: *The MITRE Maternal Mortality Interactive Dashboard (3MID): A Tool For Assessing The Effectiveness And Equity Of Quality Improvement Toolkits On Maternal Care* by Kevin Comer, Abdul Sheiknureldin, Rachel Mayer and Sybil Klaus
- 1:18pm-1:36pm ET: *A Framework For Secure Data Management For Medical Devices* by Ibrahim Almazayad, Aakarsh Rao and Jerzy Rozenblit
- 1:36pm-1:54pm ET: *ECG-Based Stethoscope Tracking Using Transfer Learning* by Haben Girmay Yhdego, Nahom Kidane, Rick McKenzie and Michel Audette
- 1:54pm-2:12pm ET: *Handling The Missing Data Problem In Electronic Health Records For Cancer Prediction* by Xudong Zhang, Jiehao Xiao, Yifei Gong, Ning Yu, Wei Zhang, Sunghoon Jang and Feng Gu
- 2:12pm-2:30pm ET: *Auto_Diff: An Automatic Differentiation Package For Python* by Parth Nobel

Break: 2:30pm-3:00pm ET

M&S in Medicine (MSM)

Analysis, Design and Training

Chairs: Jerzy Rozenblit and Minsik Hong

- 3:00pm-3:18pm ET: *Movement, Disease And Patch Exploitation In Nesting Agent Groups* by Wayne Getz, Richard Salter and Krti Tallam

- 3:18pm-3:36pm ET: *An Object State Estimation For The Peg Transfer Task In Computer-Guided Surgical Training* by Kai Meisner, Minsik Hong and Jerzy Rozenblit
- 3:36pm-4:30pm ET: *"Surgical GPS" Proof Of Concept For Scoliosis Surgery* by Austin Tapp and Michel Audette
- 3:54pm-4:12pm ET: *The Effects Of Filtering On High Frequency Oscillation Classification* by Jiaju Liu, Rachael Garner, Marianna La Rocca, Eun-Kee Bae and Dominique Duncan
- 4:12pm-4:30pm ET: *Predicting The Resource Needs And Outcomes Of Computationally Intensive Biological Simulations* by Andrew Fisher, Bhisma Adhikari, Chao Zhai, Joshua Morgan, Vijay Mago and Philippe Giabbanelli

SpringSim 2020 Virtual Conference

May 21, 2020

Parallel Meeting Two

Location: Zoom Room: Goose

Theory and Foundations of Modeling and Simulation (TMS)

Chairs: Cristina Ruiz-Martin and Joachim Denil

Current Advances in DEVS Methodology

- 11:00am-11:18am ET: *A Linear-Implicit Quantized DEVS Method For Very Stiff Electrical Networks Using A Latency Insertion Method* by Joseph Hood and Roger Dougal
- 11:18am-11:36am ET: *A Model Library For Finite State Machines In Cadmium* by Amitav Shaw, Arshpreet Singh and Gabriel Wainer
- 11:36am-11:54am ET: *A Framework For Composable Cellular Automata DEVS Modeling, Simulation, And Visualization* by Chao Zhang, Hessam Sarjoughian and Moon Gi Seok
- 11:54am-12:12pm ET: *Hybrid Iterative System Specification Of Cyberphysical Systems: Neurocognitive Behavior Application* by Bernard Zeigler
- 12:12pm-12:30pm ET: *Development Of A Real-Time DEVS Kernel: RT-Cadmium* by Benjamin Earle, Kyle Bjornson, Cristina Ruiz Martin and Gabriel Wainer

Break: 12:30pm-1:00pm ET

Theory and Foundations of Modeling and Simulation (TMS)

Chairs: Hessam Sarjoughian and Gabriel Wainer

Current Advances in Theory of Modeling and Simulation

- 1:00pm-1:18pm ET: *Simulation And Analysis Of Animal Movement Paths Using Numerus Model Builder* by Wayne Getz, Ludovica Vissat and Richard Salter

- 1:18pm-1:36pm ET: *Machine Learning Of An Approximate Morphism Of An Electronic Warfare Simulation Component* by Donald Jarvis
- 1:36pm-1:54pm ET: *We Are NOT Living In A Simulation* by Robert Axtell
- 1:54pm-2:12pm ET: *Automated Generation Of Simulation Models Using Automated, Reactive Pruning Of System Entity Structures* by Thorsten Pawletta, Hendrik Folkerts, Christina Deatcu and Bernard Zeigler
- 2:12pm-2:30pm ET: *Application Of A Model-Driven Approach To The Development Of Distributed Simulations: The ESA HRAF Case* by Andrea D'Ambrogio, Paolo Bocciarelli, Juan Delfa and Aron Kisdi

Break: 2:30pm-3:00pm ET

M&S for Smart Energy Systems (MSSES)

Chairs: James Nutaro and Ozgur Ozmen

- 3:00pm-3:18pm ET: *A Phase Transition Model And Temporal Logic Specifications For Smart Energy Systems – Revisited* by Byungkwon Park and Mohammed Olama
- 3:18pm-3:36pm ET: *Genetic Algorithm For Demand Response: A Stackelberg Game Approach* by Kadir Amasyali, Yang Chen and Mohammed Olama
- 3:36pm-3:54pm ET: *Determining The Reaction Time For Triggering Supportive Control Actions To Gurantee Adequate Frequency Response In Smart Grids* by Jiecai Luo, Seddik Djouadi, Mohammed Olama and Yichen Zhang
- 3:54pm-4:12pm ET: *A Framework For The Extension Of DEVS With Sensor Fusion Capabilities* by Joseph Boi-Ukeme and Gabriel Wainer
- 4:12pm-4:30pm ET: *Simulation Based Modeling For A Cybersecure Power Grid* by Michael Mesham, Mahmoud Fahmy and Nurcin Celik