

# **2023 IEEE International Conference on Autonomic Computing and Self-Organizing Systems (ACSOS 2023)**

**Toronto, Ontario, Canada  
25-29 September 2023**



**IEEE Catalog Number: CFP23X51-POD  
ISBN: 979-8-3503-3745-7**

**Copyright © 2023 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP23X51-POD
ISBN (Print-On-Demand):	979-8-3503-3745-7
ISBN (Online):	979-8-3503-3744-0

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# 2023 IEEE International Conference on Autonomic Computing and Self- Organizing Systems (ACSOS) **ACSOS 2023**

## Table of Contents

Message from the General Chairs .....	viii
Message from the Program Chairs .....	x
Message from the Artifacts Chairs .....	xii
Message from the Doctoral Symposium Chairs .....	xiv
Message from the Posters and Demos Chairs .....	xv
Message from the Workshop Chairs .....	xvi
Organizing Committee .....	xviii
Steering Committee .....	xx
Advisory Board .....	xxi
Program Committee .....	xxii
Sponsors .....	xxiv
Keynotes .....	xxv

## Full Research Papers

An Arms Race in Theory-of-Mind: Deception Drives the Emergence of Higher-Level Theory-of-Mind in Agent Societies .....	1
<i>Stéfan Sarkadi (King's College London, UK)</i>	
A Framework for Autonomic Computing for In Situ Imageomics .....	11
<i>Jenna M. Kline (The Ohio State University), Christopher Stewart (The Ohio State University), Tanya Berger-Wolf (The Ohio State University), Michelle Ramirez (The Ohio State University), Samuel Stevens (The Ohio State University), Reshma Ramesh Babu (The Ohio State University), Namrata Banerji (The Ohio State University), Alec Sheets (The Ohio State University), Sowbaranika Balasubramaniam (The Ohio State University), Elizabeth Campolongo (The Ohio State University), Matthew Thompson (The Ohio State University), Charles V. Stewart (Rensselaer Polytechnic Institute), Maksim Kholiavchenko (Rensselaer Polytechnic Institute), Daniel I. Rubenstein (Princeton University), Nina Van Tiel (EPFL), and Jackson Miliko (Mpala Research Centre)</i>	

Continuous Learning and Cooperative Prediction for Traffic Dynamics by Adaptive Multi-Agent Systems .....	17
<i>Ha Nhi Ngo (IRIT Computer Science Research Institute of Toulouse, Continental Digital Services France), Elsy Kaddoum (IRIT Computer Science Research Institute of Toulouse), Marie-Pierre Gleizes (IRIT Computer Science Research Institute of Toulouse), Jonathan Bonnet (Continental Digital Services France), and Anaïs Goursolle (Continental Digital Services France)</i>	
Energy Efficient Scheduling for Serverless Systems .....	27
<i>Michail Tsenos (Athens University of Economics and Business, Greece), Aristotelis Peri (Athens University of Economics and Business, Greece), and Vana Kalogeraki (Athens University of Economics and Business, Greece)</i>	
Field-Informed Reinforcement Learning of Collective Tasks with Graph Neural Networks .....	37
<i>Gianluca Aguzzi (Alma Mater Studiorum - Università di Bologna, Italy), Mirko Viroli (Alma Mater Studiorum - Università di Bologna, Italy), and Lukas Esterle (Aarhus University, Denmark)</i>	
Learning Stigmergic Communication for Self-Organising Coordination .....	47
<i>Stefano Mariani (University of Modena and Reggio Emilia, Italy) and Franco Zambonelli (University of Modena and Reggio Emilia, Italy)</i>	
Online ML Self-Adaptation in Face of Traps .....	57
<i>Michal Töpfer (Charles University, Czech Republic), František Plášil (Charles University, Czech Republic), Tomáš Bureš (Charles University, Czech Republic), Petr Hnětynka (Charles University, Czech Republic), Martin Kruliš (Charles University, Czech Republic), and Danny Weyns (Katholieke Universiteit Leuven, Belgium; Linnaeus University, Sweden)</i>	
$\mu$ Opt: An Efficient Optimal Autoscaler for Microservice Applications .....	67
<i>Emilio Incerto (IMT School for Advanced Studies Lucca, Italy), Roberto Pizziol (IMT School for Advanced Studies Lucca, Italy), and Mirco Tribastone (IMT School for Advanced Studies Lucca, Italy)</i>	
Prolego: Time-Series Analysis for Predicting Failures in Complex Systems .....	77
<i>Anwasha Das (University of Chicago, USA; Stanford University, USA) and Alex Aiken (Stanford University, USA)</i>	
Self-Organisation Programming: A Functional Reactive Macro Approach .....	87
<i>Roberto Casadei (Alma Mater Studiorum - Università di Bologna, Italy), Francesco Dente (Alma Mater Studiorum - Università di Bologna, Italy), Gianluca Aguzzi (Alma Mater Studiorum - Università di Bologna, Italy), Danilo Pianini (Alma Mater Studiorum - Università di Bologna, Italy), and Mirko Viroli (Alma Mater Studiorum - Università di Bologna, Italy)</i>	
$\Theta$ -Learning: An Algorithm for the Self-Organisation of Collective Self-Governance .....	97
<i>Asimina Mertzani (Imperial College London, UK), Josiah Ober (Stanford University, California), and Jeremy Pitt (Imperial College London, UK)</i>	
Towards the Decentralized Coordination of Multiple Self-Adaptive Systems .....	107
<i>Paul-Andrei Dragan (University of Duisburg-Essen, Germany), Andreas Metzger (University of Duisburg-Essen, Germany), and Klaus Pohl (University of Duisburg-Essen, Germany)</i>	

Worst-Case Impact Assessment of Multi-Alarm Stealth Attacks Against Control Systems with CUSUM-Based Anomaly Detection .....	117
<i>Gabriele Gualandi (Mälardalen University, Sweden) and Alessandro V. Papadopoulos (Mälardalen University, Sweden)</i>	

## Short Papers

CoverNav: Cover Following Navigation Planning in Unstructured Outdoor Environment with Deep Reinforcement Learning .....	127
<i>Jumman Hossain (University of Maryland Baltimore County, USA), Abu-Zaher Faridee (University of Maryland Baltimore County, USA), Nirmalya Roy (University of Maryland Baltimore County, USA), Anjan Basak (DEVCOM Army Research Lab, USA), and Derrick E. Asher (DEVCOM Army Research Lab, USA)</i>	
Evolving Processing Pipelines for Industrial Imaging with Cartesian Genetic Programming .....	133
<i>Andreas Margraf (Fraunhofer IGCV, Germany), Henning Cui (University of Augsburg, Germany), Anthony Stein (University of Hohenheim, Germany), and Jörg Hähner (University of Augsburg, Germany)</i>	
Orchestrating the Execution of Serverless Functions in Hybrid Clouds .....	139
<i>Aristotelis Peri (Athens University of Economics and Business, Greece), Michail Tsenos (Athens University of Economics and Business, Greece), and Vana Kalogeraki (Athens University of Economics and Business, Greece)</i>	
Prediction-Driven Resource Provisioning for Serverless Container Runtimes .....	145
<i>Dimitrios Tomaras (Athens University of Economics and Business, Greece), Michail Tsenos (Athens University of Economics and Business, Greece), and Vana Kalogeraki (Athens University of Economics and Business, Greece)</i>	
Radii of Emergent Patterns in Swarmalator Systems .....	151
<i>Udo Schilcher (University of Klagenfurt, Austria), Christoph W. Rauter (University of Klagenfurt, Austria), and Christian Bettstetter (University of Klagenfurt, Austria)</i>	
SaVE: Self-Aware Vehicular Edge Computing with Efficient Resource Allocation .....	157
<i>Aamir Akbar (Abdul Wali Khan University, Pakistan) and Samir B. Belhaouarie (Hamad Bin Khalifa University, Qatar)</i>	
<b>Author Index .....</b>	<b>163</b>