

# **2020 IEEE International Conference on Autonomic Computing and Self-Organizing Systems (ACSOS 2020)**

**Washington, DC, USA  
17-21 August 2020**



**IEEE Catalog Number: CFP20X51-POD  
ISBN: 978-1-7281-7278-1**

**Copyright © 2020 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:	CFP20X51-POD
ISBN (Print-On-Demand):	978-1-7281-7278-1
ISBN (Online):	978-1-7281-7277-4

**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

# 2020 IEEE International Conference on Autonomic Computing and Self- Organizing Systems (ACSOS) **ACSOS 2020**

## Table of Contents

Message from the General Chairs	ix
Message from the Program Committee Chairs	xii
Message from the Workshops and Tutorials Chairs	xiv
Message from the Doctoral Symposium Chairs	xvi
Keynotes	xvii
Organizing Committee	xix
Steering Committee	xx
Advisory Board	xxi
Program Committee	xxii
AMGCC 2020 Organizing Committee	xxv
SISSY 2020 Organizing Committee	xxvi
eCAS 2020 Organizing Committee	xxvii
SeAC 2020 Organizing Committee	xxviii
SPS 2020 Organizing Committee	xxix
Tutorials	xxx

## Research Papers - Cloud Systems

ENSURE: Efficient Scheduling and Autonomous Resource Management in Serverless Environments	1
<i>Amoghavarsha Suresh (Stony Brook University), Gagan Somashekar (Stony Brook University), Anandh Varadarajan (Stony Brook University), Veerendra Ramesh Kakarla (Stony Brook University), Hima Upadhyay (Stony Brook University), and Anshul Gandhi (Stony Brook University)</i>	
PRESTO: A Latency-Aware Power-Capping Orchestrator for Cloud-Native Microservices	11
<i>Rolando Brondolin (Politecnico di Milano) and Marco D. Santambrogio (Politecnico di Milano)</i>	
Self-Patch: Beyond Patch Tuesday for Containerized Applications	21
<i>Olufogorehan Tunde-Onadele (North Carolina State University), Yuhang Lin (North Carolina State University), Jingzhu He (North Carolina State University), and Xiaohui Gu (North Carolina State University)</i>	

## Research Papers - Self-Adaptation

- Hierarchical Scaling of Microservices in Kubernetes .28.....  
*Fabiana Rossi (University of Rome Tor Vergata), Valeria Cardellini (University of Rome Tor Vergata), and Francesco Lo Presti (University of Rome Tor Vergata)*
- A Self-Configuring and Adaptive Privacy-Aware Permission System for Android Apps .38.....  
*Gian Luca Scoccia (University of L'Aquila), Marco Autili (University of L'Aquila), and Paola Inverardi (University of L'Aquila)*
- Assessing Adaptations Based on Change Impacts .48.....  
*Sharmin Jahan (University of Tulsa), Ian Riley (University of Tulsa), and Rose F. Gamble (University of Tulsa)*

## Research Papers - Model-Based Systems

- Hybrid Planning Using Learning and Model Checking for Autonomous Systems .55.....  
*Ashutosh Pandey (Carnegie Mellon University), Ivan Ruchkin (Carnegie Mellon University), Bradley Schmerl (Carnegie Mellon University), and David Garlan (Carnegie Mellon University)*
- REACT: A Model-Based Runtime Environment for Adapting Communication Systems .65.....  
*Martin Pfannemüller (Universität Mannheim), Martin Breitbach (Universität Mannheim), Christian Krupitzer (Universität Würzburg), Markus Weckesser (Technische Universität Darmstadt), Christian Becker (Universität Mannheim), Bradley Schmerl (Carnegie Mellon University), and Andy Schürr (Technische Universität Darmstadt)*
- Design-Time Validation of Runtime Reconfiguration Strategies: An Environmental-Driven Approach .75.....  
*Max Scheerer (FZI Research Center for Information Technology), Martina Rapp (FZI Research Center for Information Technology), and Ralf Reussner (Karlsruhe Institute of Technology)*

## Research Papers - Open Systems

- Automated Management of Collections of Autonomic Systems .82.....  
*Thomas J. Glazier (Carnegie Mellon University), David Garlan (Carnegie Mellon University), and Bradley Schmerl (Carnegie Mellon University)*
- Adaptive Trust-Aware Decentralized Information Flow Control .92.....  
*Charilaos Skandylas (Linnaeus University), Narges Khakpour (Linnaeus University), and Jesper Andersson (Linnaeus University)*
- A Distributed Population Management Approach for Mobile Agent Systems .102.....  
*Bryan J. Prosser (Wake Forest University) and Errin W. Fulp (Wake Forest University)*

## Research Papers - Learning

- DeCrypto Pro: Deep Learning Based Cryptomining Malware Detection Using Performance Counters .109.....  
*Ganapathy Mani (Purdue University), Vikram Pasumarti (Purdue University), Bharat Bhargava (Purdue University), Faisal Tariq Vora (Purdue University), James MacDonald (Northrop Grumman Corporation), Justin King (Northrop Grumman Corporation), and Jason Kobes (Northrop Grumman Corporation)*
- Learning Distributed Controllers for V-Formation .119.....  
*Shouvik Roy (Stony Brook University), Usama Mehmood (Stony Brook University), Radu Grosu (Technische Universität Wien), Scott A. Smolka (Stony Brook University), Scott D. Stoller (Stony Brook University), and Ashish Tiwari (Microsoft Research)*
- Coevolutionary Learning of Neuromodulated Controllers for Multi-Stage and Gamified Tasks .129  
*Chloe M. Barnes (Aston University), Anikó Ekárt (Aston University), Kai Olav Ellefsen (University of Oslo), Kyrre Glette (University of Oslo), Peter R. Lewis (Aston University), and Jim Tørresen (University of Oslo)*

## Research Papers - Short Papers

- MERIT: Model-Driven Rehomeing for VNF Chains .139.....  
*Muhammad Wajahat (Stony Brook University), Bharath Balasubramanian (AT&T Labs - Research), Anshul Gandhi (Stony Brook University), Gueyoung Jung (AT&T Labs - Research), and Shankaranarayanan Puzhavakath Narayanan (AT&T Labs - Research)*
- How far should I Watch? Quantifying the Effect of Various Observational Capabilities on Long-Range Situational Awareness in Multi-Robot Teams .146.....  
*Sehyeok Kang (Arizona State University), Taeyeong Choi (Arizona State University), and Theodore P. Pavlic (Arizona State University)*
- FCPP: An Efficient and Extensible Field Calculus Framework .153.....  
*Giorgio Audrito (University of Torino)*
- Automating GUI Testing with Image-Based Deep Reinforcement Learning .160.....  
*Juha Eskonen (Ericsson), Julen Kahles (Ericsson), and Joel Reijonen (Ericsson)*

## Research Papers - Scalability

- A Survey of Methodology in Self-Adaptive Systems Research .168.....  
*Barry Porter (Lancaster University), Roberto Rodrigues Filho (Lancaster University), and Paul Dean (Lancaster University)*
- Deadlock Avoidance for Multiple Tasks in a Self-Organizing Production Cell .178.....  
*Joseph Hirsch (University of Augsburg), Martin Neumayer (University of Augsburg), Hella Ponsar (University of Augsburg), Oliver Kosak (University of Augsburg), and Wolfgang Reif (University of Augsburg)*

Taming Resource Heterogeneity In Distributed ML Training With Dynamic Batching .188.....  
*Sahil Tyagi (Indiana University Bloomington) and Prateek Sharma  
(Indiana University Bloomington)*

## Research Papers - User-Centric Systems

Reasoning about When to Provide Explanation for Human-Involved Self-Adaptive Systems .195...  
*Nianyu Li (Peking University), Javier Cámara (University of York),  
David Garlan (Carnegie Mellon University), and Bradley Schmerl  
(Carnegie Mellon University)*

Collective Learning: A 10-Year Odyssey to Human-Centered Distributed Intelligence .205.....  
*Evangelos Pournaras (University of Leeds)*

Evaluating the Effect of User-Given Guiding Attention on the Learning Process .215.....  
*Richard Nordsieck (XITASO GmbH IT & Software Solutions), Michael  
Heider (University of Augsburg), Andreas Angerer (XITASO GmbH IT &  
Software Solutions), and Jörg Hähner (University of Augsburg)*

## Research Papers - Best Paper Candidates

Building Reusable Repertoires for Stochastic Self-\* Planners .222.....  
*Cody Kinneer (Carnegie Mellon University), Rijnard van Tonder  
(Carnegie Mellon University), David Garlan (Carnegie Mellon  
University), and Claire Le Goues (Carnegie Mellon University)*

Reconfigurable Embedded Devices Using Reinforcement Learning to Develop Action-Policies .232  
*Alwyn Burger (University of Duisburg-Essen), David W King (Air Force  
Institute of Technology), and Gregor Schiele (University of  
Duisburg-Essen)*

Understanding Uncertainty in Self-Adaptive Systems .242.....  
*Radu Calinescu (University of York), Raffaella Mirandola (Politecnico  
di Milano), Diego Perez-Palacin (Linnaeus University), and Danny Weyns  
(KU Leuven)*

**Author Index 253**.....