

# **2020 IEEE International Conference on Service Oriented Systems Engineering (SOSE 2020)**

**Oxford, United Kingdom  
3-6 August 2020**



**IEEE Catalog Number: CFP20384-POD  
ISBN: 978-1-7281 -6973-6**

**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:	CFP20384-POD
ISBN (Print-On-Demand):	978-1-7281-6973-6
ISBN (Online):	978-1-7281-6972-9
ISSN:	2640-8228

**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 Service- Oriented System Engineering (SOSE) **SOSE 2020**

## Table of Contents

General Chair's Message	viii
Program Chair's Message	ix
Committees	x

### Track 1: SOSE 2020 Invited Papers

Aggregating Atomic Clocks for Time-Stamping	1
<i>Temure Saidkhodjaev (University of Maryland), Jeffrey Voas (National Institute of Standards and Technology), Rick Kuhn (National Institute of Standards and Technology), Joanna DeFranco (The Pennsylvania State University), and Phillip Laplante (The Pennsylvania State University)</i>	
Risk Breakdown Structure and Security Space for Security Management	7
<i>Hiroyuki Sato (The University of Tokyo), Shigeaki Tanimoto (Chiba Institute of Technology), and Atsushi Kanai (Hosei University)</i>	
COMPASS: A Data-Driven Blockchain Evaluation Framework	17
<i>Wei-Tek Tsai (Beihang University), Rong Wang (Beihang University), Shuai Liu (Tiande Technologies), Enyan Deng (Andrew International Sandbox Institute), and Dong Yang (Beihang University)</i>	
Service-Oriented Software Design Model for Communication Robot	31
<i>Toru Kobayashi (Nagasaki University), Kenichi Arai (Nagasaki University), Tetsuo Imai (Nagasaki University), Shigeaki Tanimoto (Chiba Institute of Technology), Hiroyuki Sato (The University of Tokyo), Atsushi Kanai (Hosei University), Teiichiro Miyazaki (Nagasaki University Hospital), and Akira Tsujino (Nagasaki University Hospital)</i>	
On Coalitional and Non-Coalitional Games in the Design of User Incentives for Dependable Mobile Crowdsensing Services	40
<i>Maryam Pouryazdan (Watts Water Technologies) and Burak Kantarci (University of Ottawa)</i>	

## Track 2: Cloud and Microservice Based Service Systems Engineering

- Applicability of Coverage Criteria for Serverless Applications .49.....  
*Stefan Winzinger (University of Bamberg) and Guido Wirtz (University of Bamberg)*
- Container Mapping and its Impact on Performance in Containerized Cloud Environments .57.....  
*Gaia Ambrosino (CeSMA–Center of Advanced Measurement Services - University of Naples Federico II), Giovanni B. Fioccola (NetCom Group S.p.A.), Roberto Canonico (University of Naples Federico II, DIETI Department), and Giorgio Ventre (University of Naples Federico II, DIETI Department)*
- System Decomposition to Optimize Functionality Distribution in Microservices with Rule Based Approach .65.....  
*Fola-Dami Joseph Eyitemi (University of Leicester) and Stephan Reiff-Marganiec (University of Derby)*

## Track 3: Evaluation and Optimization of Service Systems Attributes

- Scheduling Heterogeneous Multiprocessor Real-Time Systems with Mixed Sets of Task .72.....  
*Zhuo Cheng (Jiangxi Normal University), Jinyun Xue (Jiangxi Normal University), Haitao Zhang (Lanzhou University), Zhen You (Jiangxi Normal University), Qimin Hu (Jiangxi Normal University), and Yuto Lim (Japan Advanced Institute of Science and Technology)*
- A Social Sensing Approach for Quality Changes of Real-World Services .82.....  
*Qianqian Shu (Harbin Institute of Technology), Zhiying Tu (Harbin Institute of Technology), Xiaofei Xu (Harbin Institute of Technology), and Zhongjie Wang (Harbin Institute of Technology)*
- Pattern-Based Approach to Modelling and Verifying System Security .92.....  
*Xiaoyu Zheng (Nanjing University of Science and Technology), Dongmei Liu (Nanjing University of Science and Technology), Hong Zhu (Oxford Brookes University), and Ian Bayley (Oxford Brookes University)*

## Track 4: Applications of Service Systems Engineering

- NiCad+: Speeding the Detecting Process of NiCad .103.....  
*Chenhui Feng (National University of Defense Technology), Tao Wang (National University of Defense Technology), Jinze Liu (National University of Defense Technology), Yang Zhang (National University of Defense Technology), Kele Xu (National University of Defense Technology), and Yijie Wang (National University of Defense Technology)*
- A Blockchain-Based Tracking System .111.....  
*Ajayvikram Chauhan (San Jose State University), Gaurav Savner (San Jose State University), Prajwal Venkatesh (San Jose State University), Vishwanath Patil (San Jose State University), and Wencen Wu (San Jose State University)*

**Author Index 117**.....