

# **24th International Conference on Principles of Distributed Systems**

**OPODIS 2020, December 14–16, 2020, Strasbourg, France  
(Virtual Conference)**

Edited by

**Quentin Bramas  
Rotem Oshman  
Paolo Romano**



*Editors*

**Quentin Bramas** 

University of Strasbourg, ICUBE, CNRS, Strasbourg, France  
bramas@unistra.fr

**Rotem Oshman**

Tel Aviv University, Israel  
roshman@tau.ac.il

**Paolo Romano** 

Lisbon University & INESC-ID, Portugal  
romano@inesc-id.pt

*ACM Classification 2012*

Theory of computation → Distributed computing models; Theory of computation → Distributed algorithms; Theory of computation → Concurrent algorithms; Theory of computation → Data structures design and analysis; Networks → Mobile networks; Networks → Wireless access networks; Networks → Ad hoc networks; Computing methodologies → Distributed algorithms; Security and privacy → Distributed systems security; Information systems → Distributed storage; Computer systems organization → Dependable and fault-tolerant systems and networks; Software and its engineering → Distributed systems organizing principles

**ISBN 978-3-95977-176-4**

PRINT ISBN: 978-1-7138-2396-4

*Published online and open access by*

Schloss Dagstuhl – Leibniz-Zentrum für Informatik GmbH, Dagstuhl Publishing, Saarbrücken/Wadern, Germany. Online available at <https://www.dagstuhl.de/dagpub/978-3-95977-176-4>.

*Publication date*

January, 2021

*Bibliographic information published by the Deutsche Nationalbibliothek*

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at <https://portal.dnb.de>.

*License*

This work is licensed under a Creative Commons Attribution 3.0 Unported license (CC-BY 3.0):  
<https://creativecommons.org/licenses/by/3.0/legalcode>.



In brief, this license authorizes each and everybody to share (to copy, distribute and transmit) the work under the following conditions, without impairing or restricting the authors' moral rights:

- Attribution: The work must be attributed to its authors.

The copyright is retained by the corresponding authors.

Digital Object Identifier: 10.4230/LIPIcs.OPODIS.2020.0

ISBN 978-3-95977-176-4

ISSN 1868-8969

<https://www.dagstuhl.de/lipics>

## Contents

Preface <i>Quentin Bramas, Rotem Oshman, and Paolo Romano</i> .....	0:ix
Program Committee .....	0:xi–0:xii
Steering Committee .....	0:xiii
External Reviewers .....	0:xv–0:xvi

### Invited Talks

Big Data Processing: Security and Scalability Challenges <i>Pascal Felber</i> .....	1:1–1:1
Byzantine Agreement and SMR with Sub-Quadratic Message Complexity <i>Idit Keidar</i> .....	2:1–2:1
Can We Automate Our Own Work – or Show That It Is Hard? <i>Jukka Suomela</i> .....	3:1–3:1

### Regular Papers

Byzantine Lattice Agreement in Asynchronous Systems <i>Xiong Zheng and Vijay Garg</i> .....	4:1–4:16
Heterogeneous Paxos <i>Isaac Sheff, Xinwen Wang, Robbert van Renesse, and Andrew C. Myers</i> .....	5:1–5:17
Multi-Threshold Asynchronous Reliable Broadcast and Consensus <i>Martin Hirt, Ard Kastrati, and Chen-Da Liu-Zhang</i> .....	6:1–6:16
Echo-CGC: A Communication-Efficient Byzantine-Tolerant Distributed Machine Learning Algorithm in Single-Hop Radio Network <i>Qinzi Zhang and Lewis Tseng</i> .....	7:1–7:16
AKSEL: Fast Byzantine SGD <i>Amine Boussetta, El-Mahdi El-Mhamdi, Rachid Guerraoui, Alexandre Maurer, and Sébastien Rouault</i> .....	8:1–8:16
ACE: Abstract Consensus Encapsulation for Liveness Boosting of State Machine Replication <i>Alexander Spiegelman, Arik Rinberg, and Dahlia Malkhi</i> .....	9:1–9:18
Security Analysis of Ripple Consensus <i>Ignacio Amores-Sesar, Christian Cachin, and Jovana Mićić</i> .....	10:1–10:16
Information Theoretic HotStuff <i>Ittai Abraham and Gilad Stern</i> .....	11:1–11:16

24th International Conference on Principles of Distributed Systems (OPODIS 2020).

Editors: Quentin Bramas, Rotem Oshman, and Paolo Romano



Leibniz International Proceedings in Informatics

Schloss Dagstuhl – Leibniz-Zentrum für Informatik, Dagstuhl Publishing, Germany

Rational Behaviors in Committee-Based Blockchains <i>Yackolley Amoussou-Guenou, Bruno Biais, Maria Potop-Butucaru, and Sara Tucci-Piergiovanni</i> .....	12:1–12:16
Relaxed Queues and Stacks from Read/Write Operations <i>Armando Castañeda, Sergio Rajsbaum, and Michel Raynal</i> .....	13:1–13:19
Fast and Space-Efficient Queues via Relaxation <i>Dempsey Wade and Edward Talmage</i> .....	14:1–14:16
Recoverable, Abortable, and Adaptive Mutual Exclusion with Sublogarithmic RMR Complexity <i>Daniel Katsan and Adam Morrison</i> .....	15:1–15:16
Optimal Resilience in Systems That Mix Shared Memory and Message Passing <i>Hagit Attiya, Sweta Kumari, and Noa Schiller</i> .....	16:1–16:16
CSR++: A Fast, Scalable, Update-Friendly Graph Data Structure <i>Soukaina Firml, Vasileios Trigonakis, Jean-Pierre Lozi, Iraklis Psaroudakis, Alexander Weld, Dalila Chiadmi, Sungpack Hong, and Hassan Chafi</i> .....	17:1–17:16
Locally Solvable Tasks and the Limitations of Valency Arguments <i>Hagit Attiya, Armando Castañeda, and Sergio Rajsbaum</i> .....	18:1–18:16
Approximate Majority with Catalytic Inputs <i>Talley Amir, James Aspnes, and John Lazarsfeld</i> .....	19:1–19:16
Distributed Runtime Verification Under Partial Synchrony <i>Ritam Ganguly, Anik Momtaz, and Borzoo Bonakdarpour</i> .....	20:1–20:17
Decentralized Runtime Enforcement of Message Sequences in Message-Based Systems <i>Mahboubeh Samadi, Fatemeh Ghassemi, and Ramtin Khosravi</i> .....	21:1–21:18
Broadcasting Competitively Against Adaptive Adversary in Multi-Channel Radio Networks <i>Haimin Chen and Chaodong Zheng</i> .....	22:1–22:16
Dynamic Byzantine Reliable Broadcast <i>Rachid Guerraoui, Jovan Komatovic, Petr Kuznetsov, Yvonne-Anne Pignolet, Dragos-Adrian Seredinschi, and Andrei Tonkikh</i> .....	23:1–23:18
Broadcasting with Mobile Agents in Dynamic Networks <i>Shantanu Das, Nikos Giachoudis, Flaminia L. Luccio, and Euripides Markou</i> ....	24:1–24:16
On Broadcast in Generalized Network and Adversarial Models <i>Chen-Da Liu-Zhang, Varun Maram, and Ueli Maurer</i> .....	25:1–25:16
Maximally Resilient Replacement Paths for a Family of Product Graphs <i>Mahmoud Parham, Klaus-Tycho Foerster, Petar Kosic, and Stefan Schmid</i> .....	26:1–26:16
Self-Stabilizing Byzantine-Resilient Communication in Dynamic Networks <i>Alexandre Maurer</i> .....	27:1–27:11
Fast Deterministic Algorithms for Highly-Dynamic Networks <i>Keren Censor-Hillel, Neta Dafni, Victor I. Kolobov, Ami Paz, and Gregory Schwartzman</i> .....	28:1–28:16

Approximating Bipartite Minimum Vertex Cover in the CONGEST Model <i>Salwa Faour and Fabian Kuhn</i> .....	29:1–29:16
Distributed Distance Approximation <i>Bertie Ancona, Keren Censor-Hillel, Mina Dalirrooyfard, Yuval Efron, and Virginia Vassilevska Williams</i> .....	30:1–30:17
Fast Hybrid Network Algorithms for Shortest Paths in Sparse Graphs <i>Michael Feldmann, Kristian Hinnenthal, and Christian Scheideler</i> .....	31:1–31:16
Secured Distributed Algorithms Without Hardness Assumptions <i>Leonid Barenboim and Harel Levin</i> .....	32:1–32:16
Uniform Bipartition in the Population Protocol Model with Arbitrary Communication Graphs <i>Hiroto Yasumi, Fukuhito Ooshita, Michiko Inoue, and Sébastien Tixeuil</i> .....	33:1–33:16