# 26th International Conference on Principles of Distributed Systems

**OPODIS 2022, December 13–15, 2022, Brussels, Belgium**

Edited by

Eshcar Hillel

Roberto Palmieri

Etienne Rivière

LIPIcs – Vol. 253 – OPODIS 2022 www.dagstuhl.de/lipics

*Editors*

**Eshcar Hillel**
Pliops, Ramat Gan, Israel
eshcar@pliops.com

**Roberto Palmieri**
Lehigh University, Bethlehem, PA, USA
palmieri@lehigh.edu

**Etienne Rivière**
UCLouvain, Ottignies-Louvain-la-Neuve, Belgium
etienne.riviere@uclouvain.be

*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 978-3-95977-265-5

### PRINT ISBN: 978-1-7138-7068-5

*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/978-3-95977-265-5.

*Publication date*
February, 2023

*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 4.0 International license (CC-BY 4.0): https://creativecommons.org/licenses/by/4.0/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.2022.0

**ISBN 978-3-95977-265-5** **ISSN 1868-8969** **https://www.dagstuhl.de/lipics**

# Contents

Preface
*Eshcar Hillel, Roberto Palmieri, and Etienne Rivière* ..... 0:vii

Program Committee
..... 0:ix

Steering Committee
..... 0:xi

External Reviewers
..... 0:xiii

## Invited Talks

Theory Meets Practice in the Algorand Blockchain
*Victor Luchangco* ..... 1:1–1:1

Recoverable Computing
*Panagiota Fatourou* ..... 2:1–2:2

Realistic Self-Stabilization
*Sébastien Tixeuil* ..... 3:1–3:1

## Regular Papers

Efficient Wait-Free Queue Algorithms with Multiple Enqueuers and Multiple Dequeuers
*Colette Johnen, Adnane Khattabi, and Alessia Milani* ..... 4:1–4:19

EEMARQ: Efficient Lock-Free Range Queries with Memory Reclamation
*Gali Sheffi, Pedro Ramalhete, and Erez Petrank* ..... 5:1–5:22

The Step Complexity of Multidimensional Approximate Agreement
*Hagit Attiya and Faith Ellen* ..... 6:1–6:12

Performance Anomalies in Concurrent Data Structure Microbenchmarks
*Rosina F. Kharal and Trevor Brown* ..... 7:1–7:24

Robust and Fast Blockchain State Synchronization
*Enrique Fynn, Ethan Buchman, Zarko Milosevic, Robert Soulé, and Fernando Pedone* ..... 8:1–8:22

A Privacy-Preserving and Transparent Certification System for Digital Credentials
*Rodrigo Q. Saramago, Hein Meling, and Leander N. Jehl* ..... 9:1–9:24

When Is Spring Coming? A Security Analysis of Avalanche Consensus
*Ignacio Amores-Sesar, Christian Cachin, and Enrico Tedeschi* ..... 10:1–10:22

Computational Power of a Single Oblivious Mobile Agent in Two-Edge-Connected Graphs
*Taichi Inoue, Naoki Kitamura, Taisuke Izumi, and Toshimitsu Masuzawa* ..... 11:1–11:18

26th International Conference on Principles of Distributed Systems (OPODIS 2022).
Editors: Eshcar Hillel, Roberto Palmieri, and Etienne Rivière
Leibniz International Proceedings in Informatics
LIPICS Schloss Dagstuhl – Leibniz-Zentrum für Informatik, Dagstuhl Publishing, Germany

Line Search for an Oblivious Moving Target
*Jared Coleman, Evangelos Kranakis, Danny Krizanc, and Oscar Morales-Ponce* .. 12:1–12:19

Randomized Byzantine Gathering in Rings
*John Augustine, Arnhav Datar, and Nischith Shadagopan* ..... 13:1–13:16

Gathering of Mobile Robots with Defected Views
*Yonghwan Kim, Masahiro Shibata, Yuichi Sudo, Junya Nakamura, Yoshiaki Katayama, and Toshimitsu Masuzawa* ..... 14:1–14:18

A Unifying Approach to Efficient (Near)-Gathering of Disoriented Robots with Limited Visibility
*Jannik Castenow, Jonas Harbig, Daniel Jung, Peter Kling, Till Knollmann, and Friedhelm Meyer auf der Heide* ..... 15:1–15:25

New Dolev-Reischuk Lower Bounds Meet Blockchain Eclipse Attacks
*Ittai Abraham and Gilad Stern* ..... 16:1–16:18

Quorum Systems in Permissionless Networks
*Christian Cachin, Giuliano Losa, and Luca Zanolini* ..... 17:1–17:22

Make Every Word Count: Adaptive Byzantine Agreement with Fewer Words
*Shir Cohen, Idit Keidar, and Alexander Spiegelman* ..... 18:1–18:21

Modeling Resources in Permissionless Longest-Chain Total-Order Broadcast
*Sarah Azouvi, Christian Cachin, Duc V. Le, Marko Vukolić, and Luca Zanolini* .. 19:1–19:23

Computing Power of Hybrid Models in Synchronous Networks
*Pierre Fraigniaud, Pedro Montealegre, Pablo Paredes, Ivan Rapaport, Martín Ríos-Wilson, and Ioan Todinca* ..... 20:1–20:18

Mending Partial Solutions with Few Changes
*Darya Melnyk, Jukka Suomela, and Neven Villani* ..... 21:1–21:17

The Impossibility of Approximate Agreement on a Larger Class of Graphs
*Shihao Liu* ..... 22:1–22:20

On the Hierarchy of Distributed Majority Protocols
*Petra Berenbrink, Amin Coja-Oghlan, Oliver Gebhard, Max Hahn-Klimroth, Dominik Kaaser, and Malin Rau* ..... 23:1–23:19

Communication-Efficient BFT Using Small Trusted Hardware to Tolerate Minority Corruption
*Sravya Yandamuri, Ittai Abraham, Kartik Nayak, and Michael K. Reiter* ..... 24:1–24:23

Chopin: Combining Distributed and Centralized Schedulers for Self-Adjusting Datacenter Networks
*Neta Rozen-Schiff, Klaus-Tycho Foerster, Stefan Schmid, and David Hay* ..... 25:1–25:23

A Modular Approach to Construct Signature-Free BRB Algorithms Under a Message Adversary
*Timothé Albouy, Davide Frey, Michel Raynal, and François Taïani* ..... 26:1–26:23

Design of Self-Stabilizing Approximation Algorithms via a Primal-Dual Approach
*Yuval Emek, Yuval Gil, and Noga Harlev* ..... 27:1–27:19

Self-Stabilizing Clock Synchronization in Dynamic Networks
*Bernadette Charron-Bost and Louis Penet de Monterno* ..... 28:1–28:17