

*Commenced Publication in 1973*

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

## Editorial Board

David Hutchison

*Lancaster University, Lancaster, UK*

Takeo Kanade

*Carnegie Mellon University, Pittsburgh, PA, USA*

Josef Kittler

*University of Surrey, Guildford, UK*

Jon M. Kleinberg

*Cornell University, Ithaca, NY, USA*

Friedemann Mattern

*ETH Zurich, Zurich, Switzerland*

John C. Mitchell

*Stanford University, Stanford, CA, USA*

Moni Naor

*Weizmann Institute of Science, Rehovot, Israel*

C. Pandu Rangan

*Indian Institute of Technology, Madras, India*

Bernhard Steffen

*TU Dortmund University, Dortmund, Germany*

Demetri Terzopoulos

*University of California, Los Angeles, CA, USA*

Doug Tygar

*University of California, Berkeley, CA, USA*

Gerhard Weikum

*Max Planck Institute for Informatics, Saarbrücken, Germany*

Wil van der Aalst · Eike Best (Eds.)

# Application and Theory of Petri Nets and Concurrency

38th International Conference, PETRI NETS 2017  
Zaragoza, Spain, June 25–30, 2017  
Proceedings

*Editors*

Wil van der Aalst  
Department of Mathematics and Computer  
Science (MF 7.103)  
Eindhoven University of Technology  
Eindhoven, Noord-Brabant  
The Netherlands

Eike Best  
Carl von Ossietzky Universität Oldenburg  
Oldenburg  
Germany

ISSN 0302-9743                      ISSN 1611-3349 (electronic)  
Lecture Notes in Computer Science  
ISBN 978-3-319-57860-6              ISBN 978-3-319-57861-3 (eBook)  
DOI 10.1007/978-3-319-57861-3

Library of Congress Control Number: 2017938160

LNCS Sublibrary: SL1 – Theoretical Computer Science and General Issues

© Springer International Publishing AG 2017

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Printed on acid-free paper

This Springer imprint is published by Springer Nature  
The registered company is Springer International Publishing AG  
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

# Preface

This volume constitutes the proceedings of the 38th International Conference on Application and Theory of Petri Nets and Concurrency (Petri Nets 2017). This series of conferences serves as an annual meeting place to discuss progress in the field of Petri nets and related models of concurrency. These conferences provide a forum for researchers to present and discuss both applications and theoretical developments in this area. Novel tools and substantial enhancements to existing tools can also be presented. This year, the satellite program of the conference comprised five workshops, two Petri net courses, two advanced tutorials, and a model-checking contest.

Petri Nets 2017 was colocated with the Application of Concurrency to System Design Conference (ACSD 2017). Both were organized by the Aragón Institute of Engineering Research of Zaragoza University. The conference took place at the School of Engineering and Architecture of Zaragoza University during June 25–30, 2017. We would like to express our deepest thanks to the Organizing Committee chaired by José Manuel Colom for the time and effort invested in the local organization of this event.

This year, 33 papers were submitted to Petri Nets 2016 by authors from 25 different countries. Each paper was reviewed by three reviewers. The discussion phase and final selection process by the Program Committee (PC) were supported by the EasyChair conference system. The PC selected 16 papers for presentation: nine theory papers, four application papers, and three tool papers. The number of submissions was a bit lower than expected. However, we were pleased that several highly innovative and very strong papers were submitted. After the conference, some of these authors were invited to submit an extended version of their contribution for consideration in a special issue of a journal.

We thank the PC members and other reviewers for their careful and timely evaluation of the submissions and the fruitful constructive discussions that resulted in the final selection of papers. The Springer LNCS team (notably Anna Kramer and Alfred Hofmann) and Uli Schlachter provided excellent and welcome support in the preparation of this volume. We are also grateful to the invited speakers for their contributions:

- Thomas Henzinger, Institute of Science and Technology (IST) Austria, who delivered the Distinguished Carl Adam Petri Lecture  
“Promises and Challenges of Reactive Modeling: A Personal Perspective”
- Josep Carmona, Universitat Politècnica de Catalunya, Barcelona, Spain  
“The Alignment of Formal, Structured and Unstructured Process Descriptions”
- Christos Cassandras, Boston University, USA  
“Complexity Made Simple (at a Small Price)”
- Irina Lomazova, National Research University Higher School of Economics, Moscow, Russia  
“Resource Equivalences in Petri Nets”

Alongside ACSD 2017, the following workshops were colocated: the Workshop on Petri Nets and Software Engineering (PNSE 2017), the Workshop on Modeling and Software Engineering in Business and Industry (MoSEBIn 2017), the Workshop on Algorithms and Theories for the Analysis of Event Data (ATAED 2017), the Workshop on Structure Theory of Petri Nets (STRUCTURE 2017), and the Workshop on Healthcare Management and Patient Safety Through Modelling and Simulation. Other colocated events included: the Model Checking Contest, the Petri Net Course, and an Advanced Tutorial on Process Mining (A Tour In Process Mining: From Practice to Algorithmic Challenges).

We hope you will enjoy reading the contributions in this LNCS volume.

June 2017

Wil van der Aalst  
Eike Best