## 2018 16th ACM/IEEE International **Conference on Formal Methods and Models for System Design (MEMOCODE 2018)**

Beijing, China 15 – 18 October 2018



**IEEE Catalog Number: CFP18MCD-POD ISBN**:

978-1-5386-6196-3

## Copyright $\odot$ 2018 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:
 CFP18MCD-POD

 ISBN (Print-On-Demand):
 978-1-5386-6196-3

 ISBN (Online):
 978-1-5386-6195-6

## **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 Web: www.proceedings.com



## TABLE OF CONTENTS

Welcome Message from the Chairs	iv
Committees	v
Sponsors	vi
Keynote Talks	vii
Tutorials	viii
UCLID5: Integrating Modeling, Verification, Synthesis and Learning Sanjit Seshia and Pramod Subramanyan	1
It's a Matter of Time: Modeling and Analysis of Time Dependent Systems Using Scenario-Aware Dataflow  Maden Skelin and Marc Geilen	11
Run-time Requirement Enforcement for Loop Programs on Processor Arrays Michael Witterauf and Jürgen Teich	22
Synchronous neural networks for cyber-physical systems Partha S Roop, Hammond Pearce and Keyan Monadjem	33
Towards Dependability Metrics for Neural Networks Chih-Hong Cheng, Georg Nührenberg, Chung-Hao Huang, Harald Ruess and Hirotoshi Yasuoka	43
Model Order Reduction of Nonlinear Circuit using Proper Orthogonal Decomposition and Nonlinear Autoregressive with eXogenous input (NARX) Neural Network Nagaraj S, Seshachalam D and Sunil Hucharaddi	47
Security of Pacemakers using Runtime Verification Srinivas Pinisetty, Partha S Roop, Vidula Sawant and Gerardo Schneider	51
Formal Analysis and Verification of DDS in ROS2 Yanan Liu, Yong Guan, Xiaojuan Li, Rui Wang and Jie Zhang	62
Quotient for Assume-Guarantee Contracts Íñigo Íncer Romeo, Alberto Sangiovanni-Vincentelli, Chung-Wei Lin and Eunsuk Kang	67
A Contract-Based Approach to Scheduling and Verification of Dynamic Dataflow Networks Jonatan Wiik, Johan Ersfolk and Marina Waldén	78
Hierarchical Behavior Annex: Towards an AADL Functional Specification Extension Jinmiao Xu, Zhibin Yang, Zhiqiu Huang, Yong Zhou, Chengwei Liu, Jean-Paul Bodeveix, Lei Xue and Mamoun Filali	88
Optimal Self-Routing Split Modules for Radix-based Interconnection Networks Tripti Jain and Klaus Schneider	99
Desynchronization: From Macro-step to Micro-step Yu Bai	109