CONCUR Test-Of-Time Award 2020 Announcement

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──── **Abstract** ────

This short article announces the recipients of the CONCUR Test-of-Time Award 2020.

1 Introduction

The International Conference on Concurrency Theory (CONCUR) and the IFIP Working Group 1.8 on Concurrency Theory have established the CONCUR Test-of-Time Award to recognize important achievements in Concurrency Theory that were published at the CONCUR conference and have stood the test of time. All papers published at CONCUR between 1990 and 1995 were eligible for the first installment of the award, which was presented at the 31st International Conference on Concurrency Theory (CONCUR 2020). The conference was held on line from Vienna, Austria, in the period 1–4 September 2020, with Igor Konnov and Laura Kovacs as chairs of the program committee.

We had the great honour to serve as members of the first CONCUR Test-of-Time Award Jury, and were asked by the CONCUR Steering Committee to select one or two awardees for the periods 1990–1993 and 1992–1995.

After having made a shortlist of candidate award recipients for each of the above-mentioned periods and having thoroughly discussed their relative merits and impact on the CONCUR research community and beyond, the Jury unanimously selected the four articles mentioned below for the award out of a slate of many excellent candidates.

2   The Award Winning Contributions

2.1   Period 1990–1993

- Rob van Glabbeek. "The Linear Time-Branching Time Spectrum".
  Citation: The companion papers on "The Linear Time-Branching Time Spectrum", published by Rob van Glabbeek at CONCUR 1990 and 1993, jointly receive one award for offering a highly influential taxonomy of the menagerie of process semantics, both in a setting where every system action is observable and in the presence of silent moves. Each of the plethora of studied semantics comes equipped with a variety of elegant characterisations in terms of modal logics, testing scenarios, relations, and complete axiomatisations. The encyclopedic nature of the above-mentioned papers has made them a must read for researchers in concurrency theory for nearly 30 years.

- Søren Christensen, Hans Hüttel and Colin Stirling. "Bisimulation Equivalence is Decidable for all Context-Free Processes".
  Citation: The paper "Bisimulation Equivalence is Decidable for all Context-Free Processes", published by Søren Christensen, Hans Hüttel and Colin Stirling at CONCUR 1992, receives one award for extending and simplifying the seminal result by Baeten, Bergstra and Klop, who proved the decidability of bisimilarity over normed context-free processes. The CONCUR 1992 paper has paved the way to further decidability and complexity results for a variety of classes of infinite-state processes. This includes the 2-EXPTIME algorithm for bisimilarity over BPA presented by Burkart, Caucal and Steffen in a paper published at MFCS 1995, and the work by Senizergues in papers at FOCS 1998 and in the SIAM Journal on Computing in 2005, presenting decidability results for all "equational graphs" with finite out-degree.

2.2   Period 1992–1995

- Roberto Segala and Nancy Lynch. "Probabilistic Simulations for Probabilistic Processes".
  Citation: The paper "Probabilistic Simulations for Probabilistic Processes", published by Roberto Segala and Nancy Lynch at CONCUR 1994, receives one award for introducing the "simple" probabilistic automata model. Unlike earlier attempts to embrace probabilities, transition targets here are probability distributions over states, and this makes it possible to lift core process algebraic results in a very elegant manner. Probabilistic automata have quickly been recognised as the pivotal link between classical concurrency theory and the theory of discrete-state Markov processes. They have become the central subjects of probabilistic model checking, and are echoed in a range of very influential modelling formalisms including probabilistic timed automata, probabilistic hybrid automata, and Markov automata.

- Davide Sangiorgi. "A Theory of Bisimulation for the pi-Calculus".
  Citation: The paper "A Theory of Bisimulation for the pi-Calculus", published by Davide Sangiorgi at CONCUR 1993, receives one award for introducing the notion of open bisimilarity, which, unlike early and late bisimilarity, is a congruence for the pi-calculus. Open bisimilarity makes it possible to view most names as uninstantiated variables, and this allows for the development of efficient tools based on a kind of symbolic state-space exploration. Open bisimilarity and tools based on it have, for instance, played an important role in research on cryptographic protocols modelled using extensions of the pi-calculus. For a recent example, Horne has used open bisimilarity as the appropriate way to model the capabilities of an attacker trying to get confidential information, with a real-world application to finding and fixing a privacy flaw in e-passports presented by Filimonov et al. at ESORICS 2019.

3 Concluding Remarks

Interviews with the award recipients, which give some information on the historical context that led them to develop their award-winning work and on their research philosophy, may be found in four blog posts that are accessible from `https://processalgebra.blogspot.com/`, and are collected under one roof in a contribution to the June 2020 issue of the Bulletin of the EATCS [1].

We hope that researchers in Concurrency Theory will read or re-read the award-winning papers and the others that were presented at the early editions of the CONCUR conference, which are a veritable treasure trove of information about our field's intellectual heritage and of inspiration for future work.

──── **References** ────────────────────────────────

1 Luca Aceto. Interviews with the 2020 CONCUR Test-of-Time Award recipients. *Bulletin of the EATCS*, 131:66–84, 2020. URL: `http://bulletin.eatcs.org/index.php/beatcs/article/view/626`.