



Preface

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1 “My name is Rob, short for Robert”

It is our great pleasure to present this Festschrift dedicated to

Robert J. van Glabbeek

on the occasion of his 60th birthday. We, the guest editors, have known Rob for many years as colleague, teacher, mentor, mentee, team member, employee, good friend... and even as manager—although Rob would deny the last one. His normal first-time introduction is the Bond-like “My name is Rob, short for Robert.” and he describes himself in more detail as follows:



Rob van Glabbeek, 2014

My name is Rob van Glabbeek, born in Eindhoven, The Netherlands. I studied mathematics at the university of Leiden, and afterwards, affiliated as scientific collaborator with the Centre for Mathematics and Computer Science (CWI) in Amsterdam, wrote a dissertation in theoretical computer science. On May 16, 1990, I was awarded a Ph.D. degree by the Free University of Amsterdam. [4]

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Hence we are not only celebrating the 60th anniversary of Rob's birth, but also the 30th anniversary of his thesis, a.k.a. *Academisch Proefschrift, Comparative Concurrency Semantics and Refinement of Actions* [5].

2 Rob's networks

Over the years, Rob has built many networks.

First, there is his work on *wireless networks*: we refer to [1] for a nice summary of that.

Second, there is his *network of collaborators*. According to the dblp computer-science bibliography, Rob has co-authored papers with 54 people [2],¹ ranging from highly esteemed researchers to undergraduate students. When you are cooperating with Rob, you quickly notice that he does not care which of those you might be: either way, he respects your opinion and is always ready to embark on a deep discussion (scientific, political, or indeed on any subject at all).

And third, there is the *network of Asian restaurants* where Rob and his colleagues take lunch nearly every working day: we return to that in Sect. 4.

3 Contributions

Rob van Glabbeek has a strong international reputation in the study of the theory of concurrent computation, having made particular contributions to the conciliation of the interleaving and the true concurrency communities by codeveloping the current view of branching time and causality as orthogonal but interacting dimensions of concurrency. [3]

This volume presents three personal contributions, which illustrate some aspects of Rob's broader life, and fourteen scientific contributions.

In *Synchronous and Asynchronous Communication(s) between Three Parties*, Ursula Goltz and Jens-Wolfhard Schicke-Uffmann share some insights about Rob's early research life as a Ph.D. student. They also discuss ongoing collaboration between Braunschweig and Sydney. Vaughan Pratt reflects in *My Time With Rob* on Rob's life as a postdoc at Stanford University, which lasted 12 years. And Ansgar Fehnker goes *Out for Coffee. With Rob*. He focusses on Rob's more recent career at Data61, CSIRO (formerly NICTA) in Sydney, Australia. However, with input from Jan Friso Groote and Wan Fokkink, Ansgar also reveals some secrets from CWI in Amsterdam.

From his early days as a researcher Rob has been interested in semantic equivalences and preorders. For example, in [8]—one of the two papers for which he won one of the CONCUR Test-of-Time Awards in 2020—he considers 155 notions of observability and corresponding equivalences—nicely presented as a “TvG diagram” (for which, see Sect. 4). And it comes as no surprise that many authors considered *semantic models* and *congruences* in their contributions for this Festschrift.

- In *Congruence from the Operator's Point of View*, Maciej Gazda, Wan Fokkink and Vittorio Massaro present a new approach for congruence proofs of process equivalences,

¹ He has collaborated with many more, but not every scientific discussion with Rob results finally in a publication. Sometimes indeed they never end.

- based on syntactic requirements. They focus on specific operators, and then determine congruence relations that are respected by it.
- Antti Valmari continues the quest to clarify the big picture of semantic equivalences by listing *All Congruences Below Stability-Preserving Fair Testing or CFFD*.
 - Jan A. Bergstra and Alban Ponse consider several novel congruences on the signature of meadows with the aim of surveying different notions of fractions.
 - David Mestel and Bill Roscoe explore *Translating between Models of Concurrency*, using a recently introduced priority operator to translate general refinement questions into simpler language-inclusion tests based on sets of traces.
 - Benjamin Bisping, Uwe Nestmann and Kirstin Peters provide a brief history of *Coupled Similarity: The First 32 Years*, which is an equivalence featuring an additional τ -law, compared to weak bisimilarity.
 - In *On the Probabilistic Bisimulation Spectrum with Silent Moves*, Christel Baier, Pedro R. D'Argenio and Holger Hermanns look at Rob's spectrum from a probabilistic angle and develop the bisimulation spectrum with silent moves for probabilistic models.
 - Walter Vogler and Gerald Lüttgen's work, which is also based on Rob's spectrum, develops *A Linear-Time Branching-Time Perspective on Interface Automata*, where known semantics for these automata are classified and new semantics are introduced.

Rob's research, however, should not be reduced to branching-time spectra. It covers anything from foundational research such as introduction of justness, a crucial assumption for proving liveness properties of distributed systems, or the integration of various causality respecting models of concurrency, including Petri nets, via the initialisation of the now widespread use of higher-dimensional automata and other geometric models of concurrency, to applications of process-algebraic methods in the formal description and analysis of economic production processes and wireless networks. And so much more.

The remaining contributions all touch Rob's research interests in one way or the other.

- In *Off-the-shelf Automated Analysis of Liveness Properties for Just Paths*, Mark Bouwman, Bas Luttik and Tim Willemse enrich the operational semantics of a simple process calculus with a concurrency relation, so that for every process expression there exists an associated notion of *just path*. Their aim is to analyse liveness under justness assumptions in the modal μ -calculus.
- Aiming at the synthesis of autonomous agents, Manuel Giesekeing, Ernst-Rüdiger Olderog and Nick Würdemann present a new technique for *Solving High-Level Petri Games*.
- Xudong Qin, Simon Bliudze, Eric Madelaine, Zechen Hou, Yuxin Deng and Min Zhang present algorithms to compute the semantics of open pNets and to check their properties in a compositional way, based on an *SMT-Based Generation of Symbolic Automata*.
- Chenyi Zhang, in *Minimal Consistent DFA From Sample Strings*, proposes a new algorithm which generates minimal deterministic finite automata in polynomial time provided the given training samples satisfy a certain sufficient condition.
- Marc Jasper, Maximilian Schlüter and Bernhard Steffen discuss *Characteristic Invariants in Hennessy–Milner Logic (HML)*. As a result they show that it is sufficient to check an HML formula for each state of a finite-state process to verify that it is bisimulation equivalent to another process.
- Mathias Claus Jensen and Kim Guldstrand Larsen present a sound and *Complete Axiomatization of Weighted Branching Bisimulation*. Their proofs follow, among others, previous results of Rob.

- Finally, in *Transducer Degrees: Atoms, Infima and Suprema*, Jörg Endrullis, Jan Willem Klop and Rena Bakhshi collect, some intriguing problems that have been unsolved for a number of years, about (among others) finite-state transducers acting on infinite streams.

4 Puzzles and games

The authors of the last paper “hope that the problems [...] evoke his [Rob’s] interest, hopefully with the result that he applies his renowned problem-solving powers to them”. And we do agree that Rob’s powers are impressive. For example, together with colleagues, he characterised the may- and must-testing preorders for processes with probabilistic and non-deterministic choice, thereby solving a problem that was open for 15 years.

I also like to play games of almost any kind. [4]

For that, Rob applies his skills beyond mere scientific challenges—mainly when playing (and often winning) games, and when solving puzzles. Over the years, we have poisoned people with wine, searched for missing squares, given a precise definition of sailing around the world, produced an infinite amount of chocolate, drunk whisky in space elevators, followed emus through the desert, and have tried to rescue angels from planet-vaporising demons, etc.²

In fact one of the particular things that sets Rob apart seems to be that when he puts something down in his brain, for later consideration, it is still there when he comes back. For example, he reports that his first encounter with Rubik’s Cube involved rotating the planes in his head, for hours, but without touching the cube at all... until—once he was sure—he picked it up and normalised it all in one go. For that he simply used the transformations that he had already figured out: they were still waiting for him, neatly arranged just where he had left them in his imagination.

More recent evidence of that astonishing ability is the third network we referred to earlier, the informal Trustworthy-System group-lunch excursions, sometimes as many as 10 people, to one of the many nearby Asian restaurants. We usually share; and of course Rob orders for everyone. He solicits preferences from each of us, negotiates compromises where necessary—and then recites the whole lot from memory when the waiter or waitress arrives. Once they have gone, he finishes off by predicting what the final price-per-person will be, still without pen or paper—and of course correct to within a few cents. We refer to the *TvG diagram* of Fig. 1 to illustrate how that might be done.³

5 Humble and unreliable

The use of ‘we’ in sentences like ‘We will now prove our main theorem’ in scientific publications with only one author can be interpreted in only a few ways:

- (i) The author (mistakenly) expects his audience to join him in proving his main theorem;
- (ii) The author claims to be royal;

² On request, the editors are more than happy to share some of these puzzles.

³ The term “Typical van Glabbeek” diagram was coined by Tony Hoare at a recent IFIP WG2.3 meeting; but the acronym *TvG* for it is ours. We hope that it will in due course become part of the Theoretical Computer Science lexicon.

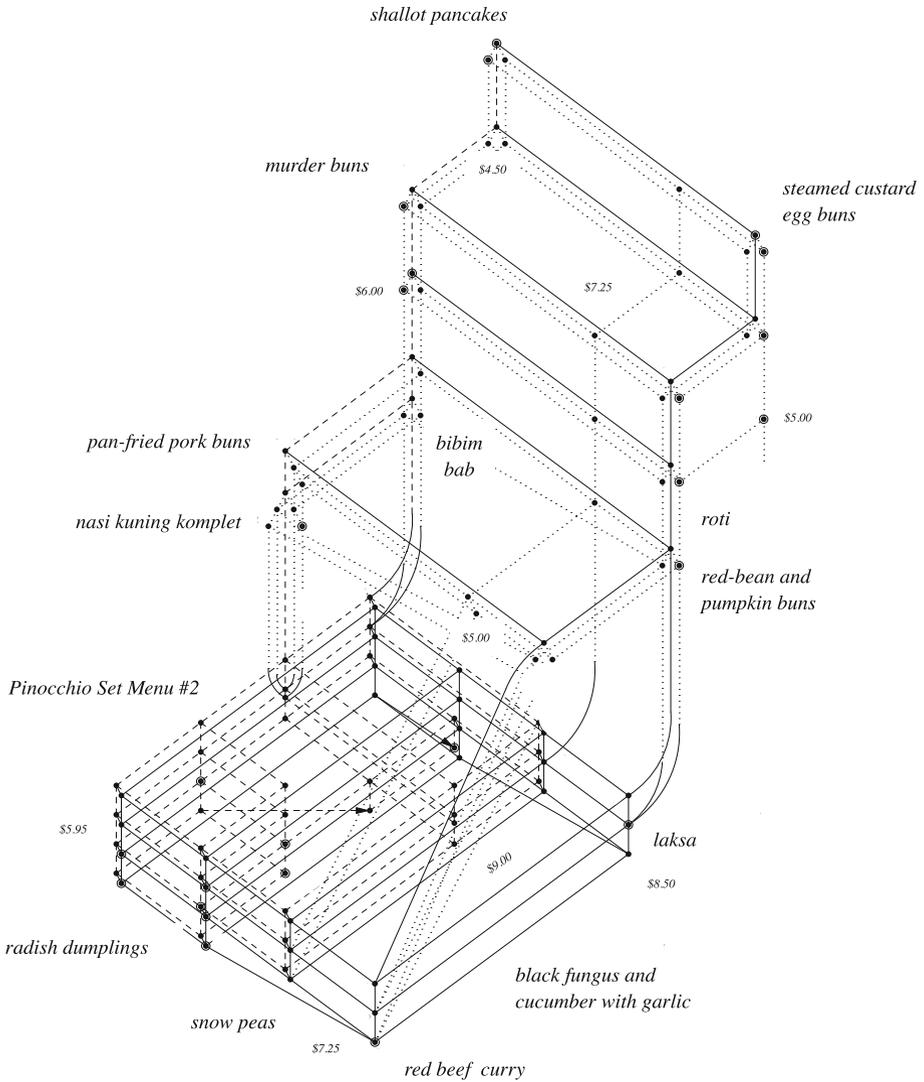


Fig. 1 The nearly infinite variety exhibited by the full spectrum of Asian cuisine

(iii) The author tries to shift the scientific responsibility for his theorem on the professional community as a whole—for instance in order to increase his authority on the subject and/or to display humbleness by sharing his results with others.

I prefer the use of ‘I’. [6, no 6]

We know for a fact that Rob is not royal. Therefore this quote implies that Rob is not humble; and indeed he is not. He is the only Dutch Ph.D. student we know of who *sold* his thesis immediately after his defence.⁴ The Dutch are obliged to print a number of copies of their

⁴ We do wonder what his strategy would have been had the defence been unsuccessful.

thesis, and usually the copies are given away, presented as gifts to friends and colleagues. Rob however rushed to a table just outside the ceremonial venue, and from there hawked his extra copies to the participants as they emerged... for only 10 Dutch guilders each. According to him, he made a profit.

Of course Rob is not unreliable either. We, the guest editors, got to know Rob as a person who does not need to be humble, as he is smart, gentle, polite, and extremely thorough and reliable. In discussions Rob always stays calm, and cares not at all if he finds he must explain some concepts over and over again. And again. He is always willing to listen to (scientific) problems and to provide solutions in a very short amount of time, preferably instantaneously. Even if no solution is provided, that does not mean that Rob has forgotten about a problem: he might just be working on a more detailed and very precise answer. (Recall the problem-solving powers mentioned in the previous section.) Indeed, over the years we have all received many (extremely) long and carefully drafted emails, each one settling some deep scientific question. And we are not aware of any other researcher who has managed to get more than 50 citations (according to Google scholar) for a personal email [7].

Reliability, however, does have its limits. Rob regularly loses track of time when he is deep in thought: proving a theorem, writing a scientific paper, or in the middle of an intricate discussion. To overcome that deficiency, Rob owns a watch with countably many different alarms—in fact exactly one alarm—to remind him of appointments etc. When the alarm goes off, it's time for Rob to solve yet another “simple” puzzle. *What was the reminder for?*

6 Epilogue

So much more could be said about Rob's personality, his capabilities and his private and scientific achievements. Rather than going on for pages, however, we suggest that if you want to know more about him, simply jump on a plane and visit—his office door is always open, and we know you would be welcome.

We are grateful to Christel Baier, Editor in Chief of *Acta Informatica*, for having given us the opportunity to publish this Festschrift in *Acta Informatica*. We also thank Roseline Periyanyagam, Priya Verma and Melissa Fearon from Springer for their constant and ongoing support. Lastly, we want to express our gratitude to the University of New South Wales (UNSW) and Data61, CSIRO, in particular the Trustworthy Systems Research Group, for having agreed to support the seminar that would have been held on 20 May 2020 to celebrate Rob's birthday.

And in conclusion we cannot do better than to offer some final words of wisdom—from Rob himself, of course:

In social and political disputes the preferable position lies in the middle about as often as mountain-tops can be found half-way up a slope [6, no 7].⁵

⁵ In the good old days, so-called *Stellingen* (in Dutch) were included in every Ph.D. thesis, summarising the candidate's theses (literally) in ten short statements. Nowadays, the *stelingen* still present perhaps the most accessible account of the work *but*, especially the last few, often give an insight into the character of the Ph.D. candidate him- or herself.

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