

Stefan Gruner
Bruce Watson
{editors}

Formal Aspects of Computing

Essays dedicated to Derrick Kourie on the occasion of his 65th birthday



Derrick George Kourie

Born 1948

B.Sc. in Mathematics with Mathematical Statistics and Physics 1968

B.Sc.-Honours in Mathematical Statistics 1969

M.Sc. in Mathematical Statistics 1970

Lecturer in Operations Research 1971-1972

M.Sc. in Operations Research 1972

Ph.D. in Operations Research 1975

Research Fellow in Mathematical Statistics 1975

Manager at QUANTIPLAN Operations Research Consulting 1976-1978

— Diploma in Datametrics and Computer Science 1977

Senior Lecturer at the University of Pretoria 1978-1979

Associate Professor 1980-1987

Full Professor 1988-2013

— Editor of the SOUTH AFRICAN COMPUTER JOURNAL 1989-2008

— Head of Department 1997-2002

Professor Emeritus 2013-

Berichte aus der Informatik

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Bruce Watson
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Preface by the Editors

Derrick Kourie is one of the founding fathers of computer science in the Republic of South Africa. To appreciate Kourie's scientific and academic contributions to research and teaching in his field, one must particularly take into account that South Africa was inhibited by the 'Apartheid', as well as by the international sanctions against it, for a long period of Derrick Kourie's life. His personal background —Lebanese by family, Roman Catholic by denomination— did not make his life much easier in the society of a pre-1994 Northern Transvaal in which Dutch family roots in combination with a Calvinist denomination were widely regarded as indispensable attributes of 'first class' citizens. Under those difficult historical circumstances Kourie completed his first MSc degree in mathematical statistics at the University of Pretoria in 1970. A second MSc degree, in operations research, followed at the University of South Africa (UNISA), Pretoria, in 1972. Thereafter, Kourie moved to England where he obtained a PhD degree in operations research at the University of Lancaster in 1975. Soon thereafter he came back to South Africa. Prior to joining the University of Pretoria as a senior lecturer in 1978, Kourie worked for brief periods as lecturer at UNISA, and as research fellow at the University of the Witwatersrand, Johannesburg. Moreover, he also managed a consultancy company specializing in computer simulations for urban planning. Appointed by the University of Pretoria as full professor in 1988, Kourie served as the head of its Department of Computer Science from 1998 until 2002. From 1989 onwards he was also the main editor of the SOUTH AFRICAN COMPUTER JOURNAL (SACJ) —initially called *QUÆSTIONES INFORMATICÆ*— for a duration of almost two decades. Kourie's academic ideals have always been to combine theory and practice in ways that impact on the efficiency and effectiveness of the software development process. Numerous postgraduate students have achieved their MSc or PhD degrees under Kourie's guidance and supervision since then, particularly in the context of the FASTAR research group on Finite Automata Systems: Theoretical and Applied Research.

Derrick Kourie has indeed played a fundamental role in co-founding and driving the FASTAR research group. Bruce Watson's move in 1998 to the University of Pretoria was largely driven by the opportunity to work with Kourie as one of the most enthusiastic proponents of correctness-by-construction algorithmics, taxonomization, and inventive algorithmics. In those fields Kourie was basing his work on the original foundations laid by Dijkstra (among others) and had published several algorithm derivations, though not particularly focused on automata. Kourie's and Watson's teamwork lead them quickly towards algorithms and applications in string processing (now known as 'stringology'), many of which are based

upon automata of various kinds. Despite Kourie's time-consuming appointment as head of department in those days, the research group accomplished a significant amount of work and introduced correctness-by-construction as a software construction course for fourth-year students (in the South African 'honours'-degree). During that time, around the year 2000, Kourie also approved and encouraged Watson's dual appointment as a professor at the Eindhoven University of Technology (NL), seconded from the University of Pretoria. Part of the plan at the time was to establish a 'beachhead' in Europe for FASTAR's brand of algorithmic research. Kourie and Watson managed to work 'ad hoc' at a distance for a year before it became apparent that they would really need a proper research group, complete with research programme, students, some funding, (etc.), all designed to bring the concurrent activities in Eindhoven and Pretoria under the same umbrella. (Similar forces had driven Kourie's launch of the ESPRESSO research group, together with Andrew Boake, with a more practical software engineering and software construction focus.) With Kourie managing the Pretorian branch of FASTAR and Watson the branch in Eindhoven, they quickly nurtured enthusiasm simply by word of mouth, resulting in a number of well-placed publications at the Prague Stringology Conference, the South African SAICSIT Symposium, as well as several other venues. By the year 2003 about thirty researchers had joined FASTAR, falling broadly into two categories: on the one hand those explicitly working for and within FASTAR in Eindhoven and Pretoria, and on the other hand those 'informally affiliated' with FASTAR (including some prominent researchers in Stellenbosch, Prague, and Helsinki). This network provided enough research and interaction momentum for the group to consider a first FASTAR workshop which was held in Eindhoven in 2004. The event was well attended by affiliated researchers from around the world. That first workshop has been followed by further annual workshops since then, most often in the region around Pretoria (including the world-renowned 'Cradle of Mankind') in the North of South Africa, but also near the Kruger National Park in the East. The workshop moved most recently, in 2012, to Stellenbosch University in the South of South Africa. Watson's recent appointment at Stellenbosch University has, with Kourie's help, allowed them to keep FASTAR's centre of gravity in South Africa for the foreseeable future.

Thanks to Kourie's guidance, as mentioned above, FASTAR has promoted and retained some highly motivated post-graduate students who cannot all be listed by name at this place. Almost all of their dissertations or theses have become benchmark works in their sub fields of research, and have lead to recruiting more FASTAR members and affiliates 'in the wake'. Thus it is expected that the coming years will yield continued growth and progress in those research areas, with upcoming forays into parallel algorithmics, quantum algorithms, as well as functional programming. The FASTAR group is now large enough and has enough momentum that it will most likely continue for many years beyond Kourie's own career. During all those successful years, Kourie has indelibly left his mark on the spirit, enthusiasm, sense of humour, as well as the research direction and scientific methodology of this group.

On the occasion of Derrick Kourie's 60th birthday five years ago we (Gruner and Watson) had already organized a small Fest-Colloquium for him, the proceedings of which were first

published informally as a technical report by the University of Pretoria, and then also more formally as revised post-proceedings by the SOUTH AFRICAN COMPUTER JOURNAL [131]. Now however, on the occasion of his 65th birthday, we intended to edit a proper Festschrift book according to the international academic traditions and standards.

For this purpose we carefully pre-selected a number well known computer scientists, all of them active academics and researchers, and all of them with personal and professional ties to Derrick Kourie and his work as founder and chairman of the FASTAR research group. The pre-selected scholars were invited —without guarantee of acceptance— to submit potential chapters for this Festschrift book. Twelve submissions were received as a result of those invitations. All submissions were thoroughly reviewed and criticized by at least two (in several cases three) international referees (names see below), all of them well known and widely respected experts in their Festschrift-related fields of study. Also we, the editors, were involved in the reviewing of several submitted chapters without conflicts of interest. Subsequently ten out of those twelve submissions (i.e. the following ten chapters of this book) were accepted under the condition of revision and further improvement, in accordance with the usual procedures of academic publishing. Two submissions had to be rejected for not having met the academic requirements. All in all, thirty reviews were written, yielding an average number of 2.5 reviews per submission. At this point we express our gratitude to all our reviewing experts, namely:

- *Richard Banach* (England)
- *Loek Cleophas* (Netherlands)
- *Maxime Crochemore* (France)
- *Luc Engelen* (Netherlands)
- *Frantisek Franek* (Canada)
- *Jürg Gutknecht* (Switzerland)
- *Richard Groult* (France)
- *Zhi Han* (Canada)
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- *Daan le Roux* (South Africa)
- *Klaas-Jan Stol* (Netherlands)
- *Alexandru Telea* (Netherlands)
- *Martin Ward* (England)
- *Uwe Wolter* (Norway)

Moreover we express our gratitude to all the colleagues who have contributed their chapters to this Festschrift book. Thanks also to the ladies in the publishing house for their professional and friendly cooperation in this publication project. Last but not least, at the end of this preface: many thanks and all the best wishes to our esteemed colleague, mentor and friend, for many further happy and fruitful years well spent in ‘active retirement’ as professor *emeritus*.

S. Gruner, B. W. Watson
Pretoria and Stellenbosch
Republic of South Africa
June the 25th, 2013 A.D.

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