

## Preface

Jozef Gruska is a well-known computer scientist for his many and broad results, but also because he was “everywhere”—he had 33 long-term visiting positions in Europe, North America, Asia, and Africa.

Professor Gruska introduced the descriptive complexity (of grammars, automata, and languages) and is one of pioneers of parallel (systolic) automata. His other main research interests include parallel systems and automata and quantum information processing, transmission, and cryptography. They are all represented by various contributions to this volume. He is co-founder of four regular series of conferences in informatics and two in quantum information processing and the founding chair (1989–1996) of the IFIP Specialist Group on Foundation of Computer Science.



Professor Jozef Gruska

When in 1996 Professor Jozef Gruska was presented with the IEEE Computer Pioneer Award, the official citation was: *For the development of computer science in the former Czechoslovakia with fundamental contributions to the theory of computing and extraordinary organisational activities.*

Indeed, Jozef Gruska is the father of theoretical computer science research in Czechoslovakia and among the first Slovak programmers in the early 1960s. Gruska was one of the first lecturers on analog/digital computers at Comenius University in Bratislava and the first lecturer on foundations of computing. In addition, he was active in establishing the first computer science curricula at the Comenius University. He also helped the development of computer science education at Masaryk University in Brno and computing education in Slovak high schools.

In 1966 Gruska started the research seminar *Automata, Languages, and Algorithms*, largely credited for the development of a strong group of theoretical computer scientists in Bratislava. For a country on the east side of the iron curtain, Czechoslovakia vitally needed scientific contacts with foreign colleagues. Jozef Gruska was one of the main organizers of the first conference on theoretical computer science in Eastern Europe, *MFCS (Mathematical Foundations of Computer Science) 1972*, in Jablonna near Warsaw (Poland). The following year, in 1973, the continuation of this conference was organized in Štrbské Pleso, High Tatras (Czechoslovakia), with Jozef Gruska as conference chair. More than 150 participants, including 80 foreigners, was most unusual for a conference in former socialist countries. The main talks were presented by J. Bečvář

(Prague), A. Blikle (Warsaw), K. Čulík (Prague), B. Dömölki (Budapest), F. Gécseg (Szeged), S. Ginsburg (Los Angeles), J. Gruska (Bratislava), P. Hájek (Prague), J. Hartmanis (Ithaca, New York), P.J. Hayes (Colchester, Essex), G. Hotz (Saarbrücken), N. Nagornyj (Moscow), M. Nivat (Paris), M. Novotný (Brno), Z. Pawlak (Warsaw), C.A. Petri (Birlinghoven/Bonn), H. Rasiowa (Warsaw), A. Salomaa (Aarhus), C.P. Schnorr (Frankfurt am Main), and P.H. Starke (Berlin). Really an international conference! After this event the proceedings of *MFCS* were published in the *Lecture Notes in Computer Science* (LNCS) of Springer-Verlag.

Rather soon, *MFCS* became the main East-European conference on theoretical computer science competing with its West-European sister *ICALP* (*International Colloquium on Automata, Languages and Programming*). *ICALP* was first organized in 1972 in Paris, France; the second *ICALP* was held in 1974, and since 1976 *ICALP* has been an annual event, also publishing its proceedings in LNCS.

Another successful enterprise by Jozef Gruska and his colleagues was *SOFSEM* (*SOFTware SEMinar*). The first *SOFSEM* was organized in 1974. Nowadays it is an international conference, similar to *MFCS*. It was started in 1974 as a national event in Czech or Slovak languages. During those early days of computer science and technology *SOFSEM* supplemented the university education and academic research. Traditionally, the audience consisted of university professors, academic researchers, university teaching staff, advanced students, and professionals in the field. It was an event for two weeks during the Winter period. First local, and later on also international, experts were invited. Each of them presented a series of lectures related to recent topics on computer science.

The basic format of each *SOFSEM* consisted of several series of invited talks, each of 3–5 hours. They were complemented by selected contributions of participants presented during two half-days in two parallel sessions. The lectures always started early in the morning and lasted long in the evenings to facilitate long lunch-breaks. The seminar venue was always chosen as far as possible from big towns. An ideal location was such that you went several hours by train, continued by an infrequent bus, and finally walked several kilometers. This ensured (to some extent) that *SOFSEM* was an oasis of intellectual freedom not much disturbed by government officials.

*MFCS* and *SOFSEM* have always been an opportunity for East-European and Soviet scientists to contact their Western colleagues. Even now—when the iron curtain no more exists and it is possible to travel elsewhere—there always is a large group of Latvian students at *SOFSEM*.

Jozef Gruska deeply feels the importance of research to be modern. This relates not only to his own research but also to what his students do. In the 1960s his interests concentrated on language theory. This resulted not only in regular papers but also in surveys both in Slovak and English (published in *Information and Control* and *Proceedings of IFIP Congresses*). Later this interest included complexity of computation, finally leading to the monograph *Foundations of Computing* (still available from Amazon).

Systolic trellis automata are simple models for VLSI. They are models of hexagonally connected and triangular shaped systolic arrays. Gruska's research on systolic automata made him really famous. Now it is impossible to write a paper related to systolic automata and not to refer to Gruska. This was the topic where Jozef Gruska got many famous co-authors, including K. Culik II, A. Salomaa, J. Wiedermann, E. Fachini,

A. Maggiolo Schettini, D. Singiorgi, M. Napoli, D. Parente, I. Guessarian, A. Monti, and many others.

Quantum computing is not merely one of the research interests of Jozef Gruska. He understood its importance from the very beginning. The first monograph written in this area of computer science is Gruska's *Quantum Computing*, published in 1999 by McGraw-Hill.

It cannot also be forgotten that he made a great contribution to the ERATO IMAI Quantum Computation and Information project, Tokyo, Japan, started in 2000. This is the first project on quantum computation in Japan, chaired by Hiroshi Imai, University of Tokyo, and awarded by the Japan Science and Technology Agency (JST). Its total budget was more than 15 million US dollars and ended up with a great success, for instance, in theory and experiments of quantum cryptography. Jozef Gruska was deeply involved in this project from the beginning, as a secret "Big Boss", and gave it a lot of important advice. The big success of the project could never be imagined without his help.

He also established contacts with Chinese and Korean colleagues and co-founded in 2001 a series of conferences, named *EQIS (ERATO Quantum Information Science)* first and *AQIS (Asia Quantum Information Science Conference)* later. Since 2003 Jozef Gruska has been the Chairman of the Steering Committee of *AQIS*, which was held since 2001 annually in Japan, China, Korea, and India.

In 1989, the IFIP General Assembly (GA) appointed Jozef Gruska as the founding chair of the temporary IFIP Special Group SG'14 on Foundations of Computing. He created this group with 43 top TCS people and chaired it for two terms until 1996, when he convinced IFIP GA to transfer SG'14 to the permanent IFIP Technical Committee TC1. It was for the first time since the establishment of IFIP in 1962 that TCS had an appropriate representation within IFIP. The first chair of TC1 was then G. Ausiello.

Professor Gruska has spent many years visiting universities and research institutes around the globe. Here is a list of some of them:

1. 1963, 6 months, Moscow, Kyiv, Novosibirsk, USSR, PhD student
2. 1968–1970, 2 academic years, University of Minnesota, USA, visiting professor
3. 1980, 6 months, University of Jena, East Germany, visiting professor
4. 1984, 1987, 1989–1993, 8 semesters, University of Hamburg, West Germany, visiting professor
5. 1994, 1996, 2000, 6 months, University of Karlsruhe, West Germany, visiting professor
6. 1988, 1989, 1992, 4 months, University of Salerno, Italy, visiting professor
7. 1990, 1993, 1997, 5 months, University Paris 6, France, visiting professor
8. 1994, 4 months, École Normale Supérieure, Lyon, France, visiting professor
9. 1997–1999, 12 months, University of Nice, France, visiting professor
10. 2001, 2002, 2003, 2004, 2005, 10 months, ERATO Quantum Project, Tokyo, Japan.

We have already mentioned the Computer Pioneer Award (IEEE, 1996). Professor Gruska was awarded many other distinctions including Bolzano Medal of the Czech Academy of Sciences (2003), elected member of the Academia Europaea (2006), Doctor Honoris Causa, University of Latvia (2013), the IFIP Silver Core Award (1995), Slovak Literally Fond Awards (1998, 2000). In the period 2008–2011, he was a member of the Council of Academia Europaea.



His Laboratory of Quantum Information Processing and Cryptography at the Masaryk University, Brno, Czech Republic has many foreign and local students as well as a continuous stream of visitors. Jozef Gruska is active as ever—see <http://www.fi.muni.cz/usr/gruska>—always ready to give a talk or to start a new collaboration.

Many happy returns, Professor Gruska!

September 2014

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Computing with New Resources

Essays Dedicated to Jozef Gruska on the Occasion of  
His 80th Birthday

Calude, C.S.; Freivalds, R.; Kazuo, I. (Eds.)

2014, XXI, 473 p. 96 illus., Softcover

ISBN: 978-3-319-13349-2