

In Memoriam

Prof. Arkādijs Borisovs – Distinguished Scientist in Intelligent Computer Technologies



Arkādijs Borisovs, Professor, Doctor of Technical Science, Habilitated Doctor of Computer Science, founder of the Latvian scientific school of decision making theory, fuzzy information processing methods and intelligent computer technologies, long-serving scientific editor of the scientific journal of RTU “Information Technology and Management Science” passed away on 14 May 2016 at the age of 78.

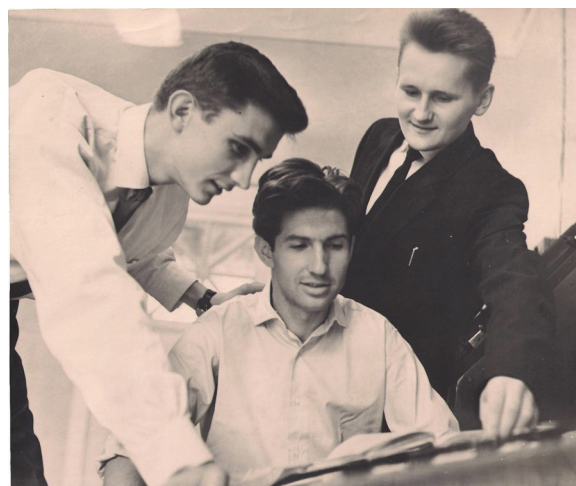
SCIENCE ENTHUSIAST SINCE THE TIME OF STUDIES

Arkādijs Borisovs was born on 3 February 1938 in Kiev. In 1964, he graduated from Riga Polytechnical Institute (currently Riga Technical University) and in 1970 he successfully defended his Doctoral Thesis, in which he proposed some learning algorithms for the diagnostics of systems with fuzzy classes of states as well as using shadows of fuzzy sets for pattern recognition. In the same year, he took active participation in the foundation of the Department of Automatised Control Systems of RTU, became its first chair and served in this position for ten years. The staff of the department guided by Arkādijs Borisovs had significant success in educating and training specialists in the field of system analysis and solving information technology tasks as well as in the research activities.

To be granted the scientific degree of Doctor of Technical Sciences, in 1986 Arkādijs Borisovs defended his Doctoral Thesis on methods and algorithms for decision making under

multiple criteria and fuzzy initial information, and later on was promoted to the academic rank of Full Professor of Computer Science at the Department of Automatised Control Systems of RTU. From 1997, he was the Head of the Specialised Institute of Intelligent Computer Technologies of RTU, then from 1999 – the Head of Decision Support System Professor Group of RTU. From 2003 to 2016, Arkādijs Borisovs was a Professor of the Department of Modelling and Simulation of RTU where he guided the Decision Support System Group.

He was a research enthusiast devoting more than 50 years to RTU. Remembering his early years of research, Prof. Borisovs said, “The word *cybernetics* appeared during my final years of study at RTU. It sounded like a new challenge. The meaning of this word was already known as everybody became engrossed in reading the books by Norbert Wiener “Cybernetics: Or Control and Communication in the Animal and the Machine” and “I Am a Mathematician” published by Nauka Publishers. The books were reissued many times and experienced permanent success. When listening to the theoretical course “Theory of Automatic Control”, the students realised that they comprehended technical aspects of cybernetics.” Later on, Arkādijs Borisovs got his independent task and field of research. He was saying, “I enjoyed that work, and the potentialities inherent in cybernetics seemed to be boundless.”



RTU (at that time RPI) students Arkādijs Borisovs (on the left) and Vitālijs Volskis (in the middle) with assistant lecturer Zigurds Markovičs (nowadays RTU professor, on the right) in the training laboratory in the early 1960s.

In the 1960s, research theme of Arkādijs Borisovs was based on the new theory of the American computer scientist Lotfi Zadeh – a fuzzy set theory. Research supervisor of Arkādijs Borisovs, RTU Professor Jānis Osis became acquainted with the fundamentals of that theory during his

fellowship at Berkeley University, USA. Thus, the first articles on fuzzy set theory and its applications in the USSR were published by J. Osis and A. Borisovs.

FORESEEING FUTURE PERSPECTIVES OF A THEORY AND MAKING NO MISTAKE

Already in the 1970s, Arkādijs Borisovs became the founder and recognised leader of the famous Riga school of fuzzy systems, being one of the first schools in this field not only in the USSR but also in the world. On his initiative, during two decades, all major conferences on fuzzy set theory and its applications were held in Riga, in particular, such large forums as “Models for Choosing Alternatives in a Fuzzy Environment”, “Models for Making Decisions Under Uncertainty”, “Linguistic Models of Decision Making”, etc.

His work was marked by extreme energy; he was a tireless scientist able to examine huge amounts of scientific literature and to surely indicate what research directions, topics and techniques would be prospective. Professor's colleagues still admire his visionary talent.

SYSTEMATIC WORK ON ARTICLE WRITING

In 1973, A. Borisovs arranged at RTU annual publishing of the scientific collected articles titled “Control of Complex Systems” (later – “Decision-Making Methods and Systems”) and was the editor-in-chief till 1993. The papers published in the volume were highly appreciated by many scientific schools.

In the 1980s, Prof. Borisovs in co-authorship with his scholars wrote a series of excellent monographs; among them are “Models of Decision Making Based on Linguistic Variables”, “Processing Fuzzy Information in Decision-Making Systems”, “Decision-Making Based on Fuzzy Models: Case Studies”, which are frequently cited even now, 35 years later.

When writing monographs, Prof. Borisovs was a very exacting leader of his created team of authors. Actually, he tried to conclude each more or less voluminous research topic, where theoretical or practical results were obtained, with preparation and publication of a monograph.

Numerous publications by Prof. Borisovs and members of his scientific school (10 monographs, 5 textbooks and more than 230 research papers) are well known to specialists in Latvia and worldwide.

Prof. Borisovs was the head of multiple research projects represented at the international scientific conferences as well as several applied projects whose results were implemented in practice. One of the last research projects headed by Prof. Borisovs was “Development of a Complex of Intelligent Methods and Medical and Biological Data Processing Algorithms for Oncology Disease Diagnostics Improvement” carried out within Latvia-Belarus Cooperation Programme in Science and Engineering.

A MAN OF WIDE RANGE OF RESEARCH INTERESTS

Research interests of Prof. Borisovs involved a diverse range of fields. Along with developing mathematical methods for validating the decisions made and processing fuzzy information, he fruitfully worked in other research fields as well, including pattern recognition, application of hybrid intelligent systems to computer-aided design, and knowledge representation methods in information systems.

In the 1990s and 2000s, research interests of Prof. Borisovs moved to the field of artificial intelligence and soft computing. Under his supervision, research on genetic algorithms, artificial neural networks, inference on Bayesian networks, and ontology modelling was conducted, whose results were published in the leading European scientific journals and won recognition worldwide.



Prof. A. Borisovs, Prof. L.A. Zadeh, and Doctoral Student A. Vališevskis at the Fifth International Conference on Application of Fuzzy Systems and Soft Computing, ICAFS-2002 in Milan.

Prof. Borisovs was a world-renowned expert in fuzzy set theory and soft computing. He was a member of IFSA European Fuzzy System Working Group, member of the BISC Group (Berkeley Initiative in Soft Computing), vice-president of the Russian Fuzzy System Association, president of the Baltic Operation Research Society, member of the Scientific Advisory Board of the Fuzzy Initiative Nordrhein-Westfalen (Germany), honorary member of the Scientific Board of the Russian Fuzzy System and Soft Computing Association, member of the Latvian National Automation Organisation, as well as program committee member of many international conferences.

He served as a reviewer and was a member of the editorial board of many journals, including scientific journal of Russian Association for Fuzzy Systems and Soft Computing “Fuzzy Systems and Soft Computing”, “Information Sciences”, Baltic Journal on Sustainability “Technological and Economic Development”, International Journal “Automatic Control and Computer Sciences”, etc.

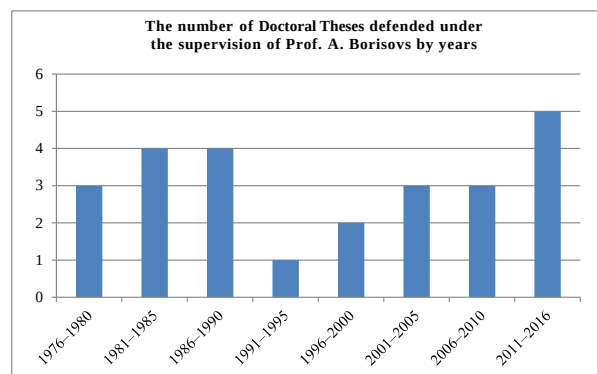
INSPIRING YOUNG RESEARCHERS

Prof. Arkādijs Borisovs was not only an outstanding scholar but also a wonderful organiser of research and pedagogical work. His distinctive feature was an ability to discover promising scholars, to see in a student capacity for research work and assist in achieving results in the chosen field. His counsel was invaluable and will be greatly missed. He will be remembered for his dedication to students. As a result of the long-term fruitful activity, he established his scientific school, educated and trained a lot of qualified specialists. He taught them to think in a non-standard manner, state and solve theoretical and practical tasks, as well as work and get results in a team of like-minded people. The scientific school of Prof. A. Borisovs is remembered as where the atmosphere of searching for new ideas, enthusiasm, mutual respect and co-operation reigned. Till his last day, Prof. Borisovs continued to work and discuss research tasks with his group.

Under the supervision of Prof. Borisovs, 25 Doctoral students have elaborated and successfully defended their Doctoral Theses, as well as more than 20 students have successfully completed MSc degree requisites, who currently work at the universities, leading IT companies, banks, state institutions and private companies in Latvia, Great Britain, Germany, Russia and France.

Nowadays, eight Doctoral degree holders, former students of Prof. Arkādijs Borisovs, successfully work as researchers and lecturers at the Department of Modelling and Simulation of RTU, carrying on his scientific ideas and principles.

The diagram below illustrates Professor's stable and uniform dynamics in educating specialists of higher qualification.



OPEN-MINDED AND OPEN-HEARTED MAN

Prof. Borisovs remained in the memory of his colleagues as a warm-hearted and positive man. His interests spanned multiple fields. He was not only always focused on his work. He had a talent to perceive beauty in nature, art and music. He had a good knowledge of architecture, especially Art Nouveau, which occupied a special place in his heart. He loved jazz and was able to see something interesting and exciting in everyday things.

Arkādijs Borisovs possessed a wonderful ability to involve in his group enthusiastic researchers, establish a community of like-minded people and arrange their successful co-operation. Colleagues of Professor's school remember with pleasure their work in the team and are proud of the results achieved then.

All those who have been fortunate to work with Prof. Arkādijs Borisovs and to know him personally will remember him with great gratitude as an outstanding scientist, a bright personality and a teacher of great talent.

On behalf of
RTU ITI Department of Modelling and Simulation
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