



**Professor Algirdas Antanas Avizienis**

**Foreign Member of the Lithuanian Academy  
of Sciences since 1990**

### **Childhood and Studies**

Algirdas Avizienis was born in Kaunas, Lithuania on July 8, 1932 and received his primary education there. His family left Lithuania in 1944 and lived in Western Germany in 1945-50, where he graduated from the Lithuanian Gymnasium at Hanau in 1949. He has resided in the United States since March, 1950. He received the B.S., M.S., and Ph.D. degrees, all in electrical engineering, from the University of Illinois, Urbana-Champaign in 1954, 1955, and 1960, respectively. From 1956 to 1960 he was associated with the Digital Computer Laboratory at the University of Illinois as a Research Assistant and Fellow, participating in the design of the ILLIAC II computer and completing a Ph.D. thesis that devised the class of "signed-digit" number systems for fast digital arithmetic.

### **Self-Testing and Repairing Computer STAR**

In 1960 he joined the Spacecraft Computers section of the Jet Propulsion Laboratory (JPL), California Institute of Technology, and initiated research on reliability of computing systems that originated the concept of "fault tolerance", first described in a paper presented at the 1967 Fall Joint Computer Conference.

He organized and directed the JPL STAR research project from 1961 to 1972. This effort resulted in the construction and evaluation of the experimental JPL STAR (Self-Testing-And-Repairing) computer, for which, he received U.S. Patent No. 3, 517, 171, "Self-Testing and Repairing Computer" granted on June 23, 1970 and assigned to NASA. A paper that described the JPL STAR computer won the Best Paper selection of the IEEE Transactions on Computers in 1971.

In 1969, JPL began designing a Thermoelectric Outer Planet Spacecraft, or TOPS (Voyager1 and Voyager2 missions). Outer planet missions ranged so far from the sun that solar cells would be inadequate. TOPS would carry radioisotope thermoelectric generators to provide electrical power.

STAR was considered as the on-board computer for TOPS. Components built to STAR specifications later found their way into the NASA Standard Spacecraft Computer 1 (NSSC-1).

### **Academic Activities**

Dr. Avizienis joined the faculty of the University of California, Los Angeles (UCLA) in 1962. Since 1972 he has been Principal Investigator of continuing research projects on fault tolerant computing and system architectures in the Computer Science Department of UCLA. Dr. Avizienis served as Chairman of the UCLA Computer Science Department from 1982 to 1985. He teaches courses in computer system architecture, computer arithmetic, fault-tolerant systems, and software fault tolerance. He is the author or coauthor of over 120 publications in these fields of study.

Dr. Avizienis has served as a consultant for studies of computer systems design and fault tolerance sponsored by the U.S. Air Force, U.S. Navy, NASA, the Federal Aviation Administration, and the National Bureau of Standards, as well as for industrial research in the U.S. and abroad. He has also served on several study groups and panels, including a three-year term as a member of the Advisory Panel on Computer Science and Engineering for the National Science Foundation (NSF), membership on the Hardware Systems Committee of the 1975-78 NSF Computer Science and Engineering Research Study, service as chairman of the Fault Tolerance Panel for the 1980 AFOSR and USAF Space Division Summer Study on 'Autonomous Spacecraft Maintenance', and as the expert on fault tolerance for the for the U.S. Defense Science Board 1981 Summer Study on "Technology Base for the 1990's". From 1985 to 1988 he served a three-year term on the Computing Research Board, and from 1984 to 1989 he served as a fault tolerance expert for the new U.S. air traffic control system on the Advanced Automation System Technical Advisory Group of the FAA.

As a member of the IEEE Computer Society, Dr. Avizienis founded and was the first Chairman of the Technical Committee on Fault-Tolerant Computing (1969-1973), and was the organizer and General Chairman of the First International Symposium on Fault-Tolerant Computing in 1971. He also served for four years (1971-1974) as a member of the Governing Board of the IEEE Computer Society. In international activities, he has served as the founding Chairman of the Working Group 10.4 on "Reliable Computing and Fault Tolerance" of IFIP (the International Federation for Information Processing) from 1980 to 1986, The General Assembly of IFIP presented its Silver Core award to Dr. Avizienis in 1986.

Dr. Avizienis has lectured and conducted joint research in many universities around the world. In 1974 he spent a five-month research visit, sponsored by the U.S. National Academy of Sciences, at the Institute of Mathematics and Cybernetics of the Lithuanian Academy of Science in Vilnius. From August, 1990 to February 1993, Dr. Avizienis served as the first Rector of the Vytautas Magnus University of Kaunas, Lithuania after it was reopened in 1989. The university is the former National University of Lithuania, established in 1922 and closed by the Soviet government in 1950. The Senate of Vytautas Magnus University awarded him the title of Professor Honoris Causa in 1994. Dr. Avizienis is also the President of A. Avizienis and Associates, Inc., a consulting firm specializing in dependable computing and fault-tolerant system design.

### **State and Academic Awards**

For his pioneering efforts in the field of fault-tolerant computing, Dr. Avizienis has received numerous honors and awards, among them the Eckert-Mauchly Award 2012, the Honor Roll of the IEEE Computer Society in 1968; the NASA Apollo Achievement Award in 1969; the NASA Exceptional Service Medal in 1980 "in recognition of outstanding achievements and widely recognized leadership in the field of fault-tolerant computing".

In recognition of his scientific accomplishments, Dr. Avizienis was awarded the honorary degree "Docteur Honoris Causa" by the Institut National Polytechnique of Toulouse, France in November, 1985. He was advanced to the rank of Faculty of Highest Distinction at UCLA in 1986, and elected to membership in the Lithuanian Academy of Science in 1990. In 1991 Dr. Avizienis received the Distinguished Alumnus Award of the Electrical and Computer Engineering Department of the University of Illinois, Urbana-Champaign. The General Assembly of IFIP presented its Silver Core award to Dr. Avizienis in 1986. The Senate of Vytautas Magnus University awarded him the title of Professor Honoris Causa in 1994.

In recognition of Dr. Avizienis merits to Lithuania he was honoured with the Cross of Commander of the Order of the Lithuanian Grand Duke Gediminas in 1998.

Information is taken from a personal website of the professor A. A. Avizienis: [www.avizienis.info](http://www.avizienis.info)

05 03 2019