

Leslie Gabriel Valiant



Leslie Gabriel Valiant, who made transformative contributions to the theory of computation, was born on 28 March 1949 at Budapest, Hungary. His parents were Leslie Valiant and Eva Julia Ujlaki. He was brought up in England, attending Tynemouth High School, North Shields. After that he was educated at King's College, Cambridge, Imperial College London and the University of Warwick where he received a PhD in computer science in 1974 for his thesis *Decision Procedures for Families of Deterministic Pushdown Automata*.

Before the award of his Ph.D., Valiant spent the year 1973-74 in the United States as a Visiting Assistant professor at Carnegie Mellon University in Pittsburgh, Pennsylvania. After returning from the United States in 1974, Valiant took up a lectureship at Leeds University where he worked for the two years 1974-76. Valiant moved to Scotland in 1975 to take up a lectureship at the University of Edinburgh.

In Edinburgh he was promoted to Reader in 1981, but he went to the United States in 1982 when he was a visiting professor at Harvard. Later that year he was appointed Gordon McKay Professor of Computer Science and Applied Mathematics at Harvard. He continued to remain at Harvard, although he spent the year 1987-88 as a visiting fellow at the University of Oxford in England. In 2001 he was named T Jefferson Coolidge Professor of Computer Science and Applied Mathematics in the Harvard School of Engineering and Applied Sciences.

Valiant was a Guggenheim Fellow in 1985-86 and received the Nevanlinna Prize in 1986. He was elected a fellow of the Royal Society of London in 1991 and, in the following year, a fellow of the American Association for Artificial Intelligence. He was awarded the Knuth Prize from the Association for Computing Machinery (ACM) Special Interest Group on Algorithms and Computation Theory and the Institute of Electrical and Electronics Engineers Technical Committee on the Mathematical Foundations of Computing in 1997. He was elected to the United States National Academy of Sciences in

2001, received the European Association for Theoretical Computer Science Award, and the Association for Computing Machinery's 2010 A M Turing Award which was presented to Valiant at the Association's annual awards banquet in San Jose, California on 4 June 2011. The award also included a cash prize of \$250,000.

Valiant is world-renowned for his work in theoretical computer science. Over the past 30 years, he has made stunning contributions in Computational learning theory, Complexity of enumeration, Algebraic computation and Parallel and distributed computing. His research has opened new frontiers and has resulted in a transformation of many areas. His work includes the study of both natural and artificial phenomena. The natural studies encompass the algorithms used by computing objects such as the human brain while the artificial include computers and their capabilities. In the case of computers, the limitations of these devices are only beginning to be understood while for natural objects, such as the human brain, the questions of how they operate remain to be answered, and it is time and again, that Valiant's work has literally defined or transformed the computer science research landscape. Some of his most remarkable contributions are as follows.

- Valiant, L., "The complexity of computing the permanent," *Theoretical Computer Science*, Vol. 8, Num. 2, 1979, pp. 189-201. *This paper demonstrated that counting problems are much more subtle than previous experience had suggested.*
- Valiant, L., "A theory of the learnable," *Communications of the ACM*, Vol. 27, Num. 11, pp. 1134-1142, 1984. *Here Valiant presents his "probably approximately correct" (PAC) model of studying learning from a computational point of view.*
- Valiant, Leslie G., "A bridging model for parallel computation," *Communications of the ACM*, Vol. 33, Num. 8, August 1990, pp. 103-111. *In this work, Valiant proposes a bulk-synchronous parallel (BSP) model as a promising route that can be efficiently implemented on hardware to take us beyond the standard von Neumann model of a sequential computer.*
- Valiant, L., *Circuits of the Mind*, Oxford University Press, 1994. *This work deals with discovering the intellectual structure within which at least some central questions can be formulated and reduced to problem solving.*
- Valiant, Leslie G., "Three Problems in Computer Science," *50th anniversary volume of Journal of the ACM*, January 2003, pp. 96-99. *In this work Valiant discusses three major computer science and cognitive science problems that have formed the basis for much of his work.*

In 1977 Valiant married Gayle Lynne Dyckhoff; they had two sons Gregory John Valiant and Paul A Valiant.

Valiant was invited to Indian Statistical Institute on occasion of the 51st Convocation of the Institute on 23rd January 2017 and delivered a speech.

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