Brian Randell

Born April 16, 1936, Cardiff, UK- developer with Lawford Russell of the Whetstone KDF9 Algol compiler, and the coauthor of the first significant textbook on compilers.

Education: Cathays High School, Cardiff; BSc, ARCS, mathematics, Imperial College of Science and Technology, University of London, 1957; DSc, Imperial College of Science and Technology, University of London, 1989.

Professional Experience: Atomic Power Division, English Electric Company Ltd., Whetstone, Leicester, 1957-1964; IBM Corp., 1964-1969; professor of computer science, University of Newcastle upon Tyne, 1969-present.

Honors and Awards: British Computer Society Award, 1977; fellow, British Computer Society; honorary doctorate, University of Rennes, France, 1991.

On leaving Imperial College in 1957 Randell joined the Atomic Power Division of the English Electric Company Ltd., Whetstone, Leicester. His first work was programming neutron diffusion and reactor kinetic problems on a DEUCE computer. With a colleague, Mike Kelly, Randell wrote the EASICODE compiler for DEUCE.[1]

By 1964 Randell was head of the automatic programming section and had written, or had supervised the writing of, six compilers, most notably the Whetstone KDF9 Algol Compiler with Lawford ' Russell (described in their book *Algol 60 Implementation).* This compiler was aimed at fast compilation and the provision of good diagnostics and debugging aids, and was developed in conjunction with a project at English Electric, Kidsgrove, led by Fraser Duncan, on the design of an optimizing compiler for Algol.

In 1964 Randell joined the IBM T.J. Watson Research Center at Yorktown Heights, NY, to work on a research project with John Cocke and Herb Schorr, concerned with the design of an ultra-high-speed computer. However, Randell was then able to take up an invitation, received some years earlier, to join the IFIP Algol Committee.

With twelve others from IBM Research, in 1965 Randell transferred temporarily to California, where they formed the nucleus of the newly formed Advanced Computer Systems Department of the Systems Development Division, and where Randell worked on CPU architecture and in particular the design of look-ahead units with Don Senzig, but also somehow got involved in the design of a high-speed divider.

In 1966 Randell wrote a memorandum entitled “Clean Machine Design” (about the need to make sure that an architecture was coherent, and not merely the sum of a set of individually defensible design decisions), and shortly thereafter found it appropriate to return to the IBM Research Center; there, Randell became manager of the System Modeling and Evaluation Group in Project IMP, an investigation, led by Manny Lehmann, of the

[1] This compiler was initially bootlegged, and nearly led to the authors' being fired from the company, since their manager viewed it as a diversion from their work on applications programming; later he accepted that it provided a cost-effective means of helping many users to write their own programs.

design of both the hardware and software of a large multiprocessing system. During this time Randell worked on dynamic storage allocation (with Carl Kuehner) and on system design methodology (with Frank Zurcher).

In 1968 Randell was one of the group of IFIP Algol Committee members who resigned over Algol 68. Shortly afterwards Randell took part in, and co-edited with Peter Naur the report on, the first NATO Software Engineering Conference, an event which had a major effect on his future research thinking. These two experiences led to his involvement in the group that set up the IFIP Working Group on Programming Methodology.

In 1969 Randell returned to the UK to take up a position of professor of computing science in the Computing Laboratory (now Department of Computing Science) of the University of Newcastle upon Tyne. Influenced no doubt by his experiences at the NATO Conference, Randell set up a research project at Newcastle, funded by the UK Science Research Council, and later also the Ministry of Defence, on Fault-Tolerant Computing Systems.

This research interest has continued ever since. In the early days of the research he investigated with colleagues the possibility of software fault tolerance, and introduced the “recovery block” concept. Subsequent major developments have included, with Lindsay Marshall and others, the Newcastle Connection (a transparently distributed Unix system, developed in 1982) and, with John Rushby, the prototype Distributed Secure System, an architecture for multilevel secure systems, later taken up by the Ministry of Defence.

Currently Randell leads the ESPRIT Basic Research Project on “Predictably Dependable Computing Systems.” This project, initiated in 1988, involves a number of the main European researchers who, like Randell, were founder-members of the IFIP Working Group on Dependability and Fault Tolerance.

In 1980 Lawford Russell's and Randell's paths crossed again. By this time the former was technical director of CAP, one of the major UK software houses. Together they set up MARI (the Microelectronics Applications Research Institute), a contract research, development, and training organization in Newcastle, jointly owned by the university, CAP, and Newcastle Polytechnic. Randell remained an associate director of MARI for some 10 years, until it became an independent organization with over 300 staff, involved in a large number of European collaborative research projects.

Randell's other research interest is the history of computing. He first started to pursue this interest actively soon after he reached Newcastle, prompted by his coming across the work of Percy Ludgate, the little-known Irish computer pioneer, while Randell was preparing material for his inaugural lecture. The main results of this research interest have been the book that Randell edited entitled *The Origins of Digital Computers,* and his unveiling of the Colossus machines-code breaking computers that were developed secretly in the UK during World War II.[1]

Since arriving at Newcastle, Randell has had brief sabbaticals and visiting professorships at the University of Toronto, Canada, the University of Otago, New Zealand, the Universities of Kaiserslautern and of Karlsruhe, Germany, and CNRS-LAAS, Toulouse, France.

[1] See the biographies of I. J. Good, Max Newman, Donald Michie, and Alan Turing.

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UPDATES

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