

PETER BRIAN DENYER

BSc, PhD, FIET, FIoN, FREng

Electronics Engineer, Academic, Inventor, Entrepreneur

Peter Denyer was a unique combination of electronics engineer, distinguished academic, inventor, company CEO and multiple entrepreneur. He pioneered CMOS image sensor chips for many applications including, most famously, mobile phones. He was the first academic to bring a Scottish University spin-out company to PLC (London Stock Exchange). To his students and close colleagues, he was an inspirational teacher and dynamic leader, a supportive and generous friend.

Peter studied Electrical Engineering at Loughborough University, where he graduated with First Class Honours in 1975. He worked for a short time at GCHQ and then moved to Edinburgh, designing LSI Circuits for Ferranti Defence Systems and later at Wolfson Microelectronics, including a digital micrometer and CCD signal processing arrays for sonar pulse compression. At the same time, he studied part-time for a PhD at Edinburgh University. Peter excelled as both an undergraduate and a PhD student. He showed early interest in company start-ups, working for a year as co-founder and Director of the LSI design house Denyer-Walmsley Microelectronics Ltd.

In 1980, Peter was a Lecturer at Edinburgh University, and his first research project was to invent a method of bit-serial silicon compilation, which grew rapidly into a six-man research activity. During this period he took up two Fellowships – one with Sir Clive Sinclair and then one in information technology. He also held extensive consultancies, including with BT, BP, Thorn-EMI, ESA, Shlumberger and, with colleagues, gave short courses to industry. His next step was to secure funding for the Silicon Architectures Research Initiative, a 30-man joint programme between the University and seven supporting companies, which he led.

His promotion from Reader to Professor set a record – on October 1st 1986 he was appointed Reader, but the very next day he was appointed to the Advent Chair of Integrated Electronics (Venture Capital), becoming the youngest Professor at the University of Edinburgh. Through the venture capitalist Advent, this post carried consultancy links with many other companies.

At this time, Carver Mead, one of the key figures in VLSI research gave this assessment of Peter:

“... He is certainly one of a handful of most creative and innovative workers in the VLSI field. ...”
[His work] *“illustrates a range ... and breadth of interest ...”* and *“is truly inspiring ... There are, world-wide, perhaps two or three people of any age that combine a comparable depth of scientific understanding, with a demonstrated capability to subject their ideas to real, experimental verification ...”*

Carver Mead tried to persuade Peter to join him at Caltech. It is largely thanks to Peter's Glasgow-born wife Fiona Reoch, whom he met at GCHQ and moved with to Edinburgh, and who wanted to educate her family in Scotland, that Peter developed his career in Scotland and not in the USA.

Whilst leading the Silicon Architectures Research Initiative, Peter devised innovative projects for his final-year and PhD students. This included a finger-print recognition system which attracted around £0.5M of funding from De La Rue. The shortcomings of the then commercially available imaging systems provoked Peter to conduct design experiments into making imager chips. In 1989, this culminated in the world's first single-chip CMOS (complementary metal-oxide semiconductor) video camera. Peter quickly took the opportunity to develop this technology commercially by setting up VLSI Vision Ltd (VVL) with University and Venture Capital support. The significance of this step should not be under-stated. At that time, a time of economic difficulty, the production of CCD imagers had largely ceased in Europe and nobody else believed that the infant CMOS imagers could compete. In fact, some industrialists and academics were convinced they



were not even possible. The success of the VVL imager, together with timely scaling of CMOS processes, meant that this was a revolution with great potential. For several years, VVL held an unchallenged lead, accompanied by intense international scrutiny. During this period, Peter was very pro-active in the invention of new products and generous in giving them to others to develop. But he also spent time on the stressful and difficult detailed de-bugging and thrived on solving difficult problems in the face of adversity.

VVL grew from one employee to around one hundred. It grew from an unknown University spinout company into the first Scottish University Company to become a PLC and be placed on the London Stock Exchange. A relentless problem was that of raising funds to continue the work. This was a really daunting task: every six months or so, a new and much larger round of funding was needed. In addition to all the other demands, technical and managerial, Peter had an extraordinary skill convincing Bankers and Venture Capitalists to invest in the growing Company. Indeed, in 1998, as part of the next round of raising capital, the only viable option was for the company to be taken over. It became the Imaging Division of ST Microelectronics (with a head office in Geneva) which, from having no imaging capability, has become a world leader in camera chips for mobile phones. Many years on, this R & D Division is still based in Edinburgh and has strong links to the University of Edinburgh School of Engineering

Granted leave of absence from his Chair at the University from 1992 to 1998, he resigned from it after the sell-off of VVL. After acting as consultant and advisor to ST Microelectronics during the transition, Peter re-directed his energies towards encouraging young academics to commercialise their ideas, sharing his experience and helping their start-up companies to attract investment. He acted as Chairman for the Scottish Microelectronics Centre, for MicroEmissive Displays and for Rhetorical Systems. In 2001 he was appointed Honorary Professor at the University of Edinburgh and was an advisor to their Commercialisation Unit. He also chaired ATEEDA, QFT and Pufferfish, advised Dexela, and was a board member of the ERA Foundation. There are many other companies, in which he did not hold an official position but which benefited from his inspiration, advice and assistance.

Peter's publications include three text books and around 100 co-authored academic papers, including three best paper awards. He supervised around 30 PhD students and at least an equal number of Research Associates. In VVL, many of his key employees learned a great deal from him informally and quite a few, inspired by his example, left to form their own companies. All of these people are indebted to Peter in many ways. As an entrepreneur at VVL, he created jobs and many other subcontract jobs both in Scotland and internationally (US, Europe, Far East). This was one of the achievements of which he was most proud at the time.

In 1997 Peter obtained a Queen's Award to Industry for VVL. In 1998 he was awarded the Royal Academy of Engineering's Silver Medal and was appointed a Fellow of the Royal Society of Edinburgh. In 2008, the work on CMOS camera chips was awarded one of the Rank Optoelectronics Prizes.

Peter was an inspiration to a generation of students, young academics and aspiring entrepreneurs. He was very inventive, dynamic and exciting to work with. He was full of energy and enthusiasm and thrived on adversity. But underneath it all he was just a very nice guy. His death is a great loss to Scotland and the UK. His skills, advice and assistance in finding customers and investors for many high-tech SMEs over the last decade will be sorely missed.

In the last few years, Peter took up sailing and progressed from novice to skipper in two years. He became a passionate yachtsman, sailing off the west coast of Scotland and in the Mediterranean. This is a sport of sufficient challenge at multiple levels to hold his interest. Peter's sudden and untimely death from cancer was a tragic loss for his colleagues, friends and especially for his family: wife Fiona, daughters Kate and Kirsty, as well as his father and mother and two brothers.

David Renshaw

Peter Brian Denyer BSc (Loughborough), PhD (Edinburgh), FIET, FIoN, FREng. Born 27 April 1953, elected FRSE 2 March 1998, Died 22 April 2010.