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‘Life in stealth’ of microchip genius who migrated to a new identity

Lynn Conway beat transgender bias and began a revolution, says **Magnus Linklater**

When Lynn Conway stepped on to the stage on Thursday night to receive the Royal Society of Edinburgh’s (RSE) James Clerk Maxwell Medal award — one of the most prestigious honours in science — few among the audience can have appreciated the remarkable journey that led up to that moment.

Not only, as a woman, has her reputation as one of the pioneers of microchip technology been overshadowed by the male professor who has been given most of the credit, for much of her life she guarded a personal secret that might have destroyed her career. In the 1960s, Professor Conway, now 77, invented a system for integrating multiple sources of information onto a single circuit. It went on to revolutionise the world of computers, was taken up and developed by most of the major Silicon Valley companies, and is now accepted as one of the breakthrough moments in the design of the modern high-speed computer.

Yet her early work was brought to an abrupt end when she was sacked from IBM after revealing that she was intending to embark on gender transition. Born a man, and married with two children, she had struggled with her gender identity, and finally decided to undergo the treatment that would lead to full transition. When she revealed her plans to IBM, bosses at the computer giant abruptly fired her. She went into hiding, underwent the process of transition on her own, and began her career again, leading what she has described as “a life of stealth” as a woman.

Even after her breakthrough work on microchip design was acknowledged, with the publication of a groundbreaking publication in 1979, she concealed her past.

“I had no support — certainly not from my family,” she said. “I was on my own, I led a life in stealth.” In those days transgenderism, particularly if it involved surgery, was not only controversial, it was regarded with deep suspicion.

“A lot of the time I was frightened to death about being found out — really bad things could happen to you,” she says now. “In San Francisco, when I was transitioning, there was a lot of trouble with the police.”

She compares her life then to that of an immigrant embarking on life in a new country, learning a new language, encountering hostility and stigmatisation because of language and culture. “I had to emigrate,” is the way she puts it.

She joined the pioneering company Xerox PARC, and took up again the research she had begun with IBM.

‘A lot of the time I was frightened to death about being found out’

What she succeeded in doing was something that had eluded computer engineers for years — how to integrate multiple calculations on to a single chip, hugely increasing the speed with which they could be processed. Known as “very large scale integrated circuits”, the title of a publication which went on to revolutionise computer design when it was rolled out in 1979, it inspired students and professionals to build and develop a wide range of microchips that changed the industry for ever. She describes the moment when she pressed the “send” button on her computer, distributing a work which might make or break her career, as a seminal one, and compares it to the kind of decision you make when you are rock-climbing (one of her favourite sports.)

“What I learned from that is how to develop skills to do hard things even if you are frightened,” she says. “Stepping off was really tough. You knew that if you fell over you were going to take everybody with you, but you just think ‘I can do this,’ so you have a go at it.”

Sitting alongside her husband, Charlie Rogers, a professional engineer with whom, in their early life together, she used to go whitewater-rafting and motocross cycling, she describes the technology of her work on microchips in layman’s terms: “It’s like a queuing problem in a café — you have a number of people waiting in a line to get served. A lot of them are going for different things. If you knew what one of them wanted, they could just jump ahead and get served. So you need a system with a number of instructions that get them going through the line and coming out at the other end without having to wait.” It was, of course, a great deal more complex than that, and, in truth, very few people, even among her colleagues understood what she was trying to do. That included Professor Carver Mead, her immediate superior, whose name always precedes hers when the microchip process is described. The seminal text on the subject, *Introduction to VLSI Systems*, lists Mead’s name first, but was actually written by Conway. “He was the professor, he got all the awards,” she told *The Times*. At the time she was often described as Mead’s assistant.

The so-called Mead-Conway revolution in microchip design is now recognised as a critical moment in the development of today’s high-speed information transmission, but it was not until 2012 that Professor Conway’s own contribution was fully acknowledged. As the citation from the RSE puts it, she is the “hidden

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hand" in the microchip design revolution, a major source of innovation in a field that eventually made personal computers and smartphones possible.

Looking back at the setbacks and struggles that marked her early career, she is remarkably phlegmatic.

She refuses to blame IBM for their cruel and insensitive response to her personal dilemma, though she describes its then head, the late TJ Watson, as "a rabid homophobe".

"Times change," she says. "I tend to be neutral on things like that. I don't think there are good guys and bad guys, we simply have different reference frames. What happened then was a function of the time. People are entrapped by rituals they have fallen into. Who were the people who burnt witches at the stake, actually believing they were doing the right thing? Look at what happened in Germany. I would hesitate to get down on IBM at all. It is not the company it was then. IBM has changed more than most."

Gradually, as her work was recognised, Professor Conway began to reveal details of her personal life on her own website, and went on to campaign actively on transgender issues, becoming a role model for others in her own position.

She was invited to the White House, drew up a code of ethics for how her profession should treat lesbian, gay, bisexual and transgender people, and was named last year by *Time* magazine as one of "21 transgender people who influenced American culture."

As she reflects on a life with more than its share of struggles, she says it is actually the setbacks that have made her the person she is today.

"The clouds have parted, the darkness has gone, I am really happy at the way things have turned out," she says now. "The experience has empowered me."

Happy to play the game for more than she can lose

What's the book on your bedside table?
A History of the World in 12 Maps, by Jerry Brotton

Which disc would you take to your desert island?
Vivaldi, *The Four Seasons*

Who would you take on a one-way trip to Mars?
Charlie!
(my husband)

What's the best advice you've ever received, and who was it from?
This advice has long had a major impact on me: "Play the game for more than you can afford to lose…only then will you learn the game" — Winston Churchill

Favourite TV: *West Wing* or *America's Got Talent*?
West Wing!

Day off
Rock-climbing or computer lecture?
Rock-climbing (only these days it would just be mountain scrambling, rather than roped vertical-wall climbing)

High fashion or dungarees?
Definitely dungarees (we call them "jeans")

Tell us a secret (something that might be a little bit embarrassing to admit)
My behaviour lets slip that I never really "grew up" and instead kept on playing, as if in kindergarten

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Professor Lynn Conway, who was fired by IBM when she revealed plans to change gender, has been called the 'hidden hand' in the microchip design revolution

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