Lynn Conway Biosketch:

Lynn Conway received her Bachelor of Science and Masters of Science in Electrical Engineering degrees from Columbia University in 1962 and 1963. She began her career at IBM Research at Yorktown Heights, NY in 1964, later moving on to work at Memorex Corporation, at the Xerox Palo Alto Research Center (PARC), and at the Defense Advanced Research Projects Agency (DARPA). Concurrently with her work at Xerox PARC, she served as Visiting Associate Professor at M.I.T. during 1978-79. She joined the University of Michigan in 1985 as Professor of Electrical Engineering and Computer Science and Associate Dean of the College of Engineering. She retired from active faculty status in December 1998 and is now a Professor of EECS, Emerita.

Fresh out of graduate school in 1965, Lynn Conway invented a powerful method for issuing multiple out-of-order instructions per machine cycle in supercomputers. By solving this fundamental computer architecture problem back in 1965, she enabled creation of the first true superscalar computer, and participated in its design. Lynn called her invention dynamic instruction scheduling (DIS).

By the 90's, chips held enough transistors that entire superscalar computers could be put onto single chips. Lynn's DIS invention suddenly became used in almost all the powerful new PC chips, making them much more powerful than they would otherwise have been. Lynn's work thus had a very major impact on the modern information technology revolution.

Most researchers thought DIS was a generalization of decades of work, having no idea it had been invented in 1965. How could this oversight have happened? Why did Lynn remain silent for over three decades about her important IBM work?

The reason is that IBM had terminated Lynn's promising young research career in 1968, firing her after learning that she was undergoing transsexual transition from male to female. After completing her gender transition in 1968, Lynn took a new name and identity and then restarted her technical career at the bottom of the ladder, as a newly-hired contract programmer at Computer Applications, Inc. Lynn had to keep her past a secret just to survive, much less build a career, because any “outings” could well have ended her new career and seriously threatened her chances for a productive and fulfilling life. Hiding her past, Lynn’s new career blossomed. She went on to work at Memorex Corporation during 1969-72, and rapidly climbed back up the ladder as a digital system designer, and then as a computer architect.

During the late 1970’s, Conway restructured and elegantly simplified the then-mysteriously-complex methods for designing microelectronic silicon chips, enabling engineers to quickly master the vital new craft of VLSI (Very-Large-Scale Integration) whereby computer engineers combine thousands of transistors onto a single computer chip. Exploiting the then-emerging personal computers and laser printers at Xerox Palo Alto Research Center (PARC), she became principal author, and guided the rapid experimental evolution of, *Introduction to VLSI Systems* (1979), the foundational text of the new field.

While visiting at MIT in 1978, Conway pioneered the teaching of the new methods and created an infrastructure for rapid prototyping of students’ project chips, enabling them to quickly validate their designs. The following year she innovated a pre-internet ARPANET-based e-commerce system, enabling a dozen universities to conduct MIT-like VLSI courses and have all student-designed chips rapidly fabricated. The courses spread like wildfire; by 1982-83 VLSI chip design was being taught in 112 universities all around the world.

As thousands of adventurous young entrepreneurs, engineers and computer scientists began exploring the vast new world of innovative microelectronics, the paradigm shift shook the industry to its foundations. However, Conway studiously avoided the limelight after making her stunning contributions

to VLSI microelectronics, terrified of again losing her employment. As the decades passed, no one could explain how the VLSI revolution had actually happened. Everyone simply took it for granted and ran with the results.

The ongoing productions of Conway's methods are all around us, deeply embedded in our personal computers, tablets and smartphones, in our automobiles, GPS and entertainment systems, in our Wi-Fi and internet infrastructure. We are all beneficiaries.

Upon retiring in 1999, Conway quietly came out and began evolving a major transgender informational website, employing many of the social learning methods that framed her engineering research. Translated into many languages, *lynnconway.com* has since become a beacon of hope and encouragement for trans people worldwide.

As the social climate began to improve, Conway began hoping to someday explain her work. She finally got her chance in the fall of 2012, when the Institute of Electrical and Electronic Engineers published her "Reminiscences of the VLSI Revolution" in a special-issue of *Solid-State Circuits Magazine* honoring her contributions.

During her career, Conway has received multiple major awards for her work, including the Wetherill Medal of the Franklin Institute, the Pender Award of the Moore School, the Secretary of Defense Meritorious Achievement Award, the *Electronics* Award for Achievement, Xerox Corporation's recognition as a Xerox Research Fellow, the National Achievement Award of the Society of Women Engineers (SWE), the Computer Pioneer Award of the IEEE Computer Society, election as a Fellow of the IEEE, election to the National Academy of Engineering, election to the Electronic Design Hall of Fame, an Honorary Doctorate from Illinois Institute of Technology, and in 2014, she was honored with a Computer History Museum Fellow Award as "a distinguished technology leader" who has "forever changed the world with their accomplishments."