A MIND AT PLAY: HOW CLAUDE SHANNON INVENTED THE INFORMATION AGE

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As a fan of biographies, I was excited to learn about *A Mind at Play: How Claude Shannon Invented the Information Age.* Not only is it a timely biography, this well-researched and easy-to-read book also captures the imagination. Because Jimmy Soni and Rob Goodman take care to situate Shannon's contributions in their cultural context, the volume encourages the reader to explore their broader implications. Claude Shannon's legacy is no doubt of particular interest to *Leonardo* readers due to the range of his work. If Shannon's training and conception of Information Theory brings the current elevation of STEM disciplines to mind, many of his lesser known projects clearly align with projects associated with the STE(A)M (with the inclusion of Art) community, although the authors never speak of STEAM per se. These include the playful spirit evident in his ongoing tinkering with electronic toys, his multifaceted studies of juggling and his unicycle experiments.

So who was Claude Shannon? Born in 1916 in Michigan, by all accounts Shannon had an ordinary childhood. Noteworthy traits included a love of math and science, a dislike of facts and mechanical inclinations. These proclivities led him to purse a dual degree in mathematics and engineering at the University of Michigan. After Michigan, Shannon was hired by the well-connected Vannevar Bush, then at MIT and later founder of the National Science Foundation (NSF), to help with his differential analyzer. This was a mechanical analog computer that depended on combinations of equivalent equations, using a wheel-and-disc mechanism for computation. A major problem was that the equations needed to be reconstructed for every problem, in effect annihilating the very efficiency the machine was meant to add to problem-solving. The resounding question was, how could it reassemble itself on the fly? Shannon, who was conversant with both symbolic logic and electrical circuitry, produced a landmark master's thesis with an innovative solution, titled "A Symbolic Analysis of Relay and Switching Circuits." In it the young Shannon tied Boolean Logic and circuitry together, conceptualizing a path where 1's and 0's could represent logical operators of Boole's (AND, OR, NOT) system, with an on switch standing for "true" and an off switch for "false."
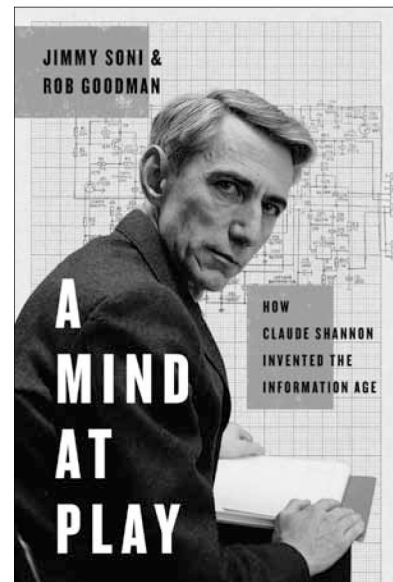
After a brief stint at the Institute for Advanced Study (Princeton, New Jersey), Shannon joined Bell Labs to work on World War II projects. Here he found an environment that fostered cutting-edge discovery and even met a visiting Alan Turing, another key figure of the Information Age. The sections discussing the shared interests of Shannon and Turing are among the book's high points, particularly in light of the role of computers