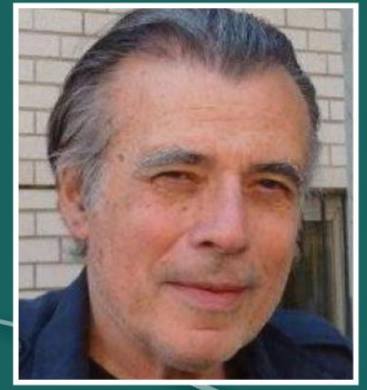


Creativity Across Space and Time



Dr. Arthur I. Miller
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Arthur I. Miller is an intrepid explorer into the nature of creativity, delving into multiple fields of studies across science, art, and technology. He is the author of the 2019 book *The Artist in the Machine: The World of AI-Powered Creativity*, which speaks to the future of machines and Artificial Intelligence as well as how creativity, knowledge and experience can be the spark for new ideas.

Coming from a home and school life that were not satisfying, Arthur threw himself into wide and deep reading. He recalled the joy of visiting New York libraries, those “magisterial buildings and stocked full of books and records.” He also was intensely interested in art and toured the vast array of New York museums and art galleries. He saw connections between art and the classic Physics papers he had read, feeling that

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“beauty, aesthetics, symmetry” were present in ways much like artistic creations.

The question that came to preoccupy him was “how do these people create such works? What is creativity?” This focus eventually helped him to move toward the history and philosophy of science as well as the nature of creative thinking. Through work in his PhD in Physics at the Massachusetts Institute of Technology, especially in studying quantum physics and relativity theory, he realized the primacy of visual images and their relationship to thinking and creativity.

In his book *Einstein, Picasso*, he addressed the biographies of both men and their highly innovative work in the early 20th century. Albert Einstein discovered relativity theory in 1905. As an example of the use of visual imagery, Einstein imagined chasing after a beam of light. Arthur pointed out “what’s amazing here is that Einstein made his discoveries by thinking like an artist.” Pablo Picasso made his artistic creations by thinking like a scientist. Both Einstein and Picasso “worked across borders and disciplines” and “didn’t focus entirely on one problem or one approach to a problem.” Picasso, rather than following the prevailing postimpressionism style, invented an entirely unique style, Cubism.

Arthur found key factors needed for creativity. The urge to produce new material in a field of your expertise, where you have your own strong view or insight is essential. Also needed is the ability to be open to other disciplines and complementary fields of study. The willingness to work independently is often associated with major leaps in creativity. To Arthur, a key point is recognition that “the intense, passionate desire to solve the problem keeps it alive in the unconscious, where it can be turned around in ways that are not possible in consciousness.”

Arthur maintains that computers can be creative and then says the question now is “Can they be fully creative?” Google’s AlphaGo project in 2016 illustrated that machines can show glimmers of creativity. This Artificial Intelligence (AI) program defeated Le Sedol, a world-class Go player. In this

situation the problem was defined as beating Go opponents. Arthur predicts the time that “machines can pick up their own problems and be creative from end to end”. He also sees many ways that “machine and people are bootstrapping each other’s creativity” in collaborative projects.

In the future, he thinks machines will have the potential to move toward finding both artistic problems and solutions. Following this line of thought, he says “another question we could ask is, can we learn to appreciate art we know has been created by a machine”, wondering how different machine and human views of the world might be. He also points to new business models such as NFTs, non-fungible tokens, that can support creative works of all types using advanced technology to ensure the uniqueness and ownership of creative works.

He stresses that predictions can be dangerous because change is occurring rapidly, and yet he does often ponder “what does it mean to be a human being in some time in the future? What is the good life, some 100 or 200 years from now?” His advice for the exciting and unknown future is to keep thinking, imagining, and finding critical areas that entice you. Then have an open mind and “don’t be afraid of machines.”

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