

THE EDITOR'S CORNER

The Mileva Story

Mileva Marić (pronounced MAR-itch), a mathematician and physicist, was Albert Einstein's first wife. The two met in 1896 as classmates at the Federal Polytechnic School in Zurich, Switzerland, where they studied together and fell in love. They married in 1903 and raised two boys before they divorced in 1919. While history has unfortunately overlooked Marić's scientific contributions, she seems likely to have been instrumental in Einstein's work—including his acclaimed *annus mirabilis* papers, which introduced $E = mc^2$.

Marić was born in Serbia in 1875. Since it was impossible for a woman to obtain a university education in the Austro-Hungarian Empire, she moved to Switzerland in 1894. She enrolled in the same courses as Einstein for prospective teachers, and she achieved comparable grades, except in applied physics, where Marić was a superior student. Before taking her final oral exams, however, she became pregnant and hence did not earn a passing grade—only Einstein received a degree.

Despite Marić's struggle to realize her dreams of a scientific career, she remained committed to Einstein. Their child was placed for adoption, but the couple eventually married, notwithstanding protests from Einstein's parents that Marić was too old and intelligent. A turning point in Einstein's career came in 1905, when he published four papers that revolutionized contemporary physics. The first paper, explaining the photoelectric effect, led to Einstein's 1922 Nobel Prize in physics; the second described Brownian motion; the third introduced the groundbreaking theory of special relativity, which created a link between space and time; and the fourth developed the principle of mass-energy equivalence.

Science historians have recently speculated on Marić's role as a secret co-author of these papers. Substantial evidence now indicates that Einstein and Marić worked together as partners from the very beginning. In a 1901 letter to her, Einstein refers to "our work on relative motion." He was later quoted as saying, "For everything that I

achieved in my life, I must thank Mileva. She is my genius inspirer, my protector against the hardships of life and science. Without her, my work would never have been started nor finished." Einstein even gave Marić all his Nobel Prize earnings.

The chronicle of the Einstein-Marić collaboration is referred to as the "Mileva Story." As Esterson and Cassidy wrote in *Time* magazine, "Without the true story of what really happened—how these fundamental theories came about—we cannot fully understand their historical significance. Moreover, we cannot bestow credit where credit is due for these achievements, especially when we recognize how often the contributions of women scientists . . . are overlooked, forgotten, and even suppressed."¹

Marić was the only woman in Einstein's classes at the prestigious Swiss university, and the fifth woman ever to study there. At a time when women had scant opportunities to pursue higher education in science, she surpassed her male peers, only to have her aspirations derailed by motherhood and a marriage that ended in acrimony. Perhaps the most compelling argument in support of Marić's role is that Einstein never developed another major scientific theory after 1915, when the couple had separated.

Isaac Newton—the physicist most revered by Einstein—is quoted as saying, "If I have seen further, it is by standing on the shoulders of giants." I would like to believe Marić was one of those giants. At the very least, she contributed substantially to her husband's theories, even as she remained in the shadows because of the sexism of the era. History has credited Einstein with discovering the world's most famous equation; then again, everything is relative.

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REFERENCES

1. Esterson, A. and Cassidy, D.C.: "Did Einstein's first wife help his work? It's complicated," *Time*, March 14, 2019, www.time.com/5551098/mileva-einstein-history, accessed July 12, 2023.