

Roman Jackiw

Roman Jackiw, a giant of theoretical physics and an emeritus professor at MIT, passed away on 14 June 2023 in Boston. He was born Roman Volodymyr Yatskiv on 8 November 1939 in the small lakeside resort of Lubliniec, Poland, where his Ukrainian father took the family to avoid World War II military action and the Communists. The family moved through Austria and Germany before emigrating to the US a decade later.

Jackiw's academic journey began with his education in New York City. In his junior high and high schools, he was taught by Xaverian and Christian Brothers monks, respectively. From independent reading, he developed an early passion for physics. He completed his undergraduate studies in physics, with minors in mathematics and history of science, at Swarthmore College in 1961 before earning a PhD from Cornell University in 1966. Jointly supervised by the notable physicists Hans Bethe and Kenneth Wilson, he wrote a thesis titled "Nonperturbative solutions of the Bethe-Salpeter equation for the vertex function."

After Cornell, Jackiw followed in Wilson's footsteps and became a junior fellow at Harvard University's Society of Fellows. In 1969 he joined the faculty at MIT, where he eventually became the Jerrold Zacharias Professor of Physics.

Jackiw's scientific contributions were profound and spanned numerous fields, including particle physics, condensed-matter physics, and gravity. His greatest contributions, though, were to quantum field theory, which he began working on as a graduate student at a time when the subject was in a lull. Over his career he added whole new avenues to the understanding of that theoretical framework.

Famously, as a young postdoc working with John Bell at Harvard, Jackiw discovered the so-called Adler-Bell-Jackiw axial anomaly and used it to explain the decay of pions into photons. He turned lemons into lemonade by both interpreting and making physical predictions from what seemed to be an inconsistency in the Feynman diagrams. His subtle and entirely new kind of computation has many generalizations that have played a central role over the past half century.

Jackiw also spearheaded the fruitful dialog between quantum field theory and



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pure mathematics. He introduced the mathematical Chern-Simons theory into physics, where it has thrived ever since, and derived the coupling-constant quantization. He used deep mathematical properties of Yang-Mills theory to derive nonperturbative phenomena, including the existence of theta vacua, which led to the fundamental and still unsolved strong CP problem. He pioneered the subject of lower-dimensional gravity and its connection to Liouville theory. Two-dimensional Jackiw-Teitelboim gravity is now, 40 years after his initial work, a currently active subject in theoretical physics.

Jackiw was often out of sync with the rest of theoretical physics, which at times caught up to him years or decades later. His research was unceasing and prolific throughout his life. Jackiw's contributions earned him numerous accolades, including the Dannie Heineman Prize for Mathematical Physics from the American Physical Society in 1995 and the Dirac Medal from the Abdus Salam International Centre for Theoretical Physics in 1998. His mark on theoretical physics is indelible.

Among Jackiw's collaborators was So-Young Pi, his wife of 42 years. They wrote 46 papers together, including on conformal symmetries, solitons, and Chern-Simons theory. During a sabbatical at the University of Leeds, Jackiw worked with Pi and Giandomenico Pamlumbo, who appears between them in the photo.

On a personal note, being Jackiw's thesis student was both a great privilege and a great pleasure. His many students knew him for his formidable intellectual acumen and insights, along with his uncompromising, ungilded, and accurate assessments of our successes and failures, a testament to his unwavering commitment to the truth. His frank assessments were softened by his genuine personal warmth and unwavering loyal support for each of his students over their career. He was and continues to be a great inspiration to many of us in both life and physics.

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Editor's note

This issue marks the last month that the obituaries department will appear in print in *PHYSICS TODAY*. Going forward we will be publishing obituaries only online.

Progress in science is inseparable from the unique stories and experiences of the people involved. Since the very first issue of *PHYSICS TODAY*, back in May 1948, obituaries have provided opportunities to honor members of the community and their contributions. And since 2005, readers have been able to submit obituaries online to be posted on the *PHYSICS TODAY* website.

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