



Remembering Prof. Martin Shubik, 1926–2018

In ABOUT



Martin Shubik, a profound scholar and cherished colleague and teacher, died on Wednesday, August 22, 2018. Shubik was the Seymour H. Knox Professor Emeritus of Mathematical Institutional Economics and had been on the faculty at Yale since 1963.

Throughout his career, Shubik used the tools of game theory to better understand numerous phenomena of economic and political life.

“Martin Shubik made outstanding and fundamental research contributions to game theory (including cooperative and experimental games), defense analysis, and the theory of money and financial institutions,” said Edward Kaplan, a professor at Yale SOM. “With Martin, we are talking about Nobel Prize-quality research which travels far beyond ‘outstanding’ to as many superlatives as you can think of.”

Shubik was born on March 24, 1926, in Manhattan. His father worked for a British company, and when Shubik was three months old, the family returned to London. “At the age of a few months, I was an international traveler,” Shubik told an interviewer in 2017. He attended

In a lecture he gave in 2016, Shubik described himself as a perplexing student. He attained top marks in algebra while struggling in geometry. By the time he reached college at the University of Toronto, he was interested in history and the social sciences, but he opted to study mathematics and physics, having the intuition that they would one day prove useful in bringing greater rigor to the social sciences.

Shubik said that his study of physics taught him to think about using mathematical models to describe complex phenomena. His mind sought to examine and formalize the world around him in order to better understand it. He served in the Royal Canadian Navy, and he watched daily routines, such as the boat drill, and wondered whether they were optimal procedures. "I more and more started to see questions that were operations research-like," he said. He pursued a master's degree in political economy at the University of Toronto, where he wrote his thesis on *quipos*, the knotted strings used as a form of communication and for accounting in the Incan empire. But it was a single assignment in an economic theory course that may have had the greatest influence on Shubik's later career. He chose to write a review of *Theory of Games and Economic Behavior*. "I dived in and by the time I had spent about four or five hours with the book, I was hooked," recalled Shubik. "I said to myself that this is the mathematical way into the social sciences."

Shubik decided to pursue further study in game theory and ended up in the rich intellectual brew of Princeton University in 1950. He studied with Oskar Morgenstern, Albert Tucker, and John von Neumann. His roommates included Lloyd Shapley and John Nash, both of whom later became co-authors. He forged lifelong relationships with other emerging scholars, including Marvin Minsky and John McCarthy. In a lecture, Shubik fondly recalled high tea at Fine Hall, the math department at Princeton, where he could mingle with the "luminaries," discussing new ideas and playing Go and Kriegsspiel.

"A Method for Evaluating the Distribution of Power in a Committee System," a seminal paper coauthored by Shubik and Shapley, came out of this period. Starting with the insight that in a voting system, power is not distributed evenly per vote, since any coalition that accumulates a majority has all the power, the two conceived a model that can be applied to committee systems ranging from legislatures to boards of directors.

"Martin's work in game theory is legendary," said Edward Kaplan, pointing to that early paper as a substantial part of Shubik's legacy. "It introduced the well-known Shapley Shubik Index that became a staple in the study of elections and assembly voting (such as in the United Nations)."

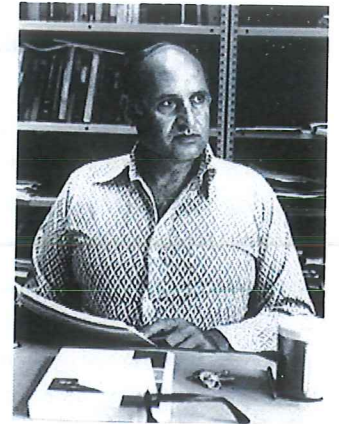
Shubik and Shapley collaborated long after their graduate school days; Shubik's CV lists 12 co-authored papers written over subsequent decades.

After completing his doctorate, Shubik spent four years working for General Electric. The position gave him an opportunity to look into nearly every facet of the economy: "I spent my time as a consultant visiting Richland to check on the atomic energy generation, Phoenix to check on computers, Santa Barbara to check on consulting services, Cincinnati to check on aircraft engines, and so on. I spent much of my time flying and learning how things were done."

Eventually, facing the possibility that he could be promoted to plant manager, Shubik put himself on a path back to research and academia, first stopping at IBM Research Labs and then landing at Yale as a professor of the economics of organization. He remained a fixture at Yale until his death. He was the director of the Cowles Foundation for Research in Economics from 1973 until 1976, and he was one of the founding faculty of the Yale School of Management (then the School of Organization and Management). He taught courses in economics, game theory, and investment theory and practice. He was named the Seymour H. Knox Professor of Mathematical Institutional Economics in 1975 and held that chair through his retirement in 2007.

"Retirement" made little difference in Shubik's research output; he went on publishing papers on economics, defense, and other topics. His CV lists 22 books and 340 articles, including some that are still forthcoming.

Professor at UCLA Anderson School of Management, wrote a letter supporting Shubik's nomination to be a fellow of INFORMS, the association for operations research and analytics professionals. "His research contributions to game theory are superb and easily merit the Fellow designation, but the same could be said separately for his work on defense analysis, and on military gaming," Tang wrote. "[H]is overall body of work is so innovative, penetrating, and voluminous that it has had enduring effects on research, education, and practice."



One of Shubik's most influential books has been *Game Theory in the Social Sciences*, the first volume of which received the Lanchester Prize in 1983. It could be seen as the realization of his early instinct that mathematics would prove essential to social science, and it has pointed the way for legions of others. In another letter supporting Shubik's nomination to be an INFORMS fellow, Matthew J. Sobel, a professor at the Weatherhead School of Management at Case Western Reserve University, called it one of the most important books about game theory published in the last half century. Summing up Shubik's contributions to the field, Sobel wrote, "It is apt to compare Shubik's contributions to game theory with those of Richard Bellman to dynamic programming. Both made seminal contributions to the underlying theory in their respective domains, and both indefatigably wrote about a vast array of contexts in which the respective theories yielded important insights."

Paul Bracken, professor of management at Yale SOM, said that Shubik's work applying gaming and game theory to defense policy helped turn the whole field toward a more rigorous approach. "Prior to his work, gaming was pretty much an intuitive field driven by gut instincts," Bracken said. "DoD's gaming is now conducted at a much higher level of usefulness because of Martin's work." Shubik's work "stands in a class of its own," Bracken said, and has influenced numerous areas of defense analysis. For instance, in a [1971 paper](#), Shubik devised a dollar auction game in which players would end up spurring each other to bid far more than one dollar in order to win a dollar. The logic of escalation clearly applies to a number of issues in defense strategy. "Vietnam, limited nuclear war with the Soviets, and other examples took on a new light in this perspective," said Bracken.

Shubik's longtime Yale SOM colleague Shyam Sunder described what may have been Shubik's greatest intellectual preoccupation: "Until the end, Martin Shubik explored money and the institutions societies create to make it serve human ends. Money—the most concrete yet the most ephemeral of objects of value—occupied his theorizing, gaming, teaching, and investing."

In a series of papers about this effort, Shubik alluded to the theory of money as his white whale—a subject he pursued tirelessly over many decades. (It is characteristic of his self-deprecating humor that he chose to implicitly compare himself with the doomed Captain Ahab.) Like Melville's whale, the theory of money as conceived by Shubik is an enormous and possibly all-encompassing subject. It could help explain the development of markets and institutions such as credit, bankruptcy, and the corporation. Shubik wrote, "The construction of a viable theory of money and financial institutions calls for the assembly of a vast jigsaw puzzle of interrelated aspects of the physical economy and its financial control by synthetic legal persons known as corporations acting as fiduciaries for their ultimate owners, the legal natural persons."

Shubik coined the term "mathematical institutional economics" to describe his approach to understanding the economy. "[T]o me it meant that in considering process one needed to clothe abstraction in the richness and relevance of institutional detail," he wrote. He sought a model that could incorporate the processes and behaviors of the real economy while retaining some of the predictive power of theory.

After many years of frustration, Shubik found his way into a solution by analyzing an n -player game where each player holds one good. He created an additional commodity that the players could exchange and realized this functioned as money. He recalled telling his wife Julie, "This is Alice through the looking glass. I have just got through the looking glass. The mechanisms and institutions are all going to come out like unwinding a sweater."

The result was a series of papers and books, many of them written with collaborators, looking at many facets of the economy. Starting in 1999, Shubik published the three volumes of *The Theory of Money and Financial Institutions*. And in 2016, he published *The Guidance of an Enterprise Economy*, which he said "more or less finished" his theory of money. He had caught his white whale.

ex] ental economics brought us together.” Noting that their [last joint paper, on efficiency of financing public goods by democratically chosen tax regime](#), Φ was published in 2018, Sunder added, “His mind remained sharp and clear until the evening before he left us.”

John Geanakoplos, a Yale professor of economics, said that Shubik was a mentor and a role model as a scholar. “When I started at Yale, Martin immediately took me under his wing, offering to write papers with me and giving me advice about how to live as a scholar and simultaneously a participant in the world. I am deeply grateful for that,” said Geanakoplos.

At the end of his life, Shubik retained the qualities that had made him such a valued colleague. “In the last few days of his life, when he knew time was short, when he was on morphine and in pain and having trouble breathing, he spent hours talking to me about research, focusing on problems he felt he had not solved,” said Geanakoplos. Though Shubik had started his economics studies in the postwar years, his mind was looking to the future. “One unsolved puzzle that Martin and I talked about at the end was how to cope with a world in which capacity constraints had moved out and increasing returns to scale were inexorably leading to bigger and bigger firms like Amazon, blurring the distinction between capitalism and socialism. He was convinced that lifetime working hours inevitably would fall and be partly replaced by more education, rendering universities more important than ever.”

Shubik received numerous awards throughout his life. He is one of very few researchers to have won both the Koopman Prize for military operations research and the Frederick W. Lanchester Prize for the best contribution to operations research and the management sciences from INFORMS, a combination that reflects the diversity of his interests. He was named a distinguished fellow of the American Economics Association in 2010. The citation recognized “contributions to a variety of fields in economics.” He was also a fellow of the Academy of Arts and Sciences, and will be named a fellow of INFORMS later this year.

Throughout his long career, Shubik retained an interest in practice, whether that meant advising corporations, government ministries, or military agencies. He coauthored a book called *The Aggressive Conservative Investor* with Martin J. Whitman, a longtime friend from Princeton, and served for many years as a director of Whitman’s Third Avenue Fund.

Ed Hirs ’81, YC ’79 took several classes with Shubik, starting as an undergraduate, and maintained a lifelong relationship with him. “Martin epitomized the Yale SOM mission of leadership in society and business,” said Hirs. “His wide-ranging academic research in game theory and financial institutions was applied to the real world via his work— even into his 90s— with the OECD, directorship of Third Avenue Funds with his friend and SOM colleague Marty Whitman, and 60-plus years of advising the Department of Defense.” Hirs recalls Shubik as a teacher who kept practical applications at the forefront and challenged his students on many levels, while making classes engaging with his “droll, puckish sense of humor.”

Among his friends and family, Shubik was known as an excellent cook and lover of food, art, and humor. Shubik’s roommate at Princeton, J. K. Lee, introduced Shubik to Chinese cooking, which became a serious and lifelong hobby. A dedicated friend, Shubik remained closely connected to friends from every period of his life and continued to add friends till the end.

Shubik was equally dedicated to his family. He is survived by his wife Julie Shubik, who was closely by his side for 50 years; his sister, the pioneering television producer Irene Shubik; his daughter Claire Shubik-Richards, for whom he was a singularly important influence; his son-in-law, economist Seth Richards-Shubik; grandsons Elliott and Leopold Shubik-Richards; and his niece Anna Shubik Sweeney and her family. Shubik was predeceased by his older brother, Oxford toxicologist Philippe Shubik.

In the last years of his life, Shubik suffered from Inclusion Body Myositis, which causes progressive weakness in the muscles. His response was characteristically rigorous: he organized a campaign to gather information about the disease, which grew into the [Inclusion Body Myositis Disease Registry at Yale](#) Φ , now the world’s largest systematic categorization of the epidemiology, natural history, and clinical care of Inclusion Body Myositis. Article number 333 on his long CV is [“Demographic and Clinical Features of Inclusion Body Myositis,”](#) Φ a paper co-authored with David Paltiel ’85, a professor of public health and management at Yale.

Paltiel recalled, “Martin felt strongly that patients could contribute to medical and scientific progress by organizing themselves and assembling/analyzing self-reported data... Even as recently as last Friday, he was sending out updates on his health status, in the hope that

“A good business school should be turning out individuals who are highly sensitive to the fact that good standards, honest laws, lack of corruption, consistency in treatment are vital to decent societies and decent economies.”

Martin Shubik talked about the power and limitations of markets in a [2007 Yale Insights interview](#).

August 30, 2018

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