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IFORS' Operational Research Hall of Fame

Co-author of *Introduction to Operations Research* and other influential operations research textbooks

Born: March 4, 1936, Aberdeen, Washington, USA

Education: B.S. industrial engineering 1958, Stanford University; PhD industrial engineering 1961, Stanford University

Key positions: Faculty member at Stanford University, 1961–present

Awards: Saul Gass Expository Writing Award (2004), Institute for Operations Research and the Management Sciences Fellow (2004). Kimball Medal (2018)

Key operations research roles: Author of numerous influential operations research textbooks; treasurer of ORSA; Vice President for Meetings of TIMS; founding series editor for the *International Series in Operations Research and Management Science*

Frederick Hillier (1935–present) is an American researcher and author whose published works have had a lasting impact on operations research.

**Frederick S. Hillier**

Hillier was born and raised in Aberdeen, Washington, a small lumber town in the western part of the state. He pursued multiple interests in his youth including mathematics, writing, and music. As a senior in high school, he gave flute lessons to five different students. Hillier's father was on faculty at Grays Harbor Junior College, where it was expected he would ultimately attend. Following the suggestion of his high school chemistry teacher, however, he applied for and was accepted into Stanford University on multiple scholarships. Stanford was a catalyst of emerging operations research (OR), having such OR pioneers on faculty as Ken Arrow, Herb Scarf, and Sam Karlin. During his time as a student, Hillier took classes from all of them, including an inventory theory course from Scarf and mathematical economics from Arrow. As a freshman, he was randomly assigned Gerald

“Jerry” Lieberman as an advisor. This perchance pairing would set the stage for a renowned career and mark the beginning of a remarkable professional partnership and friendship—both inside and outside the classroom. For many years, the two attended San Francisco 49ers football games together.

After graduating first in his engineering class of over 300, Hillier took Lieberman’s advice and remained at Stanford for graduate study. Hillier taught two classes as a graduate student: “Introduction to Operations Research” and “Engineering Economy.” While teaching the latter, he thought about the evaluation of risky projects and why it had not been particularly fleshed out as a topic. This inspired him to analyze the risk involved when dealing with individual investments and publish a paper on the topic in 1963, which has been cited by over 400 researchers. This would be among the first of his many successful and influential publications. The catalyst of Hillier’s dissertation came to him while attending a church service—during which his mind wandered toward continuous sampling plans. After finishing his PhD, Hillier nearly accepted an offer at Carnegie Mellon’s Graduate School of Industrial Administration. At Lieberman’s encouragement, however, he decided to remain at Stanford.

Soon after joining the Stanford faculty, Hillier was invited by Lieberman to co-author an introductory textbook for the burgeoning field of OR. The two delayed the book’s launch so that Hillier could focus on his research as a young academic. After his first year at Stanford, he accepted a year-long visiting professorship at Cornell University (1962–1963), with the intention of gaining experience outside of the Stanford circle and expanding his OR horizons. He began his contributions to the textbook after returning to California the following summer. At the time, Hillier had no academic committee assignments nor PhD students to advise, so he was able to dedicate his complete attention to writing, completing four chapters in roughly 10 weeks. When he began teaching in the fall, he reviewed his lecture notes and references in the evening to free his mornings up for work on the book. In the many years since its initial publication in 1967, the widely used textbook continues to be read and assigned in business and engineering classrooms alike, serving as the foundations of OR knowledge for multiple generations of OR and OR-adjacent professionals. As of 2021, the book is in its 11th edition, and the next edition is scheduled for publication in 2024. Thanks partially to translations into over 15 other languages, this unique textbook has made a truly extraordinary contribution to the field of OR by playing a major role in spreading its use around the world.

Hillier has gone on to publish five more textbooks, touching upon a number of topics including mathematical programming, stochastic modeling, risk evaluation in investments, queueing tables, and management science. In 1990, He and Lieberman published two companion volumes to their original work, *Introduction to Mathematical Programming* and *Introduction to Stochastic Models in Operations Research*. With his son, Mark, a professor at the University of Washington, Hillier co-authored *Introduction to Management Science: A Modeling Case Studies Approach with Spreadsheets*, which is now in its seventh edition and widely used in business schools globally. (This seventh edition added so much material on analytics that its title has been changed to *Introduction to Management Science and Business Analytics*.) In recognition of his influential writing career, he was awarded the Saul Gass Expository Writing Award by the Institute for Operations Research and Management Science and named a Fellow of that society in 2004. The society then awarded him the Kimball Medal (a lifetime achievement award) in 2018.

In addition to his tenure at Stanford and his stint at Cornell University, Professor Hillier has held visiting appointments at Carnegie Mellon, the Technical University of Denmark, the University of Canterbury, and the University of Cambridge. Many of his former students and PhD students have gone on to lead successful careers of their own as operations researchers and educators. Because Lieberman incurred a fatal illness in 1993 and had to drop out as a co-author, Hillier retired from full-time teaching in 1996 to focus on writing and updating his textbooks. As an active member of The Institute of Management Science and the Operations Research Society of America, Hillier held many leadership positions in OR/MS societies, including treasurer of ORSA, VP for Meetings of TIMS, Chair of the TIMS Publications Committee, and Chair of the ORSA/TIMS Combined Meetings Committee. For 20 years, he was the founding series editor for the *International Series in Operations Research and Management Science* published by Kluwer Academic and Springer. His work on the combined meetings committee contributed to the ultimate merger of ORSA and TIMS into INFORMS in 1995.

Frederick Hillier is rightfully celebrated for his tremendous corpus of works that has unquestionably enhanced the quality and depth of OR education. As both an author and an advocate, he has expanded the field by providing learning tools for countless practitioners.

Reed Devany 

Selected original works in operations research

Hillier, F.S., Lieberman, G. J., 1967. *Introduction to Operations Research*. McGraw-Hill, New York.

Hillier, F.S., Lieberman, G. J., 1990. *Introduction to Mathematical Programming*. McGraw-Hill, New York.

Hillier, F.S., Lieberman, G. J., 1990. *Introduction to Stochastic Models in Operations Research*. McGraw-Hill, New York.

Biographical material

Hillier, F. S., 2015. *Interview by Vijay Mehrotra*, November 2, 2015. Video by David Tavani, Philadelphia PA.

INFORMS, 2015. *History of O.R. Excellence: Biographical Profiles: Hillier, Frederick S* [Online]. Available at <https://www.informs.org/Explore/History-of-O.R.-Excellence/Biographical-Profiles/Hillier-Frederick-S>