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Richard A. Davis • Keh-Shin Lii • Dimitris N. Politis
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Selected Works of Murray Rosenblatt

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Editors
Richard A. Davis
Department of Statistics
Columbia University
Amsterdam Ave. 1255
New York, NY 10027
USA
davis.richarda@gmail.com

Keh-Shin Lii
Department of Statistics
University of California
Riverside, CA 92521, USA
ksl@stat.ucr.edu

Dimitris N. Politis
Department of Mathematics
University of California, San Diego
La Jolla, CA 92093-0112
USA
politis@euclid.ucsd.edu

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Preface to the Series

Springer's Selected Works in Probability and Statistics series offers scientists and scholars the opportunity of assembling and commenting upon major classical works in statistics, and honors the work of distinguished scholars in probability and statistics. Each volume contains the original papers, original commentary by experts on the subjects papers, and relevant biographies and bibliographies.

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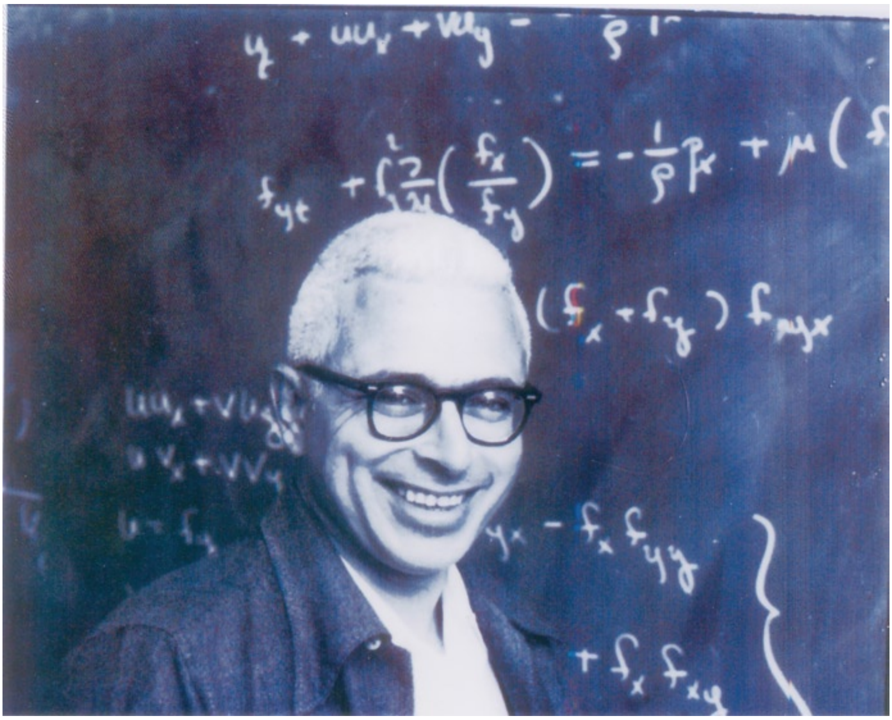
The subjects of the volumes have been selected by an editorial board consisting of Anirban DasGupta, Peter Hall, Jim Pitman, Michael Sörensen, and Jon Wellner.



Murray Rosenblatt

Preface

Murray Rosenblatt was born in New York City on September 7, 1926. After completing an undergraduate degree in mathematics at the City College of New York, he entered graduate school in mathematics at Cornell in 1946. While at Cornell, he studied both physics and probability theory and benefited greatly from his contact and exposure to some of the great minds of the day including Feynman, Feller, and Kac. It was under the direction of Marc Kac that Murray wrote his PhD dissertation in 1949 on extensions of the famed Feynman-Kac integral.

Murray met his wife Ady in the late 1940s; they were married in Ithaca in 1949, and subsequently had two children, Karin and Daniel. After receiving his PhD, Murray joined the "Committee on Statistics" at the University of Chicago. He held academic positions at the University of Indiana and Brown University before settling in the University of California at San Diego (UCSD) in 1964. He remains at UCSD to date—as Distinguished Professor Emeritus since 1994—having survived the loss of his wife Ady in 2009 after a courageous battle with cancer. The Statistical Science interview [1] provides further insights into Murray's professional life and career; more details are also found in the short section on key events included in this volume.

During the second half of the 20th century, Murray was one of the most celebrated and leading figures in probability and statistics with particular emphasis on time series, Markov processes, and nonparametric function estimation. In addition to being a fellow of IMS and AAAS, he was a Guggenheim fellow twice (1965–66, 1971–72), and was elected to the National Academy of Sciences in 1984. Among his many contributions, Murray conducted seminal work on density estimation, central limit theorems under strong mixing, spectral domain methods, long memory processes and Markov processes.

During his long—and continuing—career, Murray has published over 130 papers, and 5 books. His earliest book, the time series monograph [2] written jointly with U. Grenander, was published in 1957 and remains a classic today. This book was the first to lay out a comprehensive and modern set of techniques for modeling time series backed up by rigorous arguments. It had wide appeal to researchers and practitioners alike. Many of the results in this book are as relevant today as when they first appeared more than 50 years ago. In tribute to Murray's seminal contributions, the Rosenblatt name has been attached to two notable terms, the Rosenblatt Transformation (based on his 1952 paper [3]) and the Rosenblatt Process—a term coined by Murad Taqqu. At the close of 2009, these terms have an astonishing 506K and 1870K search listings, respectively, in Google.

We are delighted that several leading experts agreed to provide commentary and reflections on various directions of Murray's research portfolio. Rick Bradley gives a nice overview of some of Murray's work related to the central limit theory under strong mixing conditions. Peter Bickel describes Murray's insight into their papers on global measures of density estimates. David Brillinger provides a behind-the-scenes look at his papers with Murray on higher-order spectra. Murad Taqqu describes how Murray's paper on independence and dependence [4] inspired him to look at a class of limit processes with long memory, the aforementioned Rosenblatt Processes. T.-C. Sun gives an interesting account of Murray's work on Markov processes on semi-groups and the connections to results by Lévy, and Kawada and Itô. Finally, Keh-Shin Lii, a long time collaborator of Murray's, describes some of their joint work and problems in deconvolution and non-Gaussian time series modeling.

Murray was an accomplished advisor with over 20 PhD students to his credit. He had an interesting style of advising that may have reflected his experience with his own mentor Marc Kac. In his interview [1], Murray says Kac "helped occasionally with suggestions, but sort of left you alone without saying you've got to do this or that so forth and so on. He let you to go your own way." Murray breaks down his own style of advising by "suggesting an area" and "if a student is bright enough to make his own way, why do you have to impose on him?" Of course, as two of the undersigned can attest, it was not always clear that we could make it on our own! In meetings during our graduate student days, Murray was fond of frequently uttering the "what if" refrain. He was not only trying to probe our level of understanding, but trying to push us to think more broadly beyond the conventional boundaries. Murray has extraordinary insight which, unfortunately, is something that is not readily passed on to one's students. It was often a revelation when after studying a topic, one would finally come to understand the insight Murray had expressed years earlier.

This volume is a celebration of Murray Rosenblatt's stellar research career that spans over six decades. While space limitations prevented us from publishing all of Murray's numerous research papers, we have attempted to gather in this volume some of his most interesting and influential papers. The task was difficult—and in the end rather subjective—but we received help and guidance from our six expert discussants and from Murray himself.

We would like to thank Anirban DasGupta, past editor of the IMS Collections and Lectures Notes—Monograph Series, who first proposed putting a volume together in honor of Murray. Even though IMS had to back out of its commitment to this series as a result of unanticipated financial concerns, Anirban, together with Jim Pitman, Peter Hall and Jon Wellner, have been stalwart supporters of these "Selected Works" projects. We are indebted to John Kimmel and Springer for stepping in and salvaging the "Selected Works Series" that honors some of the leading figures in our field.

New York *Richard A. Davis*
Riverside *Keh-Shin Lii*
La Jolla *Dimitris N. Politis*

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Contributors

Peter Bickel Department of Statistics, University of California, Berkeley, California, 94720, E-mail: bickel@stat.berkeley.edu

Richard Bradley Department of Mathematics, Indiana University, Bloomington, Indiana, 47405, E-mail: bradleyr@indiana.edu

David R. Brillinger Department of Statistics, University of California, Berkeley, California, 94720, E-mail: brill@stat.berkeley.edu

Keh-Shin Lii Department of Statistics, University of California, Riverside, California, 92521, E-mail: ksl@stat.ucr.edu

T.-C. Sun Department of Mathematics, Wayne State University, Detroit, Michigan, 48202, E-mail: tsun@math.wayne.edu

Murad Taqqu Department of Mathematics, Boston University, Boston, Massachusetts, 02215, E-mail: murad@math.bu.edu

Murray Rosenblatt: Professional Timeline

1926	Born New York City, September 7, 1926
1946	B.S. City College of New York
1947	M.S. Cornell University
1949	PH.D. Cornell University thesis: "On distributions of certain Wiener functionals". Supervisor: Mark Kac
1949–1950	ONR postdoctoral grant (at Cornell University)
1950–1951	Instructor, Committee on Statistics, University of Chicago
1951–1955	Assistant professor, Committee on Statistics, Chicago
1953	University of Stockholm
1955	Department of Statistics, Columbia
1956–1959	Associate professor, Indiana University
1959–1964	Professor of Probability and Statistics, Brown University
1959	Brookhaven Lab visit
1960	—Madhav Heble, Indiana University, dissertation: "Linear estimation of regression coefficients, orthogonal matrix polynomials and application to multidimensional weakly stationary processes; interpolation and regression"
1960	—Perry Scheinok, Indiana University, dissertation: "The error on using the asymptotic variance and bias of spectrograph estimates for finite observation time"
1961	—Jack Hachigan, Indiana University, dissertation: "Some further results on functions of Markov processes"
1962	Symposium on Time Series, Brown University
1963	—T.-C. Sun, Brown University, dissertation: "A central limit theorem for nonlinear functions of a normal stationary process"
1964	—Henry Krieger, Brown University, dissertation: "Toeplitz operators on locally compact abelian groups"
1964	—John van Ness, Brown University, dissertation: "Estimates of the bispectrum of stationary random processes"
1964–1994	Professor of Mathematics, University of California, San Diego
1965	—Mahendra Nadkarni, Brown University, dissertation: "Vector valued weakly stationary stochastic processes and factorization of matrix valued functions and strong mixing and uniformly ergodic gaussian processes"
1965	—Henry Richardson III, Brown University, dissertation: "Regression analysis when the least-squares estimate is not asymptotically efficient"
1965	Guggenheim fellowship, University College and Imperial College, London
1967–1968	Chair, Mathematics Department, UCSD
1970	—Seung Chay, USCD, dissertation: "On quasi-Markov random fields"
1970	Wald lecturer
1971	Guggenheim fellowship, University College and Imperial College, London

1972	—Michael Sturgeon, UCSD, dissertation: "The representation of invariant conservative Baire measures for certain Markov processes"
1975	—Keh-Shin Lii, UCSD, dissertation: "Density estimation and splines"
1978	—Richard Bradley, UCSD, dissertation: "Measures of dependence on stationary sequences of random variables"
1978	—Yue-Pok Mack, UCSD, dissertation: "k-nearest neighbor estimation"
1979	—Richard Davis, UCSD, dissertation: "Extremes of stationary processes"
1979	—Stuart Strait, UCSD, dissertation: "A quadratic measure of deviation of spectral estimates"
1979	Fellow at Churchill College, Cambridge
1984	—Larry Goldstein, UCSD, dissertation: "Extensions of stochastic approximation procedures"
1984	—Diane Marcus, UCSD, dissertation: "On the approximation of distributions of sums of independent summands by infinitely divisible distributions—n dimensional case"
1984	Member, National Academy of Sciences
1985	—Karen Messer, UCSD, dissertation: "Boundary effects of smoothing splines"
1991	—Bruce Wahlen, UCSD, dissertation: "A nonparametric measure of independence"
1993	—Michael Kramer, UCSD, dissertation: "The fluctuation of the gaussian likelihood for stationary random sequences"
1994	—Yukuang Chiu, UCSD, dissertation: "Topics on prediction and representation of stationary processes"
1998	—Anthony Gamst, UCSD, dissertation: "Stochastic Burgers flows"
1994–present	Professor Emeritus, University of California—San Diego
1994–1996,	Visiting Professor, Colorado State University (fall semesters)
2003	President, Emeriti Association, UCSD

Murray Rosenblatt: Bibliography

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