

FRANK SPITZER'S PIONEERING WORK ON INTERACTING PARTICLE SYSTEMS

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In the late 1960's Frank Spitzer's research underwent a phase shift—he began to study spatially distributed interacting stochastic systems, a subject that was still in its infancy. Later, in the preface to his 1976 second edition of *Principles of Random Walk*, he would write the following:

New types of random walk problems are now in the stage of pioneering work. This came about because the simple model of a single particle, performing a random walk with given transition probabilities, may be regarded as a crude approximation to more elaborate random walk models. . . . In other models one considers the simultaneous random walk of a finite or even infinite system of particles, with certain types of interaction between the particles. But this is an entirely different story.

Although the roots of interacting systems can be traced to earlier modeling efforts in applied fields such as statistical physics, computer science and population genetics [cf. Glauber (1963), Kimura and Weiss (1964) and von Neumann (1966)], Spitzer and his Russian counterpart R. L. Dobrushin are widely credited as co-founders of a mathematical theory that has now evolved into one of the richest and most vital areas of probability. This legacy is best documented in the excellent books by Liggett (1985) and Durrett (1988), which not only detail much of the work described below, but also consolidate two decades of research by Spitzer's colleagues and students.

The early 1970's were a doubly fortunate time for me to be a graduate student in stochastic processes at Cornell University. First, I could learn the subject from three masters: Itô, Kesten and Spitzer. However, I was also lucky to find myself among an unusual concentration of eager disciples, several of whom have become my close friends and collaborators. We responded to interacting systems as a promising new paradigm for understanding the organizational principles that underlie many fundamental "real world" phenomena. All of us were equally inspired by Spitzer's keen sense of aesthetics, which was guided by the beauty of mathematics as much as any physical motivation. Although he admired exceptional technical ability, Frank seemed to favor elegance above all. He set high standards for himself and his students while communicating genuine enthusiasm for good work.

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