



Cornell University  
Operations Research and Information Engineering  
**Cornell Financial Engineering Manhattan**

**Faculty Members with a Primary Research Interest in Financial Engineering**

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**Philip Protter**

*Professor*

Philip Protter received his B.A. from Yale University in 1971 and his Ph.D from the University of California, San Diego in 1975. After teaching at Duke and Purdue University, he joined Cornell in 2000.

His research focus is in the area of theoretical and applied probability. Areas of research include mathematical finance theory (asset pricing, liquidity risk, credit risk, etc.), stochastic numerical analysis, stochastic analysis and its applications, weak convergence, Markov process theory, and filtering theory. Protter has a longstanding interest in stochastic calculus and stochastic differential equations. Protter's research focus also encompasses simulation and approximation of solutions for stochastic differential equations.

**Sidney Resnick**

*Professor*

Sidney Resnick received his B. S. from Queens College in 1966 and his M.A. and Ph.D. from Purdue in 1968 and 1970. Prior to joining ORIE, Resnick spent nine years at Colorado State University, six years at Stanford University, and two years at the Technion, in Haifa, Israel. His research has concentrated on probability modeling, with emphasis on extreme value theory and modeling of phenomena requiring heavy tails. Recent effort has focused on the inability of standard data network models to adequately explain observed phenomena in data traces. He has been struck by parallels between the fields of network modeling and some problems in financial engineering related to quantifying risk and simulating and analyzing order book data.

**David Ruppert**

*Andrew Schultz Jr Professor of Industrial Engineering*

David Ruppert received his B.A. from Cornell in 1970 and his M.A from the University of Vermont in 1973. He earned his Ph.D. from Michigan State in 1977 after which he served on the Faculty of the University of North Carolina. Professor Ruppert joined ORIE in 1987. He is the Andrew Schultz, Jr. Professor of Engineering. Ruppert's research has concentrated on several areas of regression analysis, especially nonparametric estimation, data transformation, weighting, and errors in variables. He currently pursues research on (1) the calibration of models used by environmental engineers, (2) fitting statistical models when variables have been measured with error, (3) the use of splines in statistical modeling, and (4) Bayesian computations. He has worked on a variety of applications including estimation of the term structure of interest rates and would like to be more involved in financial engineering, especially working on applied problems.



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**Gennady Samorodnitsky**

*Professor*

Gennady Samorodnitsky received his B.S. in 1978 from the Moscow Steel and Alloys Institute, USSR, his M.S. and his D. Sc. 1986 from Technion, Israel in 1983. He joined ORIE in 1988. His research interests lie in probability theory and in its various applications. A very important area is that of stochastic modeling, and he is especially interested in "non-standard" models, in particular those exhibiting heavy tails and/or long-range dependence. These models behave very differently from the "usual" models that are typically based on Gaussian or Markov stochastic processes. Both heavy tails and long-range dependence are observed in financial processes, teletraffic processes and many other processes. Since many classical statistical tools break down in the presence of long-range dependence and/or absence of Gaussianity, it is very important to understand how "non-standard" models behave, how one simulates them, how one estimates their parameters, and how one predicts their behavior in the future. He is looking closely, in particular, at certain financial and queuing models.

**Alexander Schied**

*Associate Professor*

Alexander Schied joined ORIE in November 2007, after having been a tenured faculty member in Mathematics at TU Berlin. His research is in probability theory and stochastic analysis with applications to financial engineering. Recent research topics include risk measures and risk management, robust portfolio choice under model uncertainty, and optimization problems in the face of liquidity risk. While in Berlin, Schied was Scientific Director of the Deutsche Bank Quantitative Products Laboratory, and Scientist in Charge for Finance in the Research Center Matheon.

**Stefan Weber**

*Assistant Professor*

Stefan Weber is an Assistant Professor in Financial Engineering and Applied Probability in ORIE, having joined the department in July 2005. Professor Weber received his M.Sc. in Mathematics from the University of Hanover, his M.A. in Economics from the European University Institute in Firenze, and his Ph.D. in Mathematics from Humboldt University in Berlin where he did research on mathematical finance under the guidance of Hans Follmer. Weber's research, teaching and consulting interests lie in the area of financial engineering, in particular risk management, financial regulation, optimal portfolio choice, credit risk models, and Monte Carlo methods. He would also be open to explore new research directions outside the areas in which he already has done research.



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**Shane G. Henderson**

*Associate Professor*

Shane Henderson received his BSc in Mathematics from the University of Auckland, New Zealand in 1992, his MS in Statistics in 1995 and Ph.D in Operations Research in 1997 from Stanford University. Henderson joined the ORIE in 2001. His research is concerned with discrete-event simulation, from input analysis (for example, extension of simple input models to capture correlation between inputs) to output analysis (for example, using martingales in simulation to achieve variance reduction). A new emphasis in his work is the interplay between optimization and simulation. He is particularly interested in structured simulation optimization, where the optimization problem enjoys certain properties such as convexity or quasi-convexity that can be used to develop algorithms that are robust and fast. Specific applications in this area include radiation treatment planning; call center planning, yacht match racing, ambulance deployment, adaptive Monte Carlo and policy identification in complex networks. Current work also explores the use of general variance reduction techniques, in particular, looking at the use of martingales to obtain variance reduction in simulations of Markov processes.

**Adrian Lewis**

*Professor and Director of Graduate Studies*

Adrian S. Lewis was born in England in 1962. Following his B.A., M.A., and Ph.D. degrees from Cambridge, and Research Fellowships at Queens' College, Cambridge and Dalhousie University, Canada, he worked in Canada at the University of Waterloo (1989-2001) and Simon Fraser University (2001-2004). He joined ORIE in 2004. Lewis received the 1995 Aisenstadt Prize, from the Canadian Centre de Recherches Mathematiques, the 2003 Lagrange Prize for Continuous Optimization from SIAM (Society for Industrial and Applied Mathematics) and the Mathematical Programming Society, and an Outstanding Paper Award from SIAM in 2005. His research interests include convex analysis and nonsmooth optimization, and he would be particularly interested applications involving optimization problems for innovative risk measures.

**Paat Rusmevichientong**

*Assistant Professor*

Paat Rusmevichientong received his B.A. in Mathematics from the University of California at Berkeley in 1997, his M.S. and Ph.D. in Operations Research from Stanford in 1999 and 2003 respectively. He joined the Cornell faculty in 2004 after having worked as a Software Engineer for Amazon.com in Seattle, WA. Rusmevichientong was the first prize recipient of the George B. Dantzig Dissertation Award in 2003. The award is given for the dissertation that is the most innovative and relevant to the practice of operations research and the management sciences. Recently he received an NSF CAREER award, an extremely prestigious NSF grant given only to the most promising of young scientists. Rusmevichientong would be interested in exploring how data mining techniques can be applied to extract business intelligence information from real-time high-volume data streams to drive equity and investment research. His proposal is to build upon the theories of approximation algorithms, online learning, and data mining techniques, to develop a suite of methodologies for processing high-volume data streams and extracting key business intelligence for investment research.



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**James Renegar**

*Professor and Director, School of ORIE*

Professor James Renegar received his B. A. from Rice University in 1976 and his Ph.D. in Mathematics from the University of California at Berkeley in 1983. Professor Renegar joined ORIE in 1987. His research focus is on continuous mathematical programming. Professor Renegar typically gravitates to algorithmic problems possessing an interplay of numerical analysis and algebra. He has laid theoretical foundations for round-off error analysis of algorithms for convex optimization. Currently he is pursuing hyperbolic programming, where he is devising algorithms that generalize interior-point methods. He also is intrigued by optimization problems that are naturally viewed from the perspective of functional analysis and its rich duality theory. Presently he is investigating sequences of relaxations of hyperbolic programming problems, of which linear programming and semidefinite programming are special cases.

**David B. Shmoys**

*Professor*

David Shmoys obtained his Ph.D. in Computer Science from the University of California at Berkeley in 1984. He has faculty appointments in both ORIE and Cornell's Department of Computer Science. Shmoys' research has focused on the design and analysis of efficient algorithms for discrete optimization problems.

Shmoys' work has highlighted the central role that linear programming plays in the design of approximation algorithms for NP-hard problems. In particular, he is known for his results on scheduling and clustering problems, including the first constant-performance guarantees for several problems central to the literature, including the k-center and k-median problems, the generalized assignment problem, as well as scheduling problems in which the aim is to minimize the average job-completion time. His work on polynomial-time approximation schemes for scheduling problems introduced techniques that have subsequently been applied to a variety of other settings. His current work includes the application of discrete optimization techniques to several issues in computational biology, as well as in the development of approximation algorithms for stochastic models of clustering, inventory, and related problems in logistics.

**Michael J. Todd**

*L. C. Welch Professor*

Michael Todd is the Leon C. Welch Professor of Operations Research and Information Engineering. He received his B.A. in Mathematics from Cambridge University, England in 1968 and his Ph.D. in Administrative Sciences from Yale University in 1972. Todd joined ORIE in 1973. He is interested in polynomial-time algorithms for linear and semidefinite programming. Together with two former graduate students, he has developed the software package SDPT3 for such problems. He has also worked on probabilistic analysis of the simplex method, the ellipsoid method, and simplicial algorithms for fixed-point problems and computing economic equilibria, and is currently working with a student on first-order methods for nonsmooth optimization. Problems such as semidefinite programming and second-order cone programming have rich applications in fields as diverse as structural optimization, control theory, optimal design in statistics, and combinatorial optimization. They also have a powerful duality theory and efficient algorithms for their solution.