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Curriculum Vitæ

Paul Dupuis

University Address

Paul Dupuis
IBM Professor of Applied Mathematics
Division of Applied Mathematics
Brown University
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Education

Ph.D., 1985, Brown University, Division of Applied Mathematics
M.S., 1982, Northwestern University
Sc.B., 1981, Brown University

Professional Appointments

2012–present, IBM Professor of Applied Mathematics, Division of Applied Mathematics, Brown University
2005–2011, Chairman, Division of Applied Mathematics, Brown University
1996–2012, Professor, Division of Applied Mathematics, Brown University
1996, Visiting Fellow, Faculty for Engineering, The Australian National University
1993–96, Associate Professor, Division of Applied Mathematics, Brown University
1991–93, Assistant Professor, Division of Applied Mathematics, Brown University
1988–91, Assistant Professor, Department of Mathematics and Statistics, University of Massachusetts
1986–88, Visiting Assistant Professor, LCDS, Brown University
1985–86, Postdoctoral Fellow, IMA, University of Minnesota

Research Interests

Probability theory and its applications, stochastic processes, control, numerical methods, Monte Carlo and rare event simulation, operations research, partial differential equations.

Honors

- NSF Mathematical Sciences Postdoctoral Fellow

- Fellow of the Society for Industrial and Applied Mathematics

- Fellow of the Institute for Mathematical Statistics

- Fellow of the American Mathematics Society

- Outstanding Simulation Publication Award (INFORMS, 2010).

Publications

Books:

1. *Analysis and Approximation of Rare Events: Representations and Weak Convergence Methods* (with A. Budhiraja), Springer-Verlag, New York, 2019.

2. *Numerical Methods for Stochastic Control Problems in Continuous Time* (with H. J. Kushner), Second Revised Edition, Springer-Verlag, New York, 2001.

3. *A Weak Convergence Approach to the Theory of Large Deviations* (with R. S. Ellis), John Wiley & Sons, New York, 1997.

Papers in Journals:

1. (f, Γ)-divergences: Interpolating between f-divergences and integral probability metrics, (with J. Birrell, M.A. Katsoulakis, Y. Pantazis and L. Rey-Bellet), *Journal of Machine Learning Research, **23**,* (2022), 1–70.

2. Analysis and optimization of certain parallel Monte Carlo methods in the low temperature limit (with G.-J. Wu), to appear in *SIAM J. Multiscale Model. and Simul.*

3. Quasistationary distributions and ergodic control problems, (with A. Budhiraja, P. Nyquist and G.-J. Wu), *Stoch. Proc. Appl.,* **145**, (2022), 143–164.

4. Variational representations and neural network estimation for Rényi divergences (with J. Birrell, M.A. Katsoulakis, L. Rey-Bellet and J. Wang), to appear in *SIAM J. on Mathematics of Data Science.*

5. The large deviation principle for interacting dynamical systems on graphs, with G. Medvedev, to appear in *Communications in Mathematical Physics.*

6. Large deviation properties of the empirical measure of a metastable small noise diffusion, with G.-J. Wu, *J. of Theor. Probab.*, **35**, (2022), 1049–1136.

7. Formulation and properties of a divergence used to compare probability measures without absolute continuity, with Y. Mao, *ESAIM: Control, Optimisation and Calculus of Variations*, **28** (2022), https://doi.org/10.1051/cocv/2022002.

8. Rare event asymptotics for exploration processes on random graphs, with S. Bhamidi, A. Budhiraja and R. Wu, *Annals of Appl. Probab.*, **32**, (2022), 1112–1178.

9. Robust bounds and optimization at the large deviations scale for queueing models via Rényi divergence, with R. Atar, A. Budhiraja and R. Wu, *Annals of Appl. Probab.*, **31**, (2021), 1061–1099.

10. Large deviations for the single server queue and the reneging paradox (with R. Atar, A. Budhiraja, and R. Wu), to appear in *Math of OR*.

11. Infinite swapping using IID samples (with G.-J. Wu and M. Snarski), *TOMACS,* **29***,* (2019), 1–26.

12. Sensitivity analysis for rare events based on Rényi divergence (with M.A. Katsoulakis, Y. Pantazis and L. Rey-Bellet), *Ann. of Applied Probab.*, **30**, (2020), 1507–1533.

13. Splitting algorithms for rare event simulation over long times, (with A. Buijsrogge, M. Snarski), *Ann. of Applied Probab.* **30**, (2020), 2963–2998.

14. Large deviations for empirical measures generated by Gibbs measures with singular energy functionals, (with V. Laschos and K. Ramanan), *Electronic J. of Probability*, **25**, (2020), paper no. 46, 1–41.

15. Uniform large deviation principle for Banach space valued stochastic differential equations (with M. Salins and A. Budhiraja), *Trans. of the AMS*, **372**, (2019), 8363–8421.

16. Exit time risk-sensitive control for systems of cooperative agents, (with V. Laschos and K. Ramanan), *Mathematics of Control, Signals and Systems*, **31**, (2019), 279–332.

17. Large deviations for the empirical measure of a diffusion via weak convergence methods (with D. Lipshutz), *Stochastic Processes and Their Applications,* **128**, (2018), 2581–2604.

18. Large deviations for small noise diffusions in a fast Markovian environment (with A. Budhiraja and A. Ganguly), Electron. J. Probab., **23**, (2018), 1-33.

19. Thermodynamic integration methods, infinite swapping and the calculation of generalized averages, (with J. Doll and P. Nyquist), *J. of Chemical Physics*, **146**, (2017), 134111.

20. A large deviations analysis of certain qualitative properties of parallel tempering and infinite swapping algorithms, (with J. Doll and P. Nyquist), *Applied Mathematics and Optimization*, **78**, (2018), 103–144.

21. Moderate deviations based importance sampling for stochastic recursive equations, (with D. Johnson), *Journal of Applied Probability*, **49**, (2017), 981–1010.

22. Path-space information bounds for uncertainty quantification and sensitivity analysis of stochastic dynamics, (with M.A. Katsoulakis, Y. Pantazis and P. Plecháč), *SIAM/ASA J. Uncertainty Quantification*, **4**, (2016), 80-111.

23. Limits of relative entropies associated with weakly interacting particle systems, (with A. Budhiraja, M. Fischer and K. Ramanan), *Electron. J. Probab.*, **80**, (2015), 1–22.

24. Local stability of Kolmogorov forward equations for finite state nonlinear Markov processes, (with A. Budhiraja, M. Fischer and K. Ramanan), *Electron. J. Probab.*, **81**, (2015), 1–30.

25. On performance measures for infinite swapping Monte Carlo methods, (with J. Doll), *J. of Chemical Physics*, **142**, (2015), 024111.

26. Moderate deviations for recursive stochastic algorithms, (with D. Johnson), *Stochastic Systems*, **5**, (2015), 87–119.

27. Moderate deviation principles for stochastic differential equations with jumps, (with A. Budhiraja and A. Ganguly), *Annals of Probability*, **44**, (2016), 1723–1775.

28. Large deviation principle for finite state mean-field interacting particle systems, (with K. Ramanan and W. Wu), submitted.

29. Robust bounds on risk-sensitive functionals via Rényi divergence, (with R. Atar and K. Chowdhary), *SIAM/ASA J. Uncertainty Quantification*, **3**, (2015), 18–33.

30. On the large deviation rate function for the empirical measures of reversible jump Markov processes, (with Y. Liu), *Annals of Probability*, **43**, (2015), 1121–1156.

31. Escaping from an attractor: Importance sampling and rest points I, (with K. Spiliopoulos and X. Zhou), *Annals of Applied Probability*, **25**, (2015), 2909–2958.

32. Rare-event sampling: occupation-based performance measures for parallel tempering and infinite swapping Monte Carlo methods, (with J. D. Doll, N. Plattner, D. L. Freeman and Y. Liu), *J. of Chemical Physics*, **137**, (2012), 204112.

33. Large deviations for stochastic partial differential equations driven by a Poisson random measure (with A. Budhiraja and J. Chen), *Stochastic Processes and Their Applications*, **123**, (2013), 523–560.

34. Analysis of an interacting particle method for rare event estimation (with Yi Cai), *QUESTA,* **73**, (2013), 345–406.

35. On the infinite swapping limit for parallel tempering (with Y. Liu, N. Plattner, J.D. Doll), *SIAM J. Multiscale Model. and Simul.,* **10,** (2012), 986–1022.

36. Importance sampling for multiscale diffusions (with K. Spiliopoulos and H. Wang), *SIAM J. Multiscale Model. and Simul.*, **10**, (2012), 1–27.

37. An infinite swapping approach to the rare-event sampling problem (with N. Plattner, J.D. Doll, H. Wang, Y. Liu and J. Gubernatis), *J. of Chemical Physics*, **135**, (2011), 134111.

38. Counting with combined splitting and capture-recapture methods (with B. Kaynar, A. Ridder, R. Rubinstein and R. Vaisman), *Stochastic Models,* **28**, (2012), 478–502.

39. Distinguishing and integrating aleatoric and epistemic variation in uncertainty quantification (with Kamaljit Chowdhary), *ESAIM: Mathematical Modelling and Numerical Analysis*, **47**, (2013), 635–662.

40. Large deviations for multiscale diffusions via weak convergence methods (with K. Spiliopoulos), *Stochastic Processes and Their Applications*, **122**, (2012), 1947–1987.

41. Large deviation properties of weakly interacting processes via weak convergence methods (with A. Budhiraja and M. Fischer), *Annals of Probability*, **40**, (2012), 74–102.

42. Variational representations for continuous time processes (with A. Budhiraja and V. Maroulas), *Annales de l'Institut Henri Poincaré,* **47**, (2011), 725–747.

43. The design and analysis of a generalized RESTART/DPR algorithm for rare event simulation (with T. Dean), *Annals of OR*, **189**, (2011), 63–102.

44. A spatial averaging approach to rare-event sampling, (with J. Doll et. al.), *J. Chem. Phys.*, **131**, (2009) 104107.

45. Importance sampling for Jackson networks (with H. Wang), *Queueing Systems*, **62**, (2009), 113–157.

46. Importance sampling for weighted-serve-the-longest-queue (with K. Leder and H. Wang), *Math. of Operations Research*, **34**, (2009), 642–660.

47. Large deviations for stochastic flows of diffeomorphisms (with A. Budhiraja and V. Maroulas), *Bernoulli Journal*, **16**, (2010), 234–257.

48. Large deviations for infinite dimensional stochastic dynamical systems (with A. Budhiraja and V. Maroulas), *Annals of Probability,* **36**, (2008), 1390–1420.

49. Splitting for rare event simulation: A large deviations approach to design and analysis (with T. Dean), *Stochastic Processes and their Applications*, **119**, (2009), 562–587.

50. On the large deviations properties of the weighted-serve-the-longer-queue policy (with K. Leder and H. Wang) to appear in *In and Out of Equilibrium 2*, volume 60 of *Progress in Probability*, Birkhauser, 2008.

51. Large deviations and importance sampling for a tandem network with slow-down (with K. Leder and H. Wang), *QUESTA,* **57***,* (2007), 71–83.

52. Explicit solutions for a class of nonlinear PDE that arise in allocation problems, (with J. Zhang), *SIAM J. on Mathematical Analysis*, **39**, (2008), 1627–1667.

53. Large deviation principle for general occupancy models (with J. Zhang), *Combinatorics, Probability and Computing*, **17**, (2008), 437–470.

54. Importance sampling for sums of random variables with regularly varying tails (with K. Leder and H. Wang), *ACM Trans. on Modelling and Computer Simulation*, **17**, (2007), 1–21.

55. Dynamic importance sampling for queueing networks (with D. Sezer and H. Wang), *Annals of Applied Probability,* **17**, (2007), 1306–1346.

56. Subsolutions of an Isaacs equation and efficient schemes for importance sampling (with H. Wang), *Mathematics of Operations Research*, **32**, (2007), 1–35.

57. Large deviation principle for occupancy problems with colored balls (with Carl Nuzman and Phil Whiting), *J. Appl. Probab.*, **44**, (2007), 115–141.

58. Refined large deviation asymptotics for the classical occupancy problem (with J. Zhang and P. Whiting), *Method. and Comp. in Applied Probab.*, **8**, (2006), 467–496.

59. Dynamic importance sampling for uniformly recurrent Markov chains (with H. Wang), *Annals of Applied Probability*, **15**, (2005), 1–38.

60. On the convergence from discrete to continuous time in an optimal stopping problem (with H. Wang), *Annals of Applied Probability* **15**, (2005), 1339—1366.

61. Importance sampling, large deviations and differential games (with H. Wang), *Stochastic and Stochastics Reports,* **76**, (2004), 481–508.

62. Explicit solutions for a network control problem in the large deviation regime (with Rami Atar and Adam Shwartz), *QUESTA*, **46**, (2004), 159–176.

63. Large deviation asymptotics for occupancy problems (with Carl Nuzman and Phil Whiting), *Annals of Probab.*, **32**, (2004), 2765–2818.

64. An escape time criterion for queueing networks: Asymptotic risk-sensitive control via differential games (with Rami Atar and Adam Shwartz), *Math. of OR.*, **28**, (2003), 801–835.

65. Explicit solution to a robust queueing control problem, *SIAM J. on Control and Opt.*, **23**, (2003), 1854–1875.

66. Large deviations for the empirical measures of reflecting Brownian motion and related constrained processes in $\mathbb{R}_+$ (with A. Budhiraja), *Elec. J. of Probab.*, **8**, (2003), 1–46.

67. Optimal stopping with random intervention times (with H. Wang), *Adv. Applied Probability*, **34**, (2002), 1–17.

68. A time-reversed representation for the tail probabilities of stationary reflected Brownian motion (with K. Ramanan), *Stoch. Proc. and Their Appl.*, **98**, (2002), pp. 253–287.

69. Second order numerical methods for first order Hamilton-Jacobi equations (with A. Szpiro), *SIAM J. on Numerical Analysis*, **40**, (2002) pp. 1136–1183.

70. A differential game with constrained dynamics and viscosity solutions of a related HJB equation (with R. Atar), *Nonlinear Analysis: Theory, Methods and Applications,* **51**, (2002) pp. 1105–1130.

71. On positive recurrence of constrained diffusion processes (with R. Atar and A. Budhiraja), *Ann. of Probab.* **29** (2001), 979–1000.

72. Convergence of the optimal feedback policies in a numerical method for a class of deterministic optimal control problems (with A. Szpiro), *SIAM J. on Control and Opt.*, **40** (2001) pp. 393–420.

73. Risk-sensitive and robust escape control for degenerate processes (with M. Boué), *Math. of Control, Signals and Systems*, **14** (2001) pp. 62–85.

74. An explicit formula for the solution of certain optimal control problems on domains with corners (with K. Ramanan) an invited paper in the special issue of *Probab. Th. and Math. Stat.* dedicated to A. Skorokhod **63**, (2000), pp. 32–48.

75. A multiclass feedback queueing network with a regular Skorokhod Problem (with K. Ramanan), *Queueing Systems*, **36** (2000) pp. 327–349.

76. A variational representation for positive functionals of infinite dimensional Brownian motion (with A. Budhiraja), *Prob. Math. Statist.* **20** (2000) pp. 39–61.

77. Large deviations for small noise diffusions with discontinuous statistics (with M. Boué and R. S. Ellis), *Prob. Theor. and Rel. Fields* **116** (2000) pp. 125–148.

78. Robust properties of risk–sensitive control (with M. R. James and I. R. Petersen), *Math. of Control, Signals and Systems.* **13** (2000) pp. 318–332.

79. Minimax optimal control of stochastic uncertain systems with relative entropy constraints (with I. R. Petersen and M. R. James), *IEEE Trans. on Auto. Control.* **45** (2000) pp. 398–412.

80. Large deviations and queueing networks: methods for rate function identification (with R. Atar), *Stoch. Proc. and Their Appl.* **84** (1999) pp. 255–296.

81. Simple necessary and sufficient conditions for the stability of constrained processes (with A. Budhiraja), *SIAM J. on Applied Math.* **59** (1999), pp. 1686–1700.

82. Markov chain approximations for deterministic control problems with affine dynamics and quadratic cost in the control (with M. Boué), *SIAM J. on Numerical Analysis* **36** (1999), pp. 667–695.

83. Convex duality and the Skorokhod Problem, parts I and II (with K. Ramanan), *Prob. Th. and Rel. Fields*, **115** (1999), pp. 153–195 and **115** (1999), pp. 197–236.

84. A variational formulation of a problem in image matching (with U. Grenander and M. Miller), *Quarterly of Applied Mathematics*, **56** (1998), pp. 587–600.

85. A Skorokhod Problem formulation and large deviation analysis of a processor sharing model (with K. Ramanan), *Queueing Systems*, **28** (1998), pp. 109–124.

86. Large deviation properties of data streams that share a buffer (with K. Ramanan), *The Annals of Applied Probability*, **8**, (1998), pp. 1070–1129.

87. A variational representation for certain functionals of Brownian motion (with M. Boué), *Annals of Probability*, **26** (1998), pp. 1641–1659.

88. Rates of convergence for approximations schemes in optimal control (with M. James), *SIAM J. on Control and Opt.* **36** (1998), pp. 719–741.

89. Risk sensitive and robust escape criteria (with W. McEneany), *SIAM J. on Control and Opt.* **35** (1997), pp. 2021–2048.

90. A nonstandard form of the rate function for the occupation measure of a Markov chain (with O. Zeitouni), *Stoch. Proc. and Their Appl.*, **61** (1996), pp. 249–261.

91. The large deviation principle for a general class of queueing systems, I (with R. S. Ellis), *Transactions of the AMS* **347** (1995), pp. 2689–2751.

92. A dynamical systems approach for network oligopolies and variational inequalities, (with A. Nagurney and D. Zhang), *Annals of Regional Science* **28** (1994), pp. 263–283.

93. Lyapunov functions for semimartingale reflecting Brownian motions, (with R. J. Williams), *The Annals of Probability* **22** (1994), pp. 680–702.

94. An optimal control formulation and related numerical methods for a problem in shape reconstruction, (with J. Oliensis), *The Annals of Applied Probability* **4** (1994), pp. 287–346.

95. Dynamical systems and variational inequalities, (with A. Nagurney), *The Annals of Operations Research* **44** (1993), pp. 9–42.

96. SDEs with oblique reflections on nonsmooth domains, (with H. Ishii), *The Annals of Probability* **21** (1993), pp. 554–580.

97. Large deviations for Markov processes with discontinuous statistics, II: random walks, (with R. S. Ellis), *Probability Theory and Related Fields* **91** (1992), pp. 153–194.

98. On sampling-controlled stochastic approximation, (with R. Simha), *IEEE Trans. on Auto. Control* **35** (1991), pp. 915–925.

99. Large deviations for Markov processes with discontinuous statistics, I: general upper bounds, (with R. S. Ellis and A. Weiss), *The Annals of Probability* **19** (1991), pp. 1280–1297.

100. On oblique derivative problems for fully nonlinear second-order elliptic PDE's on domains with corners, (with H. Ishii), *Hokkiado U. Math. J.* **20** (1991), pp. 135–164.

101. On Lipschitz continuity of the solution mapping to the Skorokhod Problem, with applications, (with H. Ishii), *Stochastics* **35** (1991), pp. 31–62.

102. On oblique derivative problems for fully nonlinear second-order elliptic PDE's on nonsmooth domains, (with H. Ishii), *J. of Nonlinear Analysis: Theory, Methods and Applications* **15** (1990), pp. 1123–1138.

103. A viscosity solution approach to the asymptotic analysis of queueing systems, (with H. Ishii and H. M. Soner), *The Annals of Probability* **18** (1990), pp. 226–255.

104. Minimizing exit probabilities; a large deviations approach (with H. J. Kushner), *SIAM J. on Control and Optimization.* **27** (1989), pp. 432–445.

105. Stochastic approximation and large deviations: upper bounds and w.p.1 convergence, (with H. J. Kushner), *SIAM J. on Control and Optimization.*, **27** (1989), pp. 1108–1135.

106. Large deviations analysis of some recursive algorithms with state dependent noise, *The Annals of Probability* **16** (1988), pp. 1509–1536.

107. Large deviations analysis of reflected diffusions and constrained stochastic approximation algorithms in convex sets, *Stochastics* **21** (1987), pp. 63–96.

108. Stochastic systems with small noise, analysis and simulation; a phase locked loop example (with H. J. Kushner), *SIAM J. on Applied Math.* **47** (1987), pp. 643–661.

109. Asymptotic theory of constrained stochastic approximations via the theory of large deviations (with H. J. Kushner), *Probability Theory and Related Fields* **75** (1987), pp. 223–244.

110. Large deviations estimates for systems with small noise effects, and applications to stochastic systems theory (with H. J. Kushner), *SIAM J. on Control and Optimization* **24** (1986), pp. 979–1008.

111. Stochastic approximation via large deviations: asymptotic properties (with H. J. Kushner), *SIAM J. on Control and Optimization* **23** (1985), pp. 675–696.

Proceedings and Other Publications: List available upon request. A recent addition is

1. Rare event simulation (with S. Asmussen, R. Rubinstein and H. Wang), invited contribution for *Encyclopedia of Operations Research and Management Science*, S. Gass and M. Fu (eds.), Springer, 2013.

Selected Recent Lectures

- A Main Lecturer for the Seminar on Stochastic Processes, University of Virginia, 11th of March, 2017.

- Plenary Lecture, International Conference on Monte Carlo Methods and Applications, University of Montreal, 5th of July, 2017.

- Semi-plenary Lecture, Foundations of Computational Mathematics, University of Barcelona, 11th July, 2017.

- Markov Lecture, INFORMS Annual Meeting, Houston, 23rd of October, 2017.

- Invited Speaker, 3rd GAMM AGUQ Workshop on Uncertainty Quantification, Fakultät für Mathematik, TU Dortmund, 14th of March, 2018.

- Technical Seminar, United Technologies Research Center, East Hartford, Connecticut, 30th of April, 2018.

- Invited Speaker, Workshop on Stochastic Control, Computational Methods, and Applications, Insitute for Mathematics and Its Applications, Minneapolis, MN, 8th of May, 2018.

- Mini-course at the Workshop on Simulation and Probability: Recent Trends, Institute Henri Lebesgue, Inria Rennes Bretagne Atlantique, 5th-8th June, 2018.

Courses taught at Brown (first listed course was one of the first freshman seminars at Brown, and one of very few in the physical sciences):

- AM 9: An introduction to mathematical modeling

- AM 10: An introduction to probability

- AM 33: First semester ordinary differential equations

- AM 34: Second semester ordinary differential equations

- AM 35: First semester ordinary differential equations, honors section

- AM 36: Second semester ordinary differential equations, honors section

- AM 117: Second semester numerical analysis

- AM 120: Stochastic models in operations research

- AM 121: Deterministic models in operations research

- AM 194: Senior seminar

- AM 211: Real analysis

- AM 212: Hilbert spaces

- AM 226: Introduction to stochastic control

- AM 263: First semester of introductory graduate course in probability

- AM 264: Second semester of introductory graduate course in probability

- AM 266: Weak convergence for stochastic processes

- AM 281: Stochastic differential equations

- AM 282: An introduction to the theory of large deviations

Thesis supervision:

- Yixiang Mao (Ph.D., Harvard Dept. of Math.), completed 2020.

- Guo-Jhen Wu (Ph.D.), completed 2019.

- Michael Snarski (Ph. D.), completed December 2018.

- Wei Wu (Ph. D., co-advised with Kavita Ramanan), completed 2014.

- Dane Johnson (Ph. D.), completed 2014.

- Yufei Liu (Ph. D.), completed 2013.

- Yi Cai (Ph. D.), completed 2012.

- Kenny Chowdhary (Ph. D., co-advised with Jan Hesthaven), completed 2012.

- Kevin Leder (Ph. D., co-advised with Hui Wang), completed 2008.

- Tom Dean (Ph. D.), completed, 2007.

- Devin Sezer (Ph. D.), completed 2006.

- Jim Zhang (Ph. D.), completed 2005.

- John Curran (Ph. D.), completed 2004.

- Hui-Ming Pai (Ph. D.), completed 2003.

- Tao Pang (Ph. D., main supervisor Wendell Fleming), completed 2001.

- Adam Szpiro (Ph. D.), completed 1999.

- Michelle Boue (Ph. D.), completed 1997.

- Kavita Ramanan (Ph. D.), completed 1997.

- Runhan Xie (undergraduate honors thesis), 2019-2020.

- Abraar Chaudhry (undergraduate honors thesis), 2018-2019.

- Yashil Sukurdeep (undergraduate honors thesis), 2017-2018.

- Koushiki Bose (undergraduate honors thesis), 2012-2013.

- Yong Wook Kim (undergraduate honors thesis), 2004-2005.

- Michele Aghassi (undergraduate honors thesis), 1997-1998.

- Brenda Choy (undergraduate honors thesis), 1992-1994.

SERVICE

Departmental:

- Director of Lefschetz Center for Dynamical Systems (2013,2016-present)

- Chairman of Undergraduate Committee (2017-present).

- Chairman of Division (2005-2011).

- Chairman of Computer Committee (1999-2003).

- Associate Chairman of Division (1997-2005).

- Undergraduate Committee (1997-2003).

- Chairman of Graduate Committee (1993-1994).

- Graduate Committee (1992-1993, 2014-2015).

Professional:

- Refereeing for many journals and publishers, including Stochastic Processes and Their Applications, The Annals of Probability, The Annals of Applied Probability, Transactions of the AMS, IEEE Transactions on Automatic Control, SIAM J. on Control and Optimization, SIAM J. on Applied Math., Probability Theory and Related Fields, J. of Mathematical Analysis and Applications, Stochastics and Stochastic Reports, Stochastic Analysis and Its Applications, and Springer-Verlag.

- Referee and review panel participant for many domestic and foreign funding agencies, including the NSF, ARO, AFOSR, ONR, DOE, NSA, and the Israeli, Italian, Australian, Dutch and Canadian analogues of the NSF.

- External reviewer for mathematical sciences programs at AFOSR, ARO and DOE.

- Steering committee for the Rare Evemt SIMulation (RESIM) series of workshops.

Associate Editor

- Journal of Theoretical Probability, 2006–2014

- ESAIM: Mathematical Modelling and Numerical Analysis, 2016-present

- Bernoulli, 2013–present

- The Annals of Applied Probability, 2003–2010

- Stochastic Analysis and Its Applications, 2002–2010

- The Annals of Probability, 1999–2005

- Stochastic Processes and Their Applications, 1999–2003

- Siam Journal on Control and Optimization, 1996–2002

Area Editor

- Association of Computing Machinery Transactions on Modeling and Computer Simulation, 2010–2015

Editor-in-Chief

- Applied Mathematics and Optimization, 2003–2014

Grant Support
Currently active are awards from each of AFOSR and NSF as PI.