

Professor Jerzy A. Filar
Curriculum Vitae

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Academic Qualifications

1972	B.Sc.(Hons) Mathematical Statistics University of Melbourne, Australia
1975	M.Sc.Statistics, Monash University, Australia
1977	M.A. Mathematics, University of Illinois, Chicago
1980	Ph.D. Mathematics, University of Illinois, Chicago

Professional Experience

1975-76	Tutor (full-time), Dept. of Mathematics, Monash University, Clayton, Victoria.
1979-80	Visiting Assistant Professor, Dept. of Applied Statistics, University of Minnesota, St.Paul/Minneapolis, Minnesota.
1980-86	Assistant Professor, Dept. of Mathematical Sciences, The Johns Hopkins University, Baltimore, Maryland.
1986-90	Associate Professor, Dept. of Mathematics and Statistics, University of Maryland, Baltimore County, Baltimore, Maryland.
1986-1989	Director of Graduate Programs in Mathematics and Statistics, University of Maryland, Baltimore County, Baltimore, Maryland.
1990-91	Professor, Dept. of Mathematics and Statistics, University of Maryland, Baltimore County, Baltimore, Maryland.
1992-2000	Professor of Mathematics and Statistics, School of Mathematics, University of South Australia.
1994 - 1998	Director, Centre for Industrial and Applied Mathematics (CIAM), University of South Australia.
1998-1999	Associate Dean (Research), Faculty of Information Technology, University of South Australia
2001-	Foundation Chair of Mathematics and Statistics, School of Mathematics, University of South Australia

Awards & Visiting Appointments

1968-72	Commonwealth Tertiary Scholarship, University of Melbourne, Australia
1973-74	Monash Graduate Scholarship, Monash University, Australia
1976,78	University Fellowship, University of Illinois, Chicago. USA
1981	Award for the best paper published in OPSEARCH in 1981
1985	Environmental Science and Engineering Fellowship, from the American Association for the Advancement of Science, USA
1989/90	Guest Professor, Department of Mathematics at Rijksuniversiteit Limburg, The Netherlands
1997	Visiting Professor, Department of Mathematics, University of Ulm, Germany
1998	Visiting Professor, Department of Systems Engineering, Chinese University of Hong Kong, Hong Kong
1998	Visiting Professor, Paul Sabatier University, Toulouse, France
1999	Guest Professor, Institute for Econometrics and Operations Research, Technical University of Vienna, Austria
2002	Visiting Professor; Department of Mathematics, Harvey Mudd College, Claremont, California, USA and in INRIA, Sophia Antipolis, France.
2003	Fellow of the Australian Mathematical Society.

Administrative Experience

More than twenty years of administrative experience, at the departmental, school and faculty levels, gained at The Johns Hopkins University and at the Universities of Maryland and South Australia. This included:

1. In my role as Director of Graduate Programs in Mathematics and Statistics at the University of Maryland in Baltimore I chaired a committee to complete overhaul both the undergraduate and graduate curriculum so as to ensure both a seamless transition from the former to the latter and the adoption of a modern perspective on mathematics and statistics. When I stepped down, in 1989 UMBC's graduate programs in these areas were thriving and have continued to do so ever since. During this period I served on numerous committees at all administrative levels of the university, including a committee to select a new Director of the Combined Graduate School of the University of Maryland, Baltimore, a position somewhat analogous to that of Deputy Vice Chancellor (Research).
2. In my role as the founding Director of the Centre for Industrial and Applied Mathematics (CIAM) at the University of South Australia I took charge of a group of some twenty mathematicians and statisticians who (with few notable exceptions) lacked research culture, focus and funding. In a space of four years I transformed this group to a dynamic research centre in Industrial and Applied Mathematics capable of regularly winning ARC Discovery and Linkage grants as well as numerous industrial contracts. CIAM has continued to go from strength to strength. Arguably, CIAM is now the leading centre of its kind in Australia with a diverse research portfolio of external grants and projects of approximately \$700,000 annually. By 1998 I felt that CIAM was sufficiently strong to pass on the directorship to my colleague, Professor Phil Howlett and to take on the position of Deputy Director within the centre.
3. In my role as Associate Dean of Research in what was then the Faculty of Information Technology I served on the university's research policy committee and was in charge of developing the faculty's unified research strategy that included liaison with industry, government agencies and the community. I also chaired a committee responsible for allocating the faculty's internal research funds and the research degrees management committee. Regrettably, this appointment was short lived as, in the middle of that year, the university decided to abandon faculties and move to the divisional structure. As a result of this restructuring the Faculty of Information Technology became absorbed in the Division of Information Technology, Engineering and the Environment.
4. Finally, in my role as one of the research leaders at the University of South Australia I served on numerous other committees, including a committee for promotion to the levels of Associate Professor and Professor, a committee for allocating the (small) ARC grants and the subsequent funding schemes and a grievance committee that deals with cases of conflict between research degree students and their supervisors.

Editorial Experience

1. Editor-in-Chief: Environmental Modeling and Assessment, international journal published by Kluwer.
2. Honorary Theme Editor for Theme 6.3 "Mathematical Models" of UNESCO's forthcoming Encyclopedia of Life Support Systems (EOLSS)
3. Associate Editor: Journal of Mathematical Analysis and Applications
4. Associate Editor: Mathematical Methods of Operations Research (formerly Zeitschrift für Operations Research)
5. Co-editor: International Game Theory Reviews, international journal published by World Scientific.

Research Interests

Operations Research/Optimization with emphasis on Markov Decision Processes; Theory of Games; Environmental Modelling; Optimal Control; Linear and Nonlinear Programming, and the applications of the above in engineering and economics.

Grants and Contracts

Associate investigator on AFOSR Grant 78-3495B. Professor T.E.S. Raghavan from the University of Illinois at Chicago was the principal investigator of this grant. Duration : Jan 81-Nov 81.

Principal investigator on NSF Grant ECS-8204677. Project titled "Problems in Stochastic Games and Dynamic Programming Arising out of The Traveling Inspector Model". Duration : May 82-Oct 84.

Principal investigator on a project funded jointly by the AFOSR and the NSF under grant ECS-8503440. Project titled "Sequential Stochastic Decision Processes". Duration : June 85-June 87.

Principal investigator on a project funded jointly by the AFOSR and the NSF under grant ECS-8704954. Project titled "Sequential Stochastic Decision Processes II". Duration : July 87-July 89.

IPA agreement with the Environmental Protection Agency for 25 percent of academic year salary, and an option for 100 percent summer salary. Duration : Oct 86-June 92.

Research consultancy with the US Environmental Protection Agency, Washington DC. Project titled "Windows for IMAGE". Duration : 1993.

Research consultancy with World Resources Institute, Washington DC. Project titled "Analytical Tools for the Enhancement of Integrated Models of Greenhouse Effect". Duration : April 93-March 94.

Principal investigator on Australian Research Council (Large Grant) A49532 206 (joint with Dr V. Gaitsgory). Project titled "Singular Perturbations of Controlled Markov Chains and Hybrid Systems". Duration :1995-97.

Research Assistance Grant from US Environmental Protection Agency, Washington, DC. Project titled "Environmental Indicators". Duration: 1995-1998.

Principal investigator on Australian Research Council (Large Grant) (joint with Dr V. Gaitsgory). Project titled "Stochastic and Differential Games". Duration : 1997-99.

Principal Supervisor on Australian Postgraduate Award (Industry) with SARDI, Fisheries Division. Project titled "Development of a Seagrass-fisheries habitat model for Gulf St. Vincent". Duration 1997-99.

Research agreement with Defense Science and Technology Organisation to adapt state-of-the-art operations research, optimisation and simulation methodologies for use in the A21 Restructuring of the Army battlelab process. Duration 1997-2000.

Principal investigator on Australian Research Council (Large Grant) (joint with Dr V. Gaitsgory). Project titled "Singular Perturbations of Controlled Markov Chains and Hybrid Systems II". Duration : 1999-2001.

Principal investigator on Australian Research Council (Large Grant) (joint with Dr V. Gaitsgory and Assoc. Prof. Howlett). Project titled "Asymptotic Mathematical Programming". Duration : 2000-2002.

Chief Investigator on a grant from the Sir Ross and Sir Keith Smith Fund (joint with Drs D. McMichael and A. Grant). Project titled: "Air Traffic Surveillance and Management". Duration: 1999-2002.

Chief Investigator on a grant from the Drug and Alcohol Council of South Australia (joint with Dr Y.. Kaya). Project titled: "Dynamic Modelling of Drug User Populations". Duration: 2000-2002.

Research agreement with Defense Science and Technology Organisation to investigate the techniques of aggregation of measures of performance within the context of network centric warfare. Duration 2000-2001.

Research agreement with Defense Science and Technology Organisation to investigate applicable cost-benefit methods for military systems. Duration 2001-2002.

Chief Investigator on a grant from the Sir Ross and Sir Keith Smith Fund (joint with Dr D. Panton). Project titled: "Optimisation of Air Traffic Flows". Duration: 2002-2004.

Chief investigator on Australian Research Council (Discovery Grant) (joint with Drs J. Gondzio and P. Zograf). Project titled "Hamiltonian Cycles, Controlled Markov Chains, Nonconvex Optimisation and Spectral Analysis ". Duration : 2003-2005.

Professional Societies and Service

Served as an ordinary member of the Council of the Australian Mathematics Society

Full member of ORSA : the Operations Research Society of America

Chairman, International Program Committee for the 7th Symposium on Dynamic Games held in Japan in December 1996.

From 1984-85 served as the Treasurer of the Maryland Chapter of ORSA

Organized or helped organize a number of workshops, mini symposia, special interest tracks, or sessions in OR, Control Theory and Environmental Modeling. I organized and co-chaired the 7th International Symposium on Dynamic Games held in Adelaide in December 2002.

Consulting Experience

Statistical consulting of varied nature, including the use of data in litigation. Operations Research and Statistical consulting for the US Environmental Protection Agency. In this capacity I have worked on projects ranging from the design of efficient enforcement strategies, to the evaluation of hazardous waste ranking system. The agency developed software implementing a statistical/optimization model that I designed. Consulting for the World Resources Institute from 1992-1995. I helped design the WIM (Windows for IMAGE) software package that contains a user-friendly version of IMAGE 1.0, the Dutch greenhouse model (this was done for the US Environmental Protection Agency). Since 1998 I have consulted extensively for the Australian Defense Science and Technology Organisation (DSTO).

PUBLICATIONS:

Book

"Competitive Markov Decision Processes - Theory, Algorithms, and Applications" Springer-Verlag, New York, 1996. Co-authored with O.J. Vrieze.

Book (under contract)

"Analytic Perturbation Theory and Applications" under contract with SIAM to be published in their Studies in Applied Mathematics Series. Co-authored with P.G. Howlett and K. Avrachenkov.

Edited Volumes

"Control and Game Theoretic Models of the Environment", Co-edited with C. Carraro, Birkhauser, New York, 1995.

"Contributions to Dynamic Games", Co-edited with V.Gaitsgory and K. Mizukami, Birkhauser, New York, 2000.

"Markov Processes and Controlled Markov Chains", Co-edited with A. Chen and Hou Zhenting, Kluwer, Boston, 2002.

Research papers (excluding restricted defense and commercial in-confidence reports):

I. In the area of Game Theory

1. "Estimation of Strategies in a Markov Game", Naval Research Logistics Quarterly, 23, (1976) pp.469-480.
2. "Ordered Field Property for Stochastic Games When the Player Who Controls Transitions Changes from State to State", Journal of Optimization Theory and Applications, Vol.34, #4, (1981) pp.503-513.
3. "A Single Loop Stochastic Game Which One Player Can Terminate", OPSEARCH, Vol.18, #4, (1981) pp.185-203.
4. "An Algorithm for Solving S-Games", SIAM J. on Control and Optimization, Vol.20, #6 (1982) pp.763-769. Co-authored with T.E.S.Raghavan. An abbreviated version has also appeared in the Proceedings of the 21st IEEE Conference on Decision and Control, (1982) pp. 172-175.
5. "A Finite Algorithm for the Switching Control Stochastic Game" OR. Spectrum, 5, (1983) pp.15-24. Co-authored with O.J. Vrieze, S.H. Tijs, and T.E.S. Raghavan.
6. "Semi-Antagonistic Equilibrium Points and Action Costs" Cahiers Du Centre D'Etudes De Recherche Operationelle, Vol.26, (1984) pp.227-239.
7. "The Completely Mixed Single-Controller Stochastic Game" Proceedings of the American Mathematical Society, Vol.95, #4, (1985) pp.585-594.
8. "A Matrix Game Solution of the Single-Controller Stochastic Game" Mathematics of Operations Research, Vol.9, #3, (1984) pp.356-362. Co-authored with T.E.S. Raghavan.
9. "On Stationary Equilibria of a Single-Controller Stochastic Game" Mathematical Programming, Vol.30, (1984) pp.313-325.
10. "Quadratic Programming and the Single-Controller Stochastic Game" Journal of Mathematical Analysis and Applications, Vol.113, (1986) pp.136-147.
11. "The Single-Controller Stochastic Game and the Traveling Inspector Model" In Methods of Operations Research, #51, Springer-Verlag Lecture Notes Series, (1984) pp.297-306.
12. "Bilinear Programming and Structured Stochastic Games" Journal of Optimization Theory and Applications, Vol.53, #1, (1987) pp.85-104. Co-authored with T.A. Schultz.
13. "On the Computation of Equilibria in Discounted Stochastic Games" In :T. Basar (editor) Dynamic Games and Applications in Economics, Springer-Verlag Lecture Notes in Economics and Mathematical Systems, (1985) pp.64-87. Co-authored with M. Breton, A. Haurie, and T.A. Schultz. An abbreviated version has also appeared in Journal of Economic Dynamics and Control, Vol.10, (1986) pp.33-36.
14. "Nonlinear Programming and Stationary Strategies in Stochastic Games" Mathematical Programming, Vol.35, (1986) pp.243-247. Co-authored with T.A. Schultz.
15. "Nonlinear Programming and Stationary Nash Equilibria of Stochastic Games" In : S. Jian, and Y.C. Ho (Editors), The Proceedings of the 1986 IFAC Workshop on Modeling Decision, Beijing, China, (1986) pp.297-306.
16. "On the Algorithm of Pollatschek and Avi-Itzhak" In: T.E.S.Raghavan, T.S. Ferguson, T. Parthasarathy, and O.J. Vrieze (editors), Stochastic Games and Related Topics, Kluwer academic publishers (1991), pp.59-70. Co-authored with B. Tolwinski.

17. "Algorithms for Stochastic Games - A Survey" *Zeitschrift für O.R.* Vol.35, (1991), pp.437-472. Co-authored with T.E.S. Raghavan.
18. "Nonlinear Programming and Stationary Equilibria of Stochastic Games". *Mathematical Programming*, Vol.50, (1991), pp.227-237. Co-authored with T.A. Schultz, F. Thuijsman, and O.J. Vrieze.
19. "Weighted Reward Criteria in Competitive Markov Decision Processes", *Zeitschrift für O.R.* , Vol.36, (1992) pp.343-358. An abbreviated version has appeared in *Proceedings of the 6th IFAC Symposium on Dynamic Modelling and Control of National Economies*, (1989), pp.93-98. Co-authored with O.J. Vrieze.
20. "On the Puiseux Series Expansion of the Limit discount Equation of Stochastic Games", *SIAM J. on Control and Optimization* , Vol. 35 (1997) pp.860-875. Co-authored with W. Szczechla, S. Connell and O.J. Vrieze.
21. "Discounted Stochastic Games, a Complex Analytic Perspective", *Annals of the International Society of Dynamic Games* , Birkhauser, Boston, (1999). Co-authored with S. Connell, W. Szczechla and O.J. Vrieze.
22. "Dynamic Cooperative Game Theory", *International Game Theory Review*, Vol. 2, (2000), No. 1, pp. 47-65. Co-authored with L. Petrosjan.

II. In the area of Markov Decision Processes

23. "Percentiles and Markov Decision Processes" *OR Letters*, Vol.2, #1, (1983) pp.13-15.
24. "Gain/Variability Tradeoffs in Undiscounted Markov Decision Processes" *Proceedings of the 24th Conference on Decision and Control*, (1985) pp.1106-1112. Co-authored with H.M. Lee.
25. "Multiobjective Markov Decision Process with Average Reward Criterion" *Large Scale Systems*, Vol.10, (1986) pp.215-226. Co-authored with S. Durinovic, M.N. Katehakis and H.M. Lee.
26. "Variance-Penalized Markov Decision Process" *Mathematics of Operations Research*, Vol.14, (1989) pp.147-161. Co-authored with L.C.M. Kallenberg, and H.M. Lee.
27. "Communicating MDPs : Equivalence and LP Properties" *Operations Research Letters*, Vol.7, (1988) pp.303-307. Co-authored with T.A. Schultz.
28. "Percentile Objective Criteria in Average Reward Markov Decision Processes" *Proceedings of the 28th IEEE Conference on Decision and Control*, (1989), pp.1273-1276. Co-authored with D. Krass and K. Ross.
29. "A Weighted Markov Decision Process" *Operations Research* , Vol.40 (1992) pp.1180-1187. Co-authored with D. Krass and S. Sinha.
30. "Percentile Optimality in Limiting Average Markov Decision Processes" *IEEE Transactions on Automatic Control*, Vol.40 (1995) pp.2-10. Co-authored with D. Krass and K.W. Ross.
31. "Semi-Infinite Markov Decision Processes", *Mathematical Methods of Operations Research* , Vol. 51, (2000), pp. 115-137. Co-authored with M. Chen, and Ke Liu.
32. "Linear Program for Communicating MDPs with Multiple Constraints" In: (eds: Z. Hou et al) *Markov Processes and Controlled Markov Chains*, Kluwer, Dordrecht, (2002) pp. 245-254. Co-authored with Xianping Guo.

III. In the area of Singularly Perturbed Systems

33. "Singularly Perturbed Markov Control Problem: Limiting Average Cost" *Annals of Operations Research*, Vol.28, (1991), pp.153-168. An abbreviated version has appeared in: *Proceedings of the 28th IEEE Conference on Decision and Control*, (1989), 1263-1266. Co-authored with T.Bielecki.
34. "Algorithms for Singularly Perturbed Limiting Average Markov Control Problems" *IEEE Transactions on Automatic Control* Vol.37, (1992), pp.1421-1425. Co-authored with M. Abbad, and T.R. Bielecki.
35. "Perturbation and Stability Theory for Markov Control Problems" *IEEE Transactions on Automatic Control* Vol.37, (1992) pp.1415-1420. Co-authored with M. Abbad.
36. "Singularly Perturbed Semi-Markov Control Problem" *Proceedings of the 30th IEEE Conference on Decision and Control*, (1991) pp.489-493. Co-authored with M. Abbad.
37. "Singularly Perturbed Limiting Average Stochastic Game Problems" In: B.Dutta et al. (eds), *Lecture Notes in Economics and Mathematical Systems #389* (1992) pp.69-97. Co-authored with M. Abbad.
38. "The ϵ^2 - Perturbation of a Markov Decision Process" *Proceedings of the 30th IEEE Conference on Decision and Control*, (1991) pp.465-470. Co-authored with M. Abbad.
39. "Weighted Markov Decision Processes with Perturbation", *Proceedings of the 34th IEEE Conference on Decision and Control*, (1995), New Orleans, pp. 2269-2276. Co-authored with Ke Liu.
40. "Algorithms for Singularly Perturbed Markov Control Problems: A Survey", *Control and Dynamic Systems*, Vol.73 (1995), pp. 257-286. Co-authored with M. Abbad.
41. "Asymptotic Linear Programming and Policy Improvement for Singularly Perturbed Markov Decision Processes", *Mathematical Methods of Operations Research*, Vol. 49 (1999), pp. 97-110. Co-authored with E. Altman and K. Avrachenkov.
42. "Weighted Markov Decision Processes with Perturbation", *Mathematical Methods of Operations Research*, Vol. 53, (2001), pp: 465-480. Co-authored with Ke Liu.
43. "Singular perturbations of Markov chains and decision processes", In: Feinberg, E.A. and Shwartz, A. (eds.), *Handbook of Markov Decision Processes*, Kluwer, Boston, (2001) pp. 113-152. Co-authored with Avrachenkov, K.A. and Haviv, M.

IV. In the area of Environmental Modeling and Assessment

44. "Ocean Response Times and the Greenhouse Forcing" In: R.G. Bell et al. (eds) *Coastal Engineering - Climate for Change*, Water Quality Centre Publication No.21, DSIR Marine and Fishwater, Hamilton, NZ (1991) pp.23-28. Co-authored with R.D. Braddock.
45. "System and Control Theory Perspectives of the IMAGE Greenhouse Model" In: T. Duncan and B. Pasik-Duncan (eds.) *Stochastic Theory and Adaptive Control*, Springer-Verlag Lecture Notes C. Series No.184, pp.54-68. Co-authored with D. Braddock and R. Zapert.
46. "The IMAGE Greenhouse Model as a Mathematical System", *Applied Mathematical Modelling*, Vol.18 (1994) pp.234-254. Co-authored with R. Braddock, R. Zapert, J. Rotmans and M. den Elzen.
47. "Uncertainty Analysis of a Greenhouse Model". In: A. Haurie and C Carraro (eds.) *Operations Research and Environmental Management* (1996). Co-authored with R. Zapert.

48. "An Application of Optimization to the Problem of Climate Change" In: P.M. Pardalos and C.A. Floudas (eds.) *Nonconvex Optimization and Its Applications*, Volume 7 (1995) Co-authored with P.S. Gaertner and M.A. Janssen
49. "A regional allocation of world CO₂ emission reductions", *Mathematics and Computers in Simulation*, Vol. 43 (1997), pp. 269-275. Co-authored with P.S. Gaertner.
50. "Relative Contribution of the Enhanced Greenhouse Effect on the Coastal Changes in Louisiana". In: W.E. Martin and L.A. McDonald (eds.) *Modeling Environmental Policy* (1997), pp. 161-184, Kluwer, New York. Co-authored with I. Curiel and R. Zapert.
51. "Stochasticity in the IMAGE Greenhouse Model". *Mathematical and Computer Modelling*, Vol. 22 (1995), pp. 15-22. Co-authored with R.D.Braddock and R. Zapert.
52. "Uncertainty Propagation within an Integrated Model of Climate Change", *Energy Economics*, Vol. 20, (1998), pp. 571-598. Co-authored with R. Zapert, and P.S. Gaertner.
53. "Uncertainty in Environmental Models: Dynamic Systems Perspective." In: *The Co-Action between Living Systems and the Planet*. H. Greppin, R. Degli Agosti and C. Pennel. University of Geneva Press, 1-20, (1998). Co-authored with A. Haurie.
54. "Environmental Assessment Based on Multiple Indicators" *Calcutta Statistical Association Bulletin*, Vol. 54 (2003), pp. 93-104. Co-authored with N. P. Ross and M-L. Wu.

V. In the area of Systems and Control Theory

55. "Control of Singularly Perturbed Hybrid Stochastic Systems". *IEEE Transactions on Automatic Control*, Vol. 46, (2001), No. 2, pp: 179-190. Preliminary version appeared in the *Proceedings of the 35th IEEE CDC*, (1996), pp. 511-516. Co-authored with A. Haurie and V. Gaitsgory.
56. "Asymptotic Analysis of a Stochastic Manufacturing System with Slow and Fast Motions". *Proceedings of the 35th IEEE Conference on Decision and Control*, (1996), pp.531-532. Co-authored T.R. Bielecki and V. Gaitsgory.
57. "Optimal Ergodic Control of Singularly Perturbed Hybrid Stochastic Systems". *Lectures in Applied Mathematics: Proceedings of 1996 AMS-SIAM Summer Seminar* (1997), pp 101-126. Co- authored with A. Haurie.
58. "Stability Analysis and Controller Design for a Class of Uncertain Systems with Markovian Jump Parameters", *Journal of Mathematical Control and Information*, Vol. 17, (2000), pp: 179-190.. Co-authored with P. Shi.
59. "Two Time Scale Production Model", *Automatica*, Vol. 37, (2001), pp: 1505-1513. Co-authored with A. Haurie.
60. "Decomposition and Parallel Processing Techniques for Two-Time Scale Controlled Markov Chains", *Proceedings of the 39th IEEE Conference on Decision and Control*. Co-authored with Gondzio, J., Haurie, A., Moresino, F. and Vial, J.-Ph. (2000).

VI. In the area of Operations Research and Mathematical Programming

61. "The Embedding of the Traveling Salesman Problem in a Markov Decision Process" *Proceedings of the 26th IEEE Conference on Decision and Control*, (1987) pp.2255-2263. Co-authored with D. Krass.
62. "Hamiltonian Cycles, Quadratic Programming, and Ranking of Extreme Points" In: C. Floudas and P. Pardalos (eds) *Global Optimization*, Princeton University Press, (1992) pp.32-49. Co-authored with Ming Chen.

63. "Hamiltonian Cycles and Markov Chains" *Mathematics of Operations Research*, Vol.19 (1994) pp.223-237. Co-authored with D. Krass.
64. "Hamiltonian Cycle Problem and a Singularly Perturbed Markov Decision Process". In: T. Ferguson, J. MacQueen and L.S. Shapley (eds.) *IMS Lecture Notes - Monograph Series*, Vol. 30, special volume honoring David Blackwell (1997). Co-authored with Ke Liu.
65. "Hamiltonian Cycle Problem via Markov Chains and Min-type Applications", in (ed. P.M. Pardalos) *Approximation and Complexity in Numerical Optimization: Continuous and Discrete Problems*, Kluwer, (2000) pp. 31-47. Co-authored with Andramonov, M., Pardalos, P. and Rubinov, A.
66. "Asymptotic Analysis of Perturbed Mathematical Programs", *Journal of Mathematical Analysis and Applications*, vol. 251, (2000) pp. 132-156. Co-authored with Coulomb, J.M., and Szczechla, W.
67. "A non-standard branch and bound method for the Hamiltonian cycle problem" *ANZIAM J.* 42 (E) (2000), pp. C586--C607 (formerly *J. Aust. Math. Soc., Series B*). Co-authored with J-B. Lasserre.
68. "Asymptotic Simplex Method", *Operations Research Letters*, Vol. 30 (5), (2002), pp. 295-307. . Co-authored with E. Altman and K. Avrachenkov.
69. "Hamiltonian Cycles and Singularly Perturbed Markov Chains," *Mathematics of Operations Research* , Vol. 29 (1), (2004), pp. 114-131. Co-authored with V. Ejev and M-T. Nguyen.
70. "Geometric interpretation of Hamiltonian Cycles problem via singularly perturbed Markov decision processes;" *Optimization* Vol. 52, pp. 441-458. Co-authored with V. Ejev and J. Thredgold.
71. "An interior point heuristic for the Hamiltonian cycle problem via Markov decision processes" *Journal of Global Optimization* (to appear). Co-authored with V. Ejev and J. Gondzio.

VII. In the area of general mathematical topics

72. "Some Comments on a Theorem of Hardy and Littlewood" *Journal of Optimization Theory and Applications* Vol.75 (1992) pp.201-208. Co-authored with R. Sznajder.
73. "Cesaro Limits of Analytically Perturbed Stochastic Matrices" *Linear Algebra and Applications* Vol 353 (1-3) (2002) pp. 227-243. Co-authored with H. Krieger and Z. Syed.
74. "Mathematical Models" In: *KNOWLEDGE FOR SUSTAINABLE DEVELOPMENT An Insight into the Encyclopedia of Life Support Systems*, UNESCO/EOLSS, released at the World Summit on Sustainable Development, September 2002, Johannesburg, South Africa.
75. "Directed graphs, hamiltonicity and doubly stochastic matrices", *Random Structures and Algorithms* (to appear). Co-authored with V.S. Borkar and V.Ejev.

VIII. In the area of miscellaneous applications

76. "Player Aggregation in the Traveling Inspector Model" *IEEE Transactions on Automatic Control*, Vol.AC-30, (1985) pp. 723-729.
77. "The Traveling Inspector Model" *OR Spectrum*, Vol.8, (1986) pp.33-36. Co-authored with T.A. Schultz.

78. "Inspection Optimization Model" *Socio-Economic Planning Science*, Vol.28 (1994) pp.137-146. Co-authored with D. Nickerson and N.P. Ross.
79. "How Airlines and Airports Recover from Perturbations: A Survey", *Annals of OR*, Vol. 108, (2001), pp. 315-333 . Co-authored with Manyem, P. and White, K.
80. "Air Traffic Management at Sydney with Cancellations and Curfew Penalties" In: (eds. P. Pardalos and V. Korotkich) *Optimization and Industry: New Frontiers*, Kluwer, Boston (2003), pp. 113-140. Co-authored with Manyem P., White K. and M. S. Visser.
81. "Finite Horizon Portfolio Risk Models with Probability Criterion" In: (eds: Z. Hou et al) *Markov Processes and Controlled Markov Chains*, Kluwer, Dordrecht, (2002) pp. 405-424. Co-authored with Yuanlie Lin and Ke Liu.
82. "Heroin Users in Australia: Population Trends", *Drug and Alcohol Review*, Vol. 23. (2004), pp. 107-118. Co-authored with C.Y. Kaya, Y.Tugai, M.R. Agrawal, R.L. Ali, L.R. Gowling and R. Cooke.

Doctoral Students

1. Huey-Miin Lee: Thesis title "Gain-Variability Tradeoffs in Markovian Decision Processes" - Successfully defended on September 26, 1985 (The Johns Hopkins University).
2. Todd Schultz: Thesis title "Algorithms for Solving Stochastic Games and Their Applications" - Successfully defended on March 24, 1987 (The Johns Hopkins University).
3. Dmitry Krass: Thesis title "Contributions to the Theory of Markov Decision Processes" - Successfully defended on June 16, 1989 (The Johns Hopkins University). Received honorable mention in the 1988 Nicholson Student Paper Competition, for a manuscript based on his thesis.
4. Mohammed Abbad: Ph.D. student. Thesis title "Perturbation and Stability Theory for Markov Control Problems" - Successfully defended on May 17, 1991 (UMBC).
5. Chen Ming: Ph.D. student. Thesis title "Some Mathematical Programming Problems Arising from Markov Decision Processes" - Successfully defended on May 8, 1992 (UMBC).
6. Radoslaw Zapert: Ph.D. student. Thesis title "Uncertainty Analysis of Greenhouse Effect Models" - Successfully defended on April 29, 1994 (UMBC).
7. Paul Gaertner: Thesis title "Optimisation Analysis Applied to Integrated Models of the Enhanced Greenhouse Effect" (UniSA; approved June, 1997).
8. Ke Liu: Thesis title "Theory and Applications of Markov Decision Processes and Their Perturbations" (UniSA; approved September, 1997).
9. Belinda Chiera: Thesis topic "Greenhouse and the Australian Coastline" (UniSA; approved August, 2000).
10. Konstantin Avrachenkov: Thesis topic "Singularly Perturbed Operators and MDPs" (UniSA; approved, September 2000).
11. Lynne McArthur: Thesis topic: "Modelling South Australian Sea Grass Habitats" (UniSA; approved, March 2003).
12. Kevin White: Thesis topic: "Airport Recovery Problem" (UniSA; 3rd year).
13. Manju Aggrawal: Thesis topic: "Dynamic Modelling of Drug Users in Australia" (UniSA; 3rd year).

14. Kang Boda: Thesis topic: "Analysis of Risk in Multi-Stage Decision Processes" (UniSA; 1st year).

Master's (by thesis) Student

1. Nikoleta Tomecko : Thesis topic "Optimal Player Assignments in Australian Rules Football" (UniSA, approved February 2000)

Major Invited Lectures and Conference Addresses (* denotes tutorial or plenary lecture)

"Semi-antagonistic Equilibrium Points and Action Costs", Game Theory Day, University of Nijmegen, The Netherlands, August 1982.

"An Algorithm for Solving S-Games and Differential S-Games", SIAM sponsored paper, 21st IEEE Conference on Decision and Control, Orlando, Florida.

"Player Aggregation in the Travelling Inspector Model", Oberwolfach Institute's meeting on Mathematical Game Theory, Oberwolfach, Germany 1984.

"Gain-Variability Tradeoffs in Markov Decision Processes", Optimization Days, University of Montreal, Montreal, Canada, May 1985.

"Algorithms for Stochastic Games and Related Inspection Problems", 1986 IFAC Workshop on Modeling Decisions and Games, Beijing, China, August 1986.

"On Stationary Equilibria of Stochastic Games", Optimizatop Days, University of Quebec, Canada, May 1987.

"Mathematical Programming and Stochastic Games", International Workshop on Stochastic Games, University of Illinois, Chicago, Illinois, June 1987.

"The Traveling Salesman Problem and Markov Decision Processes", Game Theory Day, University of Nijmegen, The Netherlands, August 1987.

"Mathematical Programming and Stationary Equilibria of Stochastic Games", 12th Symposium on Operations Research, Passau, Germany, September 1987.

"Mathematical Programming and Stationary Equilibria of Stochastic Games", Workshop on Incentives, Stochastics, and Cooperation in Game Theory, University of Bielefeld, Germany, September 1987.

"An Embedding of the Traveling Salesman Problem in a Markov Decision Process", 26th IEEE Conference on Decision and Control, Los Angeles, December 1987.

"Horizon-sensitivity in Markov Decision Processes and Stochastic Games", Oberwolfach Institute's meeting on Mathematical Game Theory, Oberwolfach, Germany, January 1989.

"Weighted Reward Criteria in Competitive Markov Control Problems", The 6th IFAC Symposium on Dynamic Modelling and Control of National Economies, Edinburgh, Scotland, June 1989.

"Singular Perturbations of Markov Control Problems", The 28th IEEE Conference on Decision and Control, Tampa, Florida, December 1989.

*"Nonlinear Programming and Markov Control Problems, A four lecture mini-course at the Rijksuniversiteit Limburg, The Netherlands, December 1989.

"Potential Military Applications of Markov Control Problems", TIMS/ORSA Joint National Meeting, Las Vegas, May 1990.

"Mathematics and Environmental Modeling", Australian Environmental Studies, Griffith University, Brisbane, Australia, October 1989.

"Perturbation and Stability Theory for Markov Control Problems", International Conference on Game Theory and Economic Applications, Indian Statistical Inst., New Delhi, December 1990.

"An Overview of IMAGE", EPA Conference on Statistics, Richmond, March 1991. "Systems Analysis and Control Approach to Global Change Modeling", Workshop of the International Academy of the Environment, Universite de Geneve, Geneva, July 1991.

"Perturbation and Stability Theory for Markov Control Problems", Workshop on Stochastic Estimation and Control, Mexico City, Mexico, August 1991.

"A System Theoretic Approach to the Modeling of the Greenhouse Effect", Stochastic Theory and Adaptive Control Workshop, University of Kansas, September 1991.

"Control and Game Theoretic Perspectives of Greenhouse Modelling", Workshop on Environmental Modelling at the Academy of the Environment, Geneva, July 1992.

*"Greenhouse Modelling; Control/System Theoretic Approach to Greenhouse Effect", The 29th Australian Applied Mathematics Conference, Hahndorf, February 1993.

"Greenhouse Modelling ; Control/System Theoretic Approach", Department of Mathematics, La Trobe University, Melbourne, April 1993.

"Asymptotic Behaviour of the Limit-Discount Equation of Stochastic Games", Conference on Applied Probability, Paris, June 1993.

"Hamiltonian Cycles, Markov Chains and Quadratic Programming", Conference on Applied Probability Theory, Paris, June 1993.

"Algorithms for Finite State Stochastic Games", Institut National De Recherche En Informatique Et En Automatique (INRIA), Sophia Antipolis, June 1993.

"Greenhouse Modelling ; Control/System Theoretic Approach", Department of Mathematics, University of Strathclyde, Glasgow, June 1993.

*"Mathematical Modelling and Computer Interface as Means of Communication in Environmental Modelling", International Workshop on Operations Research and Environmental Modelling, International Academy of the Environment, Geneva, Switzerland, November 1993.

"Mathematical Modelling and Computer Interface as Means of Communication in Environmental Modelling", Department of Economics, University of Tilburg, The Netherlands, November 1993.

"Mathematical Modelling and Computer Interface as Means of Communication in Environmental Modelling", Department of Mathematics, Delft University, The Netherlands, December 1993.

"Hamiltonian Cycles and Markov Chains", TIMS/ORSA Joint National Meeting, Boston, April, 1994.

"System Theoretic Approach to Greenhouse Effect", School of Forestry, Yale University, New Haven, April 1994.

"An Application of Optimization to the Problem of Climate Change", Department of Agricultural Engineering, Cornell University, April 1995.

"An Application of Optimization to the Problem of Climate Change", State-of-the-Art in Global Optimization conference, Princeton University, April 1995.

"An Application of Optimization to the Problem of Climate Change", Department of Mathematics, Deakin University, May 1995.

*"Mathematics of Discounting and Averaging", 40th Annual Conference of the Australian Mathematical Society, Adelaide, Australia, July 1996.

"Mathematical Analysis and Applications", Weizmann Institute of Science, Israel, July 1997.

"Perturbation Theory for Markov Decision Processes", Technion, Israel, July 1997.

"An Application of Optimization to the Problem of Climate Change", Fondazione Eni Enrico Mattei, Venice, July 1997.

"The Mathematics of Discounting and Averaging", Universität Ulm, Germany, July 1997.

*"Asymptotic Simplex and Singularly Perturbed Linear Programs", Academia Sinica, China, March 1998, seminar during a research tour sponsored by the National Science Foundation of China

"Hamiltonian Cycles and Singularly Perturbed Markov Chains", Tsinghua University, China, March 1998 seminar during a research tour sponsored by the National Science Foundation of China

"The Mathematics of Discounting and Averaging", Paul Sabatier University, Toulouse, France, May 1998

"Uncertainty Propagation in Models of the Enhanced Greenhouse Effect", Chinese University of Hong Kong, Hong Kong, December 1998.

"Control Theoretic Perspective of Integrated Models of the Enhanced Greenhouse Effect", Technical University of Vienna, April, 1999

*"Modelling Stochasticity in Environmental Models", Workshop on Statistical Science & Environmental Policy, Indian Statistical Institute, Calcutta, January 2000.

*"Singular Perturbations in a Range of Optimisation Problems" The 36th ANZIAM Applied Mathematics Conference, New Zealand, February 2000.

"Perturbations and Uncertainty in Models with Enhanced Greenhouse Effect Illustrations", Georgia Institute of Technology, May, 2001.

*"Model Uncertainty and Modelling of Uncertainty", NCCR Climate WP4 Workshop on Climate Risk Assessment, Sils-Maria, Switzerland, October 2001.

"Hamiltonian Cycles, Markov Chains and Indefinite Quadratic Programming", Applied Mathematics seminar, Carnegie-Mellon University, March 2002.

"Model Uncertainty and Modelling of Uncertainty with Greenhouse Illustrations", Statistics Colloquium, University of Maryland at Baltimore County, April, May 2002.

"Model Uncertainty and Modelling of Uncertainty", MSSE seminar, Stanford University, May 2002.

"Ground Holding and Airport Recovery Problems", presentation at the Boeing Research Laboratories, Seattle, May 2002.

"Data Envelopment and Environmental Indicators", Invited Paper, TIESS 2002, Genoa, Italy, June 2002.

"Cesaro Limits of Perturbed Markov Chains", Workshop on Optimal Stopping and Stochastic Games, Polish Academy of Science, Bedlewo, Poland, July 2002.

“Cesaro Limits of Perturbed Markov Chains”, The 10th ISDG Symposium, St Petersburg, Russia, July 2002.

“Hamiltonian Cycles, Markov Chains and Indefinite Quadratic Programming”, Research Seminar, INRIA, Sophia-Antipolis, France 2002.

“Sustainable Manufacturing Systems” Public Lecture in University of South Australia’s Sustainability Lecture Series, Adelaide, May 2003.

Subjects Taught

1. University of Illinois at Chicago
 - (a) Math 109 : Finite Mathematics
 - (b) Math 111 : Practical Calculus I
 - (c) Math 112 : Practical Calculus II
 - (d) Math 220 : Differential Equations
 - (e) Math 370 : Introduction to Probability Theory

2. University of Minnesota, St.Paul/Minneapolis
 - (a) Stats 1051 : Introduction to Statistics

3. The Johns Hopkins University
 - (a) 55.307-8 : Theory of Games
 - (b) 55.609 : Advanced Linear Programming
 - (c) 55.691 : Advanced Game Theory
 - (d) 55.303-4 : Foundations of Optimization - Algorithms
 - (e) 55.301 : Matrix Analysis and Linear Algebra
 - (f) 55.319 : Dynamic Systems
 - (g) 55.345-6 : Introduction to Optimization
 - (h) 55.692 : Topics in Control Theory

4. University of Maryland Baltimore County
 - (a) Math 650-1 : Foundations of Optimization - Algorithms
 - (b) Math 740 : Topics in Systems Theory and Optimization
 - (c) Math 380 : Introduction to Operations Research
 - (d) Math 382 : Deterministic Methods of Operations Research
 - (e) Math 740 : Markov Decision Processes
 - (f) Math 484 : Stochastic Methods in Operations Research

5. University of South Australia
 - (a) Math 01708 : Operations Research 3
 - (b) Math 03632 : Decision Science
 - (c) Math 07893 : Markov Decision Processes & Applications
 - (d) Math 07894 : Advances in the Theory of Linear Programming
 - (e) Math 07895 : Introduction to Game Theory

6. Harvey Mudd College, Claremont, California
 - (a) Math186 : Stochastic Operations Research
 - (b) Math189 : Mathematical Modeling of Natural Resources

July 2003