**STUART MCDONALD**
www.ist.caltech.edu/~smcdonald
smcdonald@ist.caltech.edu

**CALIFORNIA INSTITUTE OF TECHNOLOGY**

**Office Contact Information**
California Institute of Technology MC 136-93
Pasadena, CA 91125
Phone: (626) 395 1765

**Home Contact Information**
Home: (626) 696 3012
Cell: (626) 319 8361
Fax: (626) 793 4681

**Current Employment:**

California Institute of Technology: Research Fellow, Social and Information Systems Laboratory, 2006 – 2008

University of Queensland, QLD, Australia: Assistant Professor, School of Economics, 2005 – Present (Two years sabbatical while at the Caltech)

**Eduction:**

Doctor of Philosophy, University of Queensland, QLD, Australia, 2007

Thesis Title: *Time Horizon and Uncertainty in Continuous Time Finance: Preferences for Information and Term Structure Modeling*

Bachelor of Arts Hons 1, University of Queensland, QLD, Australia, 1999
Thesis Title: *Convergence Conditions for the Training of Feed-Forward Neural Networks with the EM Algorithm*

Bachelor of Economic Hons 2a, University of Queensland, QLD, Australia, 1997
Thesis Title: *A Dynamic General Equilibrium Model of the Information Economy*

**Research Fields:** Microeconomic Theory, Public Economics, Mathematical Finance, Financial Economics and Operations Research

**Teaching Fields:** Microeconomics, Public Economics, Industrial Organization, Regulatory Economics, Financial Economics, Mathematical Economics and Operations Research

**Grants, Fellowships and Honors:**

| | |
|---|---|
| 2006 - 08 | California Institute of Technology: Social and Information Sciences Laboratory Fellowship |
| 2005 - 06 | Australian Research Council Center for Complex Systems: ACCS Grant, "Computational Game Theory, $38,000 |
| 2005 | University of Queensland: New Staff Start-Up Research Grant, $12,000 |
| 2004 | Australian Research Council Center for Complex Systems: Postdoctoral Research Fellowship |
| 2002 | Society for Computational Economics: Student Prize of the Society of Computational Economics |
| 2000 | International Society for Dynamic Games: Student Prize of the International Society for Dynamic Games |

**Teaching Experience:**

2005 - Present University of Queensland: Assistant Professor, School of Economics
- Teaching: Public Finance, Regulatory Economics, Financial Economics (MBA), Microeconomics
- Supervision: 2 PhD students, 3 Masters of Economics and Finance, 1 Masters of Resource Economics, 1 Bachelor of Economics Honors

2000 - 2003 University of Queensland: Associate Lecturer, School of Economics
- Teaching: Industrial Organization, Economic Dynamics and Control, Introductory Mathematical Economics, Introductory Mathematical Statistics

**Research Experience:**

2006-Present California Institute of Technology: Social and Information Systems Laboratory Fellow
- Project: Dynamic mechanism design with applications to pricing of pollution, natural resource and congestion

Jan-Mar 2006 Visitor, Division of Humanities and Social Sciences, California Institute of Technology
- Project: Theoretical examination of experimental evidence showing the existence of stable cycles between pure strategy equilibria in coordination games

2004 University of Queensland: Postdoctoral Research Fellow, ARC Center for Complex Systems
- Project: Evolving Economic Systems. Design and implementation of an agent based behavioral finance model explaining pricing bubbles in financial markets

2000-2003 University of Queensland: Research Officer, School of Economics and Centre for Economic Policy Modeling
- Project: Development of a multi-agent model of automobile gas pricing combing consumer search and dynamic oligopoly to create a dynamic spatial pricing model

August, 2001 University of Glasgow: Visitor, Institute of Life Sciences and Department of Mathematics
- Project: Numerical algorithms for pricing of derivatives in bond markets using stochastic partial differential equations

**Academic and Professional Service:**

California Institute of Technology: Organizer, Invited Workshop on Economic Dynamics and Dynamic Games, March 2008

California Institute of Technology: Organizer, SISL/Yahoo! Economic Theory Workshop, Huntington Beach, November 9-11, 2007

Econometrics Society: Organizing Committee, Australasian Econometric Society Meeting 2007, July 6-8, 2007

University of Queensland: Representative to the Engineering, Physical Sciences and Architecture Faculty Committee, 2005 – 2006

University of Queensland: Actuarial studies program curriculum design committee, School of Economics, University of Queensland, 2002

University of Queensland: Postgraduate Representative, School of Economics Research Committee, 2002-03

Australian Society of Operations Research (ASOR): Queensland Branch Committee, 2000-Present

Academic Refereeing: North American Journal of Economics and Finance, Asia-Pacific Journal of Operations Research, Australian Economic Papers, Review of Economic Design

**Invited Seminars and Presentations:**

University of Montreal: HEC, October 30, 2007: "The Market for Internet Services as a Tiebout Economy: An Application of the Shapley Value to the Pricing of Internet Services"

University of Southern California, Department of Economics, February 13, 2006: "The Market for Internet Services as a Tiebout Economy: An Application of the Shapley Value to the Pricing of Internet Services

ARC Centre for Complex Systems: Winter School of Complexity, University of Queensland, July 8-10 2005: "Short Course on Computational Methods and Information Based Complexity Applied to Non-Cooperative Game Theory"

World Congress of Game Theory, Marseilles, France, 2004: " Finding Traitors in Secure Networks Using Byzantine Agreements

Keele University, United Kingdom, Department of Economics, June 18, 2004: "Game Theoretic Formulation of the Byzantine General's Problem"

University of Adelaide: School of Economics, October 24, 2003: "The Market for Internet Services as a Tiebout Economy: "An Application of the Shapley Value to the Pricing of Internet Services"

Victoria University Wellington Department of Economics and Finance, December 8 and 9, 2002: (1) "Computing Perfection and Properness in Finite Games via Markov Chain Monte Carlo"; (2) "Interest Rate Term Structure as a Random Field

9th International Conference on Computation in Economics and Finance, Seattle, WA, 2003: "The Evolution of Preferences and Intertemporal Savings Behavior"

University of Sydney: School of Economics, October 31, 2002: "Inter-Temporal Savings Behavior and the Evolution of Preferences"

Econometrics Society Australasian Meeting, Brisbane, QLD, Australia, 2002: "Risk, Uncertainty and Social Cohesion"

8th International Conference on Computation in Economics and Finance, Aix-en-Provence, France, 2002: "Modeling Interest Rate Term Structure as a Random Field"

Australian Graduate School of Management, University of New South Wales, May 8 2002: "The Market for Internet Services as a Tiebout Economy: An Application of the Shapley Value to Pricing of Internet Services"

International Conference on Game Theory: Stony Brook, NY, 2001: (1) "Evolutionary Implementation" and (2) "Consistent Implementation"

Econometrics Society Australasian Meeting, Auckland NZ, 2001: "Evolutionary Implementation" and (2) "Consistent Implementation"

International Symposium on Dynamic Games, Adelaide, SA, Australia, 2000: "Computing the trembles of trembling hand perfection via simulated annealing"

Economic Society of Australia 29th Annual Conference of Economists, Gold Coast QLD Australia, 2000: "How about tomorrow? Procrastination as an optimal response to conference deadlines."

**Journal Publications:**

J. Zhang, J. Davies, J. Zeng and S. McDonald (2007) Optimal taxation in a growth model with public consumption and home production. *Journal of Public Economics* (In Press)

M. Bowden and S. McDonald (2007) The Impact of Interaction and Social Learning on Aggregate Expectations. *Computational Economics* (In Press)

L. Wagner and S. McDonald (2006) Finding Traitors in Secure Networks Using Byzantine Agreements. *International Journal of Network Security* (In Press)

R. Beard and S. McDonald (2006) Time Consistent Fair Water Sharing Agreements. *Annals of Dynamic Games* Vol. 9

**Other Peer Reviewed Publications:**

Bowden, M. & McDonald S (2006). Herd behaviour as a source of volatility in agent expectations. In: Costantino M and Brebbia C (Eds.), *Computational Finance and its Applications 2*. WIT transactions on modelling and simulation. WIT Press, Imperial College, London, UK. pp. 129-140.

S. McDonald and Wagner, L. (2004) Using Simulated Annealing to Compute the Trembles of Trembling Hand Perfection. *Proceedings of IEEE Congress on Evolutionary Computation 2003 Vol. 4*

R. Beard and S. McDonald (2000) Job Queues and Job Search: A Queueing Network Model of Labour Market Dynamics. A. Ohuchi (Ed*.) Putting OR/MS into Real Life: Proceedings of the Second Joint International Workshop, ORSJ-Hokkaido and ASOR-Queensland Branch*

S. McDonald (2000) The Market for Internet Services as a Tiebout Economy: An Application of the Shapley Value for the Pricing of Internet Service. E. Kozan and R. Beard (Eds.) *3rd Operations Research Conference of the ASOR – Qld Branch*

S. McDonald and N. Denman (1999) Boltzmann Games. E. Kozan (Ed.) *Proceedings of the 15th National Conference of the Australian Society for Operations Research, Gold Coast, Qld, 4-7 July 1999, Vol 2*

S. McDonald and R. Beard (1999) An Application of the Stochastic Calculus of Variations and the Stochastic Euler Equation to Finance. S. Hurn (Ed.) *Computational Finance: Proceedings of the Queensland Finance Conference 1999*

S. McDonald and G. McLachlan (1998) The EM Algorithm and Neural Networks. E. Kozan and R. Beard (Eds.) *2nd Operations Research Conference of the ASOR – QLD Branch*

**Research Papers:**

S. McDonald (2007) Infinite Time Horizon Stochastic Differential Utility. (Under review *Mathematics of Operations Research*)

S. McDonald (2007) Numerical Solutions Stochastic Partial Differential Equation by Method of Lines (Under review *Annals of Applied Probability*)

S. McDonald (2007) Numerical Simulation when Interest Rate Term Structure is Modelled as a Stochastic Partial Differential Equation. (Submitted to *Mathematical Finance*)

S. McDonald (2007) Quasi-Maximum Likelihood Training of Feed-Forward Neural Networks with the EM Algorithm (Submitted to *Statistics and Computation*)

S. McDonald and R. Beard (2007) Numerical Solutions by Method of Lines for Stochastic Partial Differential Equations with Applications to Finance (Under review *Journal of Economic Dynamics and Control*)

S. McDonald and L. Wagner (2007) The Computation of Perfect and Proper Equilibrium for Finite Games via Simulated Annealing. (Submitted to the *IEEE Transactions of Evolutionary Computation*)

S. McDonald and J. Zhang (2006) Inequality and Growth with Education Externalities and Missing Markets. (Under review *Journal of Economic Dynamics and Control*)

G. Salerno, R. Beard and S. McDonald (2007) Rent Seeking Behavior and Optimal Taxation of Pollution in Shallow Lakes.

T. Purcell R. Beard and S. McDonald (2007) An Econometric Analysis of Walrasian and Marshallian Stability: An Application to Trade Liberalization within the Australian Pig Industry.

S. McDonald (2007) Fair and Efficient Pricing of Local Public Goods via the Shapley Value.

**References**:

Professor John Ledyard
California Institute of Technology
MC 228-77
Pasadena, CA 91125
(626) 395 4822
jledyard@hss.caltech.edu

Professor Stan Hurn
School of Economics and Finance, Queensland
University of Technology, QLD, 4001, Australia

+61 7 3864 5293
s.hurn@qut.edu.au

Professor John Quiggin
School of Economics, University of Queensland,
Brisbane QLD, 4072, Australia
+ 61 7 3346 9646
j.quiggin@uq.edu.au

Professor Jie Zhang
School of Economics, University of Queensland,
Brisbane QLD, 4072, Australia
+61 7 3365 6488
j.zhang@economics.uq.edu.au