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Academic Qualifications

Johns Hopkins University
G.W.C. Whiting School of Engineering
- Ph.D. in Mathematical Sciences, 1996;
  Thesis: Advancing the Resampling Paradigm.
- M.S.E. in Mathematical Sciences, 1993.

National University of Singapore
- B.Sc.(Hons.) in Physics, 1987.
- B.Sc. in Physics, 1986.

Appointments (Employment History)

University of Canterbury
- Senior Lecturer, Department of Mathematics & Statistics, 2005-present.
- Lecturer, Department of Mathematics & Statistics, 2003-2004.

National University of Singapore
- Adjunct Fellow, Department of Computational Science, 2002 (concurrent appointment).

DSO National Laboratories
- Principal Member of Technical Staff, 2000-2003.
- Senior Member of Technical Staff, 1999-2000.
- Senior Research Engineer/Statistical Scientist, 1996-1999.

Defence Science Organisation
- Senior Software Engineer, 1991-1996.
- Software Engineer, 1987-1991.

Research Interests

Computational, Bayesian and nonparametric statistics, with applications in medical research, signal processing and image processing.

Research Experience

Current Projects:

Massive High-Dimensional Data Sets
Model selection and classification techniques; 2009-

Bandwidth Selection for Kernel Density Estimation
Robustness of bandwidth selection based on exact mean integrated squared error formulas derived from finite normal mixtures; 2009-

Models and Algorithms for Predicting Sepsis
Classification algorithms for sepsis biomarkers; 2009-

Exact Sampling Using Markov Chains
Exact Markov chain Monte Carlo methods for linear regression models; 2006-

Analysing Physiological Signals from Preterm Babies

- Effect of oxygen saturation on short-term outcomes; 2009-
- Quantify oxygen saturation; 2005-
- Hidden Markov models and Markov switching models for assessing state of health; 2005-2006.

Past Projects:

Probabilistic Seismic Risk Assessment
2007-2009.

Selected Ion Flow Tube-Mass Spectrometry (SIFT-MS)
Analysis and classification of SIFT-MS data; 2005-2009.

Modelling of Neuron Signals
Wavelet representation of neuron signals via perfect sampling; 2004-2005.

Blood Glucose-Insulin Modelling and Control

- Validation of a model of glucose and insulin metabolism against empirical data; 2004-2007.
- Modelling of insulin sensitivity variability using kernel conditional densities; 2004-2007.
- Analysis of time series data with irregular observation times, with application in the monitoring of blood glucose levels in

Research Experience (continued)

ICU patients; 2003-2004.

Agitation-Sedation Modelling and Control

- Validation of an agitation-sensing system against empirical data; 2004-2005.
- Assessment of differential equation models against empirical data, using kernel regression and weighted kernel density estimation, with application in agitation-sedation dynamics; 2003-2005.

Bayesian Signal Processing Theory

- Formulation and analysis of Bayesian solutions for generic signal processing problems.
  Principal investigator, 1999-2003.
- Research in Monte Carlo filters (particle filters).
  Principal investigator, 1996-1999.

Bayesian Signal Processing Applications

Application of novel Bayesian solutions to real-world signal processing and image processing problems, such as detection of weak signal and simultaneous estimation of signal parameters, passive location and tracking, estimation of motion field and elevation field for images.
Principal investigator, 2001-2003.
Collaborator, 1999-2001.

Computational Structures for Bayesian Signal Processing

Explore computing architecture and other computational issues for real-time Bayesian algorithms; for example, fast algorithms, parallelization and customized hardware.
Collaborator, 2001-2003.
Principal investigator, 2000-2001.

Quantization and Dithering

- Formulation and analysis of a new scheme, called Quasi-Subtractive Dithering, for dithered quantization.
  Principal investigator, 2000-2001.
- Theoretical analysis of quantization and dithering.
  Collaborator, 1997-2000.

Computational Statistics

Study of resampling methods, including the bootstrap, jackknife and sampling/importance resampling:
(a) Analysis of the use of the smoothed bootstrap for estimating the mean integrated squared error of the kernel density estimator;
(b) Use of the bootstrap and jackknife for constructing point

estimators and confidence intervals;
(c) Use of sampling/importance resampling in sequential Bayesian estimation.
Ph.D. dissertation research, 1993-1996.

Analysis of air-borne radar algorithms
Project leader, 1990-1991.

Design and analysis of ship-borne radar algorithms
Project member, 1989-1990.

Research Supervision

Senior supervisor

Jason Bentley, UC Summer Scholarship, 2008/2009.
A new bandwidth selection method for kernel density estimation.

Marina Zahari, Ph.D., 2007-
Health assessment in preterm babies using non-invasive oxygen saturation recordings.

Jason Bentley, research assistant, 2007.
Exact Markov chain Monte Carlo algorithms and their applications.

Jason Bentley, M.Sc. with First-Class Honours, 2006-2009.
Bayesian variable selection in linear models using exact Markov chain Monte Carlo.
Jason is now at Police National Headquarters, Wellington, New Zealand.

Xinyuan Li, B.Sc. (Hons.) project, 2008.
Practical challenges in Bayesian inference for mixture models.

Andrew Richens, M.Sc. with Distinction, 2005-2008.
Detecting change-points in time series using the Bayesian approach with perfect simulation.
Andrew is now at Sungard, Christchurch, New Zealand.

Qian Hou, B.Sc. (Hons.) project, 2007.
Quantifying the variability of oxygen concentration in preterm babies using the stochastic volatility model and particle filters.
Qian is now at AMI Insurance, Christchurch, New Zealand.

Qian Hou, UC Summer Scholarship, 2006/2007.
Analysing physiological measurements from preterm babies to assess their state of health.

Lisa Chang Li, summer research assistant, 2006/2007.
Functional data analysis.

Annie Jin Luo, summer research assistant, 2006/2007.
Binary classification using generalised linear models, with application to SIFT-MS medical diagnosis.

James Roscoe, Department of Mathematics and Statistics Summer Scholarship, 2005/2006.
Developing a hidden Markov model for assessing the health of premature babies.

Gavin Bell, summer project, 2005.
Detecting change-points using a particle filter.

James Roscoe, summer research assistant, 2004/2005.
Wavelet representation of neuron spiking signals.

Associate supervisor

Christopher Pretty, Ph.D., 2008-
Optimizing drug delivery for simultaneous glycaemic control and treatment of heart failure and shock in critical care.

Anna MacDonald, Ph.D., 2008- (co-supervisor)
Extreme value modelling with application to forecasting of neonatal long-term health.

Gloria Teng, M.Sc., 2008-
Set-valued nonparametric statistical methods.

Brendon Bradley, Ph.D., 2007-2009.
Structure-specific probabilistic seismic risk assessment.
Brendon is now a Seismic Hazard Modeler at GNS Science, Lower Hutt, New Zealand.

Katherine Moorhead, Ph.D., 2005-2009.
Design and implementation of analytical mathematics for SYFT-MS medical applications.

Jessica Lin, Ph.D., 2004-2007.
Robust modeling and control of the glucose-insulin regulatory system for ICU patients.
Jessica is now a FRST postdoctoral fellow at the *Department of Medicine, University of Otago*, Christchurch, New Zealand.

Involvement in postgraduate supervision

Jacquelyn Parente, Ph.D., 2009-
Xin Zhao, Ph.D., 2007-
Jason Xing Wei Wong, Ph.D., 2006-2007.
James Neilson, M.E., 2005-2006.
Thomas Lotz, Ph.D., 2004-2007.
Franck Agogue, Ph.D., 2004-2005.
Andrew Rudge, Ph.D., 2003-2005.
Carmen Doran, M.E., 2003-2004.

Research leader/supervisor

Statistical signal processing group (Nicholas Chia, Serena Chai, Michael Liew, Sharon Quek), 1996-2003.
Bayesian signal and image processing.

Awards and Grants

University of Canterbury Summer Scholarship ($4,000) for research student, Jason Bentley. *A new bandwidth selection method for kernel density estimation*, 12/08-2/09.

Doctoral student, Anna MacDonald, won second prize at the 2008 Australian Statistical Conference in Melbourne, for her poster on *Quantile estimation using extreme value mixture model with application to neonatal physiological measurements*.

Department of Mathematics and Statistics Research Grant ($3,600) for research assistant, Jason Bentley. *Exact Markov chain Monte Carlo algorithms and their applications*, 11/07-12/07.

Masters student, Jason Bentley, won a Student Prize at the 2007 Spring Bayes Conference in Brisbane, for his talk on *exact Markov chain Monte Carlo and Bayesian variable selection.*

Masters student, Jason Bentley, won a Student Prize at the 2007 New Zealand Statistical Association Conference, for his talk on *Bayesian analysis of linear regression models using exact Markov chain Monte Carlo.*

University of Canterbury Summer Scholarship ($4,000) for research student, Qian Hou. *Analysing physiological measurements from preterm babies to assess their state of health*, 11/06-2/07.

University of Canterbury Visiting Erskine Fellowship (~$13,000) for Professor Christian Robert (Universite Paris Dauphine) to contribute to teaching and research at the university, in the area of *computational Bayesian statistics*, 7/06-8/06.

Department of Mathematics and Statistics Summer Scholarship (~$7,000) for research student, James Roscoe. *Developing a hidden Markov model for assessing the health of premature babies*, 11/05-2/06.

Syft Technologies Ltd. Research Grant (~$56,000), with Professor Geoffrey Chase, *Breath testing and diagnostic systems for medical application of SIFT-MS technology,* 2004-2009.

University of Canterbury Research Grant ($20,000), *Application-optimal inference: Developing practical statistical solutions that respect and exploit application realities,* 2004-2007.

Canterbury Medical Research Foundation Research Grant ($22,200), with Dr Geoff Shaw and Professor Geoff Chase, *Clinical Trial Verification of a Patient Agitation Sensing System,* 2004-2005.

Department of Mathematics and Statistics Grant ($15,000), with Dr Easaw Chacko and Dr Marco Reale, *Organisation of New Zealand Time Series Study Group Workshop, 4-5 December 2003, Christchurch.*

Defence Technology Training Award, 1991-1996.

Best Technical Paper Award, 1990
Defence Technology Digest.

Teaching Experience

Teaching Co-Chair for Undergraduate and Honours Statistics, 2009-present.

2009
Statistical Inference (2nd year)
Bayesian Inference (3rd year) (jointly with Erskine Fellow, Professor Carey Priebe)
Computational Statistics (4th year)
Probability Theory (4th year)

2008
Engineering Statistics (2nd year)
Statistical Inference (2nd year)
Bayesian Inference (3rd and 4th year)
Computational Statistics (4th year)
Probability Theory (4th year)

2007
Engineering Statistics (2nd year)
Statistical Inference (2nd year)
Computational Statistics (3rd year)
Engineering Decision-Making (3rd year)
Computational Statistics (4th year)
Probability Theory (4th year)

2006
Engineering Statistics (2nd year)
Statistical Inference (2nd year)
Engineering Decision-Making (3rd year)
Bayesian Statistics (3rd and 4th year) (jointly with Erskine Fellow, Professor Christian Robert)
Computational Statistics (4th year)

2005
Engineering Statistics (2nd year)
Statistical Inference (2nd year)
Engineering Decision-Making (3rd year)
Bioinformatics II (Statistical Methods) (3rd and 4th year) (jointly with Erskine Fellow, Professor Daniel Naiman)
Probability Theory (4th year)

2004
Engineering Statistics (2nd year)
Statistical Inference (2nd year)
Nonparametric Methods (3rd year)
Computational Statistics (4th year)

Lecture on "Microarray Data Analysis" for Bioinformatics course (4^{th} year)

2003
Engineering Statistics (2^{nd} year)
Statistical Inference (2^{nd} year)
Applied Stochastic Modeling (3^{rd}/4^{th} year)
Probability Theory (4^{th} year)

Signal Processing
Third-year course in the Department of Computational Science, National University of Singapore, Jan-May 2002.
Developed course content and material, delivered lectures, conducted tutorials and consultation with students, graded assignments and assessments.

Bayesian Inference
10-hour course for research engineers and scientists, DSO National Laboratories, Sep-Dec 1996.
Developed course contents and materials, delivered lectures.

Probability and Statistics for Statistical Signal Processing
4-hour course for research engineers and scientists, Research Division Cross-Laboratory Training Programme, DSO National Laboratories, 17 March 1999.
Developed course content and material, delivered lectures.

Professional Activities

Associate editor

- Computational Statistics and Data Analysis, 2009 –

Reviewer for refereed journals

- Computational Statistics and Data Analysis, 2008 –
- Journal of Agricultural, Biological, and Environmental Statistics, 2008.
- Journal of Applied Mathematics and Decision Sciences, 2007.
- Computational Statistics and Data Analysis, 2004-2006.
- IEEE Transactions on Aerospace and Electronic Systems, 2004/2005.
- EURASIP Journal on Applied Signal Processing, 2003/2004.
- Computational Statistics and Data Analysis, 2002.
- Journal of Computational and Graphical Statistics, 2001/2002.
- Special Issue of the IEEE Transactions on Signal Processing on "Monte Carlo Methods for Statistical Signal Processing", 2001.

Invited speaker

- Second Workshop on Hidden Markov Models and Complex Systems, Wellington, 5-8 December 2005: "Analysing physiological signals from preterm babies".
- Statistics and Probability in Communications Engineering (SPICE), Christchurch, 1 September 2005: "Introduction to particle filters and an application in change-point detection".
- Special Session on Applications of Particle Filtering in Communications, 11th European Signal Processing Conference, Toulouse, 3-6 September 2002: "Bayesian algorithms for the passive location of a stationary emitter by a moving platform".
- Meeting on Particle Systems and Filtering, Henri Poincare Institute, Paris, 18-20 June 2001: "The sequential MCMC filter: Algorithm, motivations and applications".

Organizer/chair at professional meetings

- Local Arrangement Chair, Seventh IEEE International Conference on Control and Automation, Christchurch, 9-11 December 2009.
- Organizing Committee, New Zealand Statistical Association Annual Conference, Christchurch, 4 July 2007.
- Organizer, First New Zealand Time Series Study Group Workshop, Christchurch, New Zealand, 4-5 December 2003.
- Organizer and Chair, Invited Session on Monte Carlo Filtering, 53rd Session of the International Statistical Institute (ISI 2001), Seoul, South Korea, 22-29 August 2001.
- Organizer and Chair, Session on Monte Carlo Filtering, 6th World Meeting of the International Society for Bayesian

Analysis (ISBA 2000), Crete, Greece, 28 May – 1 June 2000.

Miscellaneous

- Coordinator, Statistics Interest Group, DSO National Laboratories, 1998-2003.

Other Activities

Member, Secretariat for the International Advisory Panel, 2nd IAP Meeting, DSO National Laboratories, 26 April – 7 May 1999.

Chairman, Organizing Committee, 1997 Signal Processing Retreat.

Membership

New Zealand Statistical Association, 2003-present.

American Statistical Association, 1993-2003.

Book Chapter (1)

1. Lee, D.S. (2008). “Exact Markov Chain Monte Carlo algorithms and their applications in probabilistic data analysis and inference”. In H.-F. Wang (Ed.), *Intelligent Data Analysis: Developing New Methodologies Through Pattern Discovery and Recovery*. Information Science Reference, IGI Publishing, pp. 161-183, ISBN-13: 978-1-59904-982-3. **(Invited)**

Refereed Journal Papers (27)

1. Bradley, B.A. and Lee, D.S. (2009). Component correlations in structure-specific seismic loss estimation. Earthquake Engineering and Structural Dynamics, to appear.

2. Bradley, B.A. and Lee, D.S. (2009). Accuracy of approximate methods of uncertainty propagation in seismic loss estimation. Structural Safety, article in press – available online through Science Direct from 22 May 2009.

3. Bradley, B.A., Lee, D.S., Broughton, R. and Price, C. (2009). “Efficient evaluation of performance-based earthquake engineering equations”. Structural Safety 31(1), 65-74.

4. Bradley, B.A., Dhakal, R.P., Cubrinovski, M., MacRae, G.A., and Lee, D.S. (2009). Seismic loss estimation for efficient decision making. Bulletin of the New Zealand Society for Earthquake Engineering 42(2), 96-110.

5. Chase, J.G., Shaw, G.M., Le Compte, A.J., Lonergan, T.R., Willacy, M.B., Wong, X.W., Lin, J., Lotz, T., Lee, D.S. and Hann, C.E. (2008). “Implementation and evaluation of the SPRINT protocol for tight glycaemic control in critically ill patients: a clinical practice change”. Critical Care 12:R49, ISSN: 1364-8535. Available on-line at http://ccforum.com/content/12/2/R49 .

6. Moorhead, K.T., Lee, D.S., Chase, J.G., Moot, A.R., Ledingham, K., Scotter, J., Allardyce, R., Sentilimohan, S.T., Endre, Z. (2008). "Classifying Algorithms for SIFT-MS Technology and Medical Diagnosis". Computer Methods and Programs in Biomedicine, Vol. 89(3), pp. 226-238, ISSN: 0169-2607.

7. Lin, J., Lee, D.S., Chase, J.G., Shaw, G.M., LeCompte, A., Lotz, T., Wong, X.W., Lonergan, T. and Hann, C.E. (2008). "Stochastic modelling of insulin sensitivity and adaptive glycemic control for critical care". Computer Methods and Programs in Biomedicine, Vol. 89(2), pp. 141-152, ISSN: 0169-2607. **(Invited)**

8. Chase, J.G., Shaw, G.M., LeCompte, A.J., Lee, D.S., Lonergan, T., Willacy, M., Wong, X.W., Lin, J., Lotz, T. and Hann, C.E. (2007). “Tight glycaemic control in critical care using insulin and nutrition – the SPRINT protocol”. Proceedings of the 6th Annual Diabetes Technology Meeting, Diabetes Technology Society, November 2-4

2006, Atlanta, USA. Journal of Diabetes Science and Technology 1(2), pp. A22, ISSN: 1932-2968. (Abstract)

9. Lin, J., Lee, D.S., Chase, J.G., Hann, C.E., Lotz, T. and Wong, X.W. (2006). "Stochastic modelling of insulin sensitivity variability in critical care". Biomedical Signal Processing & Control, Vol. 1(3), pp. 229-242, ISSN: 1746-8094.

10. Rudge, A.D., Chase, J.G., Shaw, G.M., Lee, D.S. and Hann, C.E. (2006). "Parameter identification and sedative sensitivity analysis of an agitation–sedation model". Computer Methods and Programs in Biomedicine, Vol. 83(3), pp. 211-221, ISSN: 0169-2607.

11. Chase, J.G., Lin, J., Lee, D.S., Shaw, G.M., Lotz, T., Hann, C.E. and Wong, X.W. (2006). "Modelling stochastic insulin sensitivity variability in critical care". Proceedings of the Canterbury Health Research Conference, 26–27 August 2005, Christchurch, New Zealand. New Zealand Medical Journal (NZMJ), Vol. 119(1231), p. 11, ISSN: 0028-8446. (Abstract)

12. Rudge, A.D., Chase, J.G., Shaw, G.M. and Lee, D.S. (2006). "Physiological modelling of agitation-sedation dynamics including endogenous agitation reduction". Medical Engineering and Physics, Vol. 28(7), pp. 629-638, ISSN: 1350-4533.

13. Lotz, T., Chase, J.G., McAuley, K.A., Lee, D.S., Lin, J., Hann, C.E. and Mann, J.I. (2006). "Transient and steady state euglycemic clamp validation of a model for glycemic control & insulin sensitivity testing." Diabetes Technology & Therapeutics, Vol. 8(3), pp. 338-346, ISSN: 1520-9156.

14. Rudge, A.D., Chase, J.G., Shaw, G.M. and Lee, D.S. (2006). "Physiological modelling of agitation-sedation dynamics". Medical Engineering and Physics 28(1), 49-59, (online April 2005), ISSN: 1350-4533.

15. Chase, J.G., Rudge, A.D., Lee, D.S. and Shaw, G.M. (2005). "H-infinity control analysis of patient agitation management in the critically ill," International Journal of Intelligent Systems Technologies and Applications 1(1/2), 111-125, ISSN: 1740-8865. **(Invited special edition)**

16. Lee, D.S., Rudge, A.D., Chase, J.G. and Shaw, G.M. (2005). "A new model validation tool using kernel regression and density estimation," Computer Methods and Programs in Biomedicine 80, 75-87, ISSN: 0169-2607.

17. Rudge, A.D., Chase, J.G., Shaw, G.M., Lee, D.S., Wake, G.C., Hudson, I. and Johnston, L. (2005), "Impact of control on agitation-sedation dynamics", Control Engineering Practice, Vol. 13(9), 1139-1149, ISSN: 0967-0661. **(Invited)**

18. Shaw, G.M., Chase, J.G., Lee, D.S., Bloomfield, M., Doran, C.V., Lin, J. and Lotz, T. (2005). "Peak and range of blood glucose are also associated

with ICU mortality". Proceedings of the 34th Critical Care Congress, Society of Critical Care Medicine (SCCM), January 15-19 205, Phoenix, Arizona. Critical Care Medicine, Vol. 32(12), p. A125, ISSN: 0090-3493. (Abstract)

19. Shaw, G.M., Chase, J.G., Lee, D.S., Hooper, E., Rudge, A.D. and Agogue, F. (2005). "Emerging methods for sedation and agitation management in critical illness". Proceedings of the 34th Critical Care Congress, Society of Critical Care Medicine (SCCM), January 15-19 205, Phoenix, Arizona. Critical Care Medicine, Vol. 32(12), pp. A97, ISSN: 0090-3493. (Abstract)

20. Chase, J. G., Rudge, A. D., Shaw, G. M., Wake, G. C., Lee, D., Hudson, I. and Johnston, L. (2004), "Modeling and control of the agitation-sedation cycle for critical care patients," Medical Engineering and Physics 26(6), 459-471, ISSN: 1350-4533.

21. Shaw, G.M., Chase, J.G., Rudge, A.D., Starfinger, C., Lam, Z., Lee, D., Wake, G.C., Greenfield, K. and Dove, R. (2003), “Rethinking sedation and agitation management in critical illness”, Critical Care and Resuscitation 5(3), September 2003, 198-206. **(Invited special review)**

22. Lee, D.S. and Chia, K.K. (2002), "A particle algorithm for sequential Bayesian parameter estimation and model selection", Special Issue on Monte Carlo Methods for Statistical Signal Processing, IEEE Transactions on Signal Processing, Vol. 50, No. 2, February 2002, pp. 326-336.

23. Lee, D.S. and Ong, C.A. (2001), "Quasi-subtractive dithering", Signal Processing, Vol. 81, No. 11, November 2001, pp. 2321-2331.

24. Lee, D.S. and Priebe, C.E. (2000), "Exact mean and mean squared error of the smoothed bootstrap mean integrated squared error estimator", Computational Statistics, Vol. 15, No. 2, 2000, pp. 169-181.

25. Lee, D.S. and Naiman, D.Q. (1996), “A hybrid estimator for the cumulative probability of detection of surveillance radars”, IEEE Transactions on Aerospace and Electronic Systems, Vol. 32, No. 1, January 1996, pp. 476-480.

26. Lee, D.S. and Tan, Y.H. (1990), “An analytical study using covariance analysis of the effects of glint and frequency agility on the performance of tracking filters in tracking radars”, Defence Technology Digest, No. 6, pp. 41-45.

27. Lee, D.S. (1990), “A discussion on the use of covariance factorization techniques for implementing Kalman filters on short wordlength machines”, Defence Technology Digest, No. 6, pp. 38-40.

Conference Papers and Abstracts (total = 48, *refereed=31)

1. *Lin, J., Parente, J.D., Chase, J.G., Shaw, G.M., Blakemore, A., Le Compte, A.J., Pretty, C., Razak, N., Lee, D., Hann, C.E. and Wang, S.H. (2009). "Development of a model-based clinical sepsis biomarker for critically ill patients". 7th IFAC Symposium on Modelling and Control in Biomedical Systems, 12-14 August 2009, Aalborg, Denmark. **(Invited)**

2. *LeCompte, A.J., Lynn, A., Chase, J.G., Shaw, G.M., Russell, G., Blakemore, A., Lee, D.S., Wong, X.W., Lin, J. and Hann, C.E. (2008). "Neonatal glycaemic control – model validation and in silico virtual patient trials". Proceedings of the 8th Annual Diabetes Technology Meeting, 13-15 November 2008, Bethesda, Maryland, USA. (1 page)

3. Bentley, J., Lee, D. and Robert, C. (2008). "Gibbs CFTP and Bayesian variable selection". 9th World Conference of the International Society for Bayesian Analysis (ISBA 2008), 21-25 July 2008, Hamilton Island, Australia. (poster)

4. *MacDonald, A., Scarrott, C.J., Lee, D.S., Reale, M., Russell, G., Zahari, M. and Zhao, X. (2008). "Quantile estimation using extreme value mixture model with application to neonatal physiological measurements". Australian Statistical Conference, 30 June – 3 July 2008, Melbourne, Australia. **(Second prize winner for best poster)**

5. Zahari, M., Lee, D.S., Russell, G., Scarrott, C., Reale, M., Tunnicliffe-Wilson, G., Zhao, X. and MacDonald, A. (2008). "Quantifying blood oxygen levels in preterm infants using coefficient of variation". Australian Statistical Conference, 30 June – 3 July 2008, Melbourne, Australia.

6. *Bradley, B.A., Dhakal, R.P., Cubrinovski, M., MacRae, G.A., Lee, D.S. (2008). "Seismic loss estimation for efficient decision making". NZSEE Annual Technical Conference, 11-13 April 2008, Wairakei, New Zealand.

7. *Zhao, X., Hou, Q., Lee, D., Reale, M., Scarrott, C., Russell, G., MacDonald, A. and Zahari, M. (2007). "A comparison between alternative volatility estimations – application on blood oxygen concentration of preterm infants". In Oxley, L. and Kulasiri, D. (eds), MODSIM 2007 International Congress on Modelling and Simulation, 10-13 December 2007, Christchurch, New Zealand. Modelling and Simulation Society of Australia and New Zealand, 2027-2033.

8. *Endre, Z., Moorhead, K.T., Storer, M., Hu, S., Dean, J., Logan, K., Allardyce, R., Ledingham, K., McGregor, D., Senthilmohan, S., Lee, D.S, Scotter, J. and Chase, J.G. (2007). "Breath ammonia reduction ratio (Arr) measures dialysis efficacy". American Society of Nephrology (ASN) Renal Week 2007, 31 October – 5 November 2007, San Francisco, CA, USA.

9. *Chase, J.G., Shaw, G.M., LeCompte, A.J., Lee, D.S., Lonergan, T., Willacy, M., Wong, X.W., Lin, J., Lotz, T. and Hann, C.E. (2007). "Intensive insulin therapy and the artificial pancreas in critical care - pitfalls? practicalities and performance". 7th Annual Diabetes Technology Meeting, Diabetes Technology Society, 25-27 October 2007, San Francisco, CA, USA. **(Invited major session presentation)**

10. *Bentley, J., Lee, D. and Robert, C. (2007). "Exact Markov chain Monte Carlo and Bayesian variable selection". Spring Bayes Conference, 26-28 September 2007, Brisbane, Australia. **(Winner of a student prize)**

11. Zhao, X., Hou, Q., Reale, M., Scarrott, C., Russell, G., Lee, D., Tunnicliffe-Wilson, G., MacDonald, A. and Zahari, M. (2007). "Stochastic volatility of oxygen concentration in preterm infants". Workshop on Non-linear and Complex System Analysis, 27-29 September 2007, Brisbane, Australia.

12. *Moorhead, K., Lee, D., Chase, J., Moot, A., Ledingham, K., Allardyce, R., Senthilmohan, S. and Endre, Z. (2007). "Classification Algorithms for SIFT-MS Medical Diagnosis". 29th International Conference of the IEEE Engineering in Medicine and Biology Society, August 23-26, Lyon, France.

13. *Bentley, J., Lee, D. and Robert, C. (2007). "Bayesian analysis of linear regression models using exact Markov chain Monte Carlo". New Zealand Statistical Association Conference, 4 July 2007, Christchurch, New Zealand. **(Winner of a student prize)**

14. *Lee, D.S., Roscoe, J. and Russell, G. (2006). "Developing hidden Markov models for aiding the assessment of preterm babies' health". International Conference on Biomedical and Pharmaceutical Engineering (ICBPE), December 11-14, Singapore.

15. *Chase, J.G., Shaw, G.M., LeCompte, A., Lee, D.S., Lonergan, T., Willacy, M., Wong, X.W., Lin, J., Lotz, T. and Hann, C.E. (2006). "Tight glycaemic control in critical care using insulin and nutrition – the SPRINT Protocol". 6th Annual Diabetes Technology Meeting, Diabetes Technology Society, November 2-4, Atlanta, USA.

16. *Chase, J.G., Lin, J., Lee, D.S., Wong, J., Hann, C.E. and Shaw, G.M. (2006). "Stochastic insulin sensitivity models for tight glycaemic control". 6th IFAC Symposium on Modeling and Control in Biomedical Systems (MCBMS), September 19-22, Reims, France.

17. *Lin, J., Lee, D.S., Chase, J.G., Shaw, G.M., Lotz, T.S., Hann, C.E. and Wong, X.W. (2005). "Stochastic modelling of insulin sensitivity variability in critical care". 12th International Conference on Biomedical Engineering (ICBME), 7-10 December 2005, Singapore.

18. *Rudge, A.D., Chase, J.G., Lee, D.S. and Shaw, G.M. (2005). "Physiologically-based model of agitation-sedation dynamics in critically ill patients incorporating endogenous

agitation reduction". 12th International Conference on Biomedical Engineering (ICBME), 7-10 December 2005, Singapore.

19. *Rudge, A.D., Chase, J.G., Shaw, G.M. and Lee, D.S. (2005). "Derivative-focused control of agitation-sedation dynamics in critically ill patients". 12th International Conference on Biomedical Engineering (ICBME), 7-10 December 2005, Singapore.

20. Lee, D.S., Russell, G., Reale, M., Tunnicliffe-Wilson, G. and Roscoe, J. (2005). "Analysing physiological signals from preterm babies". 2nd Workshop on Hidden Markov Models and Complex Systems, 5-8 December 2005, Wellington, New Zealand. **(Invited)**

21. Lee, D.S. and Bell, G. (2005). Introduction to particle filters and an application in change-point detection. Statistics and Probability in Communications Engineering (SPICE 2005), 1 September, University of Canterbury, Christchurch, New Zealand. **(Invited)**

22. *Chase, J.G., Lin, J., Lee, D.S., Shaw, G.M., Lotz, T., Hann, C.E. and Wong, X.W. (2005). "Modelling stochastic insulin sensitivity variability in critical care". Canterbury Health Research Conference (CHSRC), 26-27 August 2005, Christchurch, New Zealand.

23. *Shaw, G.M., Chase, J.G., Lee, D.S., Bloomfield, M., Doran, C.V., Lin, J. and Lotz, T. (2005). "Peak and range of blood glucose are also associated with ICU mortality". Proceedings of the 34th Critical Care Congress, Society of Critical Care Medicine (SCCM), January 15-19, Phoenix, Arizona.

24. *Shaw, G.M., Chase, J.G., Lee, D.S., Hooper, E., Rudge, A.D. and Agogue, F. (2005). "Emerging methods for sedation and agitation management in critical illness". Proceedings of 34th Critical Care Congress, Society of Critical Care Medicine (SCCM), January 15-19, Phoenix, Arizona.

25. Lee, D.S., Iyengar, S., Czanner, G. and Roscoe, J. (2005). "Bayesian wavelet representation of neuron signals via perfect sampling". 2nd IMS-ISBA Joint Meeting, January 12-14, Bormio, Italy.

26. *Chase, J.G., Rudge, A.D., Shaw, G.M. and Lee, D.S. (2004). "Sedation management in the critically ill using dynamic systems modeling". New Zealand Mathematics Society (NZMS) Colloquium and MISG SIAM, December 6-8, Dunedin, New Zealand. **(Invited)**

27. *Rudge, A.D., Shaw, G.M., Chase, J.G. and Lee, D.S. (2004). "Analysis of model-based clinical sedation management". New Zealand Physics and Engineering in Medicine (NZPEM), Proceedings of the 2004 Annual Conference of the Australasian College of Physical Scientists and Engineers in Medicine (ACPEM), 22-23 November 2004, Christchurch, New Zealand.

28. *Rudge, A.D., Shaw, G.M., Chase, J.G., and Lee, D.S. (2004). “Physiologically-based minimal model of agitation-sedation model dynamics,” 2004 Canterbury Health Sciences Research Conference (CHSRC 2004), September 5-6, Christchurch.

29. *Lin, J., Chase, J.G., Shaw, G.M., Lotz, T., Hann, C.E., Doran, C.V., and Lee, D.S. (2004), “Long term verification of glucose-insulin regulatory system model dynamics”, Proceedings of the 26th International Conference of IEEE Engineering in Medicine and Biology Society (EMBS 2004), San Francisco, September 1-5, 758-761, ISBN: 0-7803-8440-7.

30. *Rudge, A.D., Chase, J.G., Shaw, G.M. and Lee, D.S. (2004), “Physiologically-based minimal model of agitation-sedation dynamics”, Proceedings of the 26th International Conference of IEEE Engineering in Medicine and Biology Society (EMBS 2004), San Francisco, September 1-5, 774-777, ISBN: 0-7803-8440-7.

31. *Rudge, A.D., Chase, J.G., Shaw, G.M. and Lee, D.S. (2004), “Automated agitation management accounting for saturation dynamics”, Proceedings of the 26th International Conference of IEEE Engineering in Medicine and Biology Society (EMBS 2004), San Francisco, September 1-5, 3459-3462, ISBN: 0-7803-8440-7.

32. *Doran, C.V., Bloomfield, M., Lee, D., Shaw, G.M., Chase, J.G., Lin, J. and Lotz, T. (2004). "Effect of hyperglycemia on mortality in the Christchurch Intensive Care Unit". Proceedings of the 34th Annual General Meeting of the Christchurch Medical Research Society, 28 April 2004, Christchurch, New Zealand. New Zealand Medical Journal, Vol. 117(1195), p. 4, ISSN: 0028-8446. (Abstract)

33. *Shaw, G.M., Chase, J.G., Lee, D., Hooper, E., Rudge, A.D. and Agogue, F. (2004), “Emerging methods for sedation and agitation management in critical illness”. Australian and New Zealand Intensive Care Society (ANZICS) New Zealand Region Annual Scientific Meeting, 24-26 March 2004, Wellington, New Zealand. **(Invited)**

34. *Shaw, G.M., Chase, J.G., Lee, D.S., Bloomfield, M., Doran, C.V., and Lin, J. (2004), "How high are blood glucose levels in intensive care?" Australian and New Zealand Intensive Care Society (ANZICS) New Zealand Region Annual Scientific Meeting, 24-26 March 2004, Wellington, New Zealand. **(Winner of best medical free paper award)**

35. *Shaw, G.M., Chase, J.G., Lee, D.S., Wake, G.C., Lin, J., Browne, P., Robertson, M. and Doran, C.V. (2004), "Targeted glucose control in critically ill patients," Australian and New Zealand Intensive Care Society (ANZICS) New Zealand Region Annual Scientific Meeting, 24-26 March 2004, Wellington, New Zealand.

36. Lee, D.S., Rudge, A.D., Chase, J.G., Hudson, I., Shaw, G.M., Johnston, L. and Wake, G.C. (2003), “Dynamic model assessment using a probability band for local linear kernel regression, with an application in agitation-sedation modeling”, 54th Annual

Conference of the New Zealand Statistical Association, Palmerston North, 2-4 July 2003.

37. *Liew, M., Lee, D., Chia, N. and Cheng, K.P. (2002), “Bayesian algorithms for the passive location of a stationary emitter by a moving platform”, Special Session on Applications of Particle Filtering in Communications, 11th European Signal Processing Conference, Toulouse, 3-6 September 2002. **(Invited)**

38. Chia, N.K.K. and Lee, D.S. (2001), "Bayesian computations using the sequential MCMC filter", 53rd Session of the International Statistical Institute (ISI 2001), 22-29 August 2001, Seoul, South Korea.

39. Lee, D.S. and Chia, N.K.K. (2001), “The sequential MCMC filter: Formulation and applications”, Special Session on Resampling and Monte Carlo Methods for Statistical Signal Processing, 11th IEEE Workshop on Statistical Signal Processing, 6-8 August 2001, Singapore.

40. Lee, D.S. (2001), “The sequential MCMC filter: Algorithm, motivations and applications”, Meeting on Particle Systems and Filtering, Henri Poincare Institute, 18-20 June 2001, Paris, France. **(Invited)**

41. Chia, K.K. and Lee, D.S. (2000), "Sequential MCMC filtering for dynamic and static models", 2000 Joint Statistical Meetings, August 13-17, Indianapolis, Indiana, USA.

42. Lee, D.S. and Chia, K.K. (1999), "Recursive estimation for noise-free state models by Monte Carlo filtering", 1999 Proceedings of the Section on Bayesian Statistical Science, Joint Statistical Meetings, August 8-12, Baltimore, USA, pp. 21-26.

43. Lee, D.S. (1999). “Distribution-based signal processing”. 4th North American Meeting of New Researchers in Statistics and Probability, 4-7 August 1999, The Johns Hopkins University, Baltimore, USA.

44. Lee, D.S. and Priebe, C.E. (1998), “Exact mean and mean squared error of the smoothed bootstrap mean integrated squared error estimator”, 1998 Joint Statistical Meetings, August 9-13, Dallas, Texas, USA.

45. Lee, D.S. (1997), “Selecting sample sizes for the sampling/importance resampling filter”, 1997 Joint Statistical Meetings, August 10-14, Anaheim, California, USA.

46. *Lee, D.S. (1997), “Dynamic state estimation using the SIR filter”, MINDEF-NUS Joint R&D Seminar, Singapore, January 1997, pp. 12-22.

47. Lee, D.S. (1995), "A new algorithm for recursive state estimation for nonlinear, non-Gaussian dynamic state-space models", 1995 Proceedings of the Section on Bayesian Statistical Science, Joint Statistical Meetings, August 13-17, Orlando, Florida, USA, pp. 116-120.

48. Lee, D.S. (1995). “Hybrid estimators for the cumulative probability of detection of surveillance radars”. Second Spring Research Conference on Statistics in Industry and Technology, June 1995, Waterloo, Ontario, Canada.