

# CHRISTOPHER ERIC HANN

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## EDUCATION:

- 1997-2001 **University of Canterbury**, Christchurch, New Zealand.
- *Ph.D.* in Mathematics- Department of Mathematics and Statistics
  - Supervisor: Dr. M. S. Hickman, Senior Lecturer of Mathematics.
  - Dissertation: "Recognising two planar objects under a projective transformation"
- 1993-1996 **University of Canterbury**, Christchurch, New Zealand.
- *B.Sc.* First Class Honours in Mathematics – Department of Mathematics and Statistics.

## PROFESSIONAL and ACADEMIC EXPERIENCE:

**University of Canterbury Dept. of Electrical and Computer Engineering**  
2012-  
*Senior Lecturer, Rutherford Discovery Fellow*

**University of Canterbury Dept. of Electrical and Computer Engineering** 2010-11  
*Lecturer*

Rocket Systems modelling and control, Biomedical Modelling, General Control Systems and applications to industry, System Identification, Image processing and Computer Vision.

**University of Canterbury Dept. of Mechanical Engineering** 2007-2010  
*Senior Research Associate / Sir Charles Hercus Health Research Fellow*

Biomedical Modelling, System Identification and Control. Image processing and Computer Vision. Main focus is on biomedical systems and device research with emphasis on the cardiovascular system in critical care. Full time academic research position. Lecturing ENME333 – Control Engineering, and some of ENEL430 – Control Systems and ENEL351 – Signals, systems and control

**University of Canterbury Dept. of Mechanical Engineering** 2004-2006  
*Research Associate/  
New Zealand Foundation for Research, Science and Technology (FRST)  
Postdoctoral Fellow*

Biomedical Modeling, System Identification and Control. Image processing and Computer Vision. Main focus is on biomedical systems and device research. Full time academic research position.

**University of Canterbury Dept. of Mathematics and Statistics** 2001-2003  
*Teaching Fellow*

Teaching courses in Mathematical Modeling, Computer Software in MATLAB, SIMULINK AND MAPLE, Applied Partial Differential Equations, Dynamical Systems and Advanced Engineering Mathematics. Full time teaching position.

**National Institute of Water and Atmospheric Research Ltd** 2001-2003

*Part-time Researcher*

Develop automatic river boundary extraction algorithms, camera calibration, image warping and rotating camera system with zoom on a 33 m power pylon/12 m portable mast for measuring large/small scale morphological change in the Waimakariri river for flood management.

**RESEARCH and PROJECT AREAS:** selected overview by area

**Rocket Systems and Control:**

- Development of real-time modeling and system identification techniques for implementation during rocket flight.
- 6DOF rigid body dynamic modeling of rocket response including lift and drag coefficients, and atmospheric disturbances
- Minimal modeling of shock waves and turbulence during rocket flight
- Vertical wind tunnel testing and control system development
- Orbital mechanics calculations and optimization for small payload, low earth orbit insertion

**Biomedical Systems:**

- Modeling of Glucose-Insulin system, real-time parameter identification and control for active insulin infusion systems for diabetic individuals and hyperglycemic critical care patients.
- Development of macro-physical cardio-vascular system models including ventricular interaction, the body's natural reflex actions and parameter ID methods for real time diagnostic and therapy assistance in the ICU.
- Integral based Inverse Problem Solutions for a Digital Image-Based Elasto Tomography Breast Cancer Screening System.
- Development of real time parameter ID algorithms for quantifying agitation in sedated patients, as well as measures of sedation level.
- Agitation sensing with Image Processing based on patient motion and facial grimacing.

**Image Processing and Computer Vision**

- Automated computer vision algorithms based on Atomic Force Microscopy and other high resolution imaging techniques, for biological cell detection and analysis. Features might be utilized for early diagnostics and disease detection techniques.
- Automatic detection of Diabetic Retinopathy
  - Pattern recognition of fovea, veins and optic disk
  - Characterization of dot hemorrhages, exudates and micro-aneurysms
  - Development of accurate potential screening tool for Diabetic Retinopathy
- High Speed 3D Motion Sensing for a Digital Image-based Elasto Tomography Breast Cancer Screening System
  - 3D camera calibration, 3D structure from multiple camera images
  - Automatic feature identification between multiple overlapping camera images
  - Fast feature tracking and pixel correspondence between multiple frames of actuated breast tissue images for each digital camera.
  - Automatic edge extraction algorithms of natural and artificially placed speckle patterns on breast tissue.

- Intensive care patient motion detection and measurement, facial grimacing detection for the development of an agitation sensor
- Measuring morphological change in the Waimakariri River using a rotating camera system with zoom on a 33m power pylon and on a 12m portable mast.
  - Automatic boundary extraction algorithms for images of the Waimakariri river
  - Matching of a 360 degree array of overlapping images based on projectively invariant features and points
  - Creating a plan view from a single calibrated image where the calibration points are measured using a total station.

### **System identification and control for industry applications**

- Robotics development for tree felling and excavator control on steep slopes and complex terrain (Scion and Trinder Engineers).
- Unmanned aerial vehicle (UAV) applications, including small planes, small to medium size blimps, quad-copters and helicopters
- Minimal modeling and control system characterization for Stiff Stay Wire Fences (South Fence Machinery Ltd)
- Computer vision and robotics for automated petrol pumps

### **Structural Health Monitoring:**

- Developing real time integral based structural Health Monitoring algorithms. Applying integral-based methods to detect stiffness changes to the structure of multi-storey buildings during and after an earthquake using only accelerometer data.
- Computational algorithms associated with H-infinity control of large multi-storey buildings

### **HONOURS AND AWARDS:**

1. Rutherford Discovery Fellowship, "*Advanced Rocket System Modelling and Control for Supersonic and Hypersonic Flight*," \$800,000, 2012-2016 – one of 10 chosen across all fields
2. Sir Charles Hercus Health Research Fellowship, "*Model-based cardiac diagnosis and therapy in critical care*," \$500,000, 2007-2010 - the first non-MD researcher to win this fellowship.
3. New Zealand Science and Technology Postdoctoral Fellowship, "*Modeling and Identification of Cardiovascular Haemodynamics for Improved Management of Critical Care Patients*," \$216,000, 2004-2006.
4. University of Canterbury Doctoral Scholarship \$13,000 per year 1997-1999
5. William Georghetti Scholarship, NZ Vice Chancellors Committee, \$6,000 per year 1997-1999.
6. University of Canterbury Senior Scholarship \$1000, 1996.
7. Page memorial prize for academic achievement in third undergraduate year, \$100, 1995.

### **REFLECTED GLORY:**

1. National media coverage of supersonic launch from Birdlings flat, 10.31 am, Saturday 5 May, Kaitorete Spit. Coverage includes TV3 Campbell Live, multiple articles in The Press, The Dominion Post, Sunday Star Times (National Newspaper), Otago Daily Times, TVNZ webpage under national news, Interview on Classic Hits and RDU, The Akaroa Mail. Also featured on news page of University of Canterbury College of Engineering and Rutherford Discovery Royal Society of NZ news.
2. The William Pickering Fellowship was awarded to Lee Wilson to study astronautic engineering at the California Institute of Technology, 2012
3. Significant media coverage from 2009-2011 of rocket research including The Press, Radio New Zealand National, UC Chronicle, local newspapers and Filming for a Science Learning Hub

- (MoRST). In addition, two postgraduate students Malcolm Snowdon and Avinash Rao were selected to feature in the “UCan Inspirational” advertising campaign
4. Best paper award given to Syariful Shamsudin for the paper “Neural Networks Based System Identification for an Unmanned Helicopter System”, Proceedings of the Fourth Asia International Symposium on Mechatronics (AISM 2010), Singapore, 15-18 Dec. 2010, pp. 12-19
  5. University of Canterbury College of Engineering strategic fund, \$2000 for Masters Student Malcolm Snowdon to travel to Singapore to present paper on “Rocket Roll Dynamics and Disturbance - Minimal Modelling and System Identification”, at 11th International Conference on Control, Automation, Robotics and Vision, ICARCV 2010.
  6. College of Engineering Research Poster Competition: *Best Poster Award*, (\$1000) to postgraduate student Ashwath Sundaresan, August 2010.
  7. College of Engineering Research Poster Competition: Merit Awards (3<sup>rd</sup> place tie, \$200 each) awarded to postgraduate student Christina Starfinger, March 2008.
  8. James Hay Conference Grant (\$3500) awarded to PhD student Ashwath Sundaresan for the International Society of Biomechanics XXII Congress in Cape Town, South Africa, 2009.
  9. Conference funding totalling \$2500 from NZSPAA (\$1000), RSNZ (\$1000) and CMRF(\$500) awarded to Christina Starfinger to present the paper “Model-based hemodynamic analysis and prediction of PEEP interventions” at the Society of Critical Care Medicine’s 37th Critical Care Congress, February 2-6, 2008, Honolulu, Hawaii, USA.
  10. Summer Scholarship by the Australian National University in Canberra awarded to Piers Lawrence 2007.
  11. 2<sup>nd</sup> Prize in the Best Mechanical Engineering Postgraduate Paper Competition given to Christina Starfinger (\$100), for the paper “Model based cardiac diagnosis of pulmonary embolism”, University of Canterbury, October, 2007.
  12. College of Engineering Postgraduate Poster Competition: Best poster (1<sup>st</sup> place, \$2000) awarded to PhD student Jason Wong, University of Canterbury, March, 2007.
  13. 1<sup>st</sup> Prize in the Pulsion Medical Systems AG Young Researchers Meeting given to PhD student Christina Starfinger, for the short paper and presentation of “*Haemodynamic management using a minimal cardiac model*,” Munich, Germany, October 7, 2006, approx. \$5k conference funding

## PUBLICATIONS

### Refereed Journal Papers 98 – **24 invited (25%)**

1. Brown, RG, Chase, JG and **Hann, CE** (2012). “A Pointwise Smooth Surface Stereo Reconstruction Algorithm without Correspondence,” Image and Vision Computing, accepted – to appear.
2. Stevenson, DJ, Revie, JA, Chase, JG, **Hann, CE**, Shaw GM, Lambermont, BC, Ghuyesen, A, Kolh, P, and Desai T (2012). “Algorithmic Processing of Pressure Waveforms to Facilitate Estimation of Cardiac Elastance,” BioMedical Engineering OnLine, 11:28, available online.
3. Chandrapal M, Chen XQ, Wang WH, **Hann CE** (2012). “Nonparametric control algorithms for a pneumatic artificial muscle”, Expert Systems With Applications, Vol 39, pp. 8636-8644.
4. Moorhead, KT, Paeme, S, Chase, JG, Kolh, P, Pierard, L, **Hann, CE**, Dauby, PC and Desai, T (2012). “A Simplified Model for Mitral Valve Dynamics,” Computer Methods and Programs in Biomedicine, available online November 26 2011, ISSN: 0169-2607 (**invited**).
5. Revie, JA, Stevenson, DJ, Chase, JG, **Hann, CE**, Lambermont, B, Ghuyesen, A, Kolh, P, Shaw, GM, Heldmann, S and Desai, T (2012). “Validation of Subject-Specific Cardiovascular System Models from Porcine Measurements,” Computer Methods and Programs in Biomedicine, available online Nov 27 2011, ISSN: 0169-2607 (**invited**).
6. **Hann CE**, Snowdon M, Rao A, Winn O, Wongvanich N and Chen XQ (2012). “Minimal Modelling Approach to Describe Turbulent Rocket Roll Dynamics in a Vertical Wind Tunnel,” Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering, - available online, December 2011.

7. Revie, JA, Stevenson, DJ, Chase, JG, **Hann, CE**, Lambermont, BC, Ghuysen, A, Kolh, P, Morimont, P, Shaw, GM and Desaive T (2011). "Clinical detection and monitoring of acute pulmonary embolism: proof of concept of a computer-based method," *Annals of Intensive Care*, 1:33 (open access), ISSN: 2110-5820.
8. Paeme, S, Moorhead, KT, Chase, JG, **Hann, CE**, Lambermont, B, Kolh, P, D'orio, V, Moonen, M, Lancellotti, P, Dauby, PC and Desaive, T (2011). "Mathematical model of the cardiovascular system including mitral valve dynamics. Application to mitral regurgitation," *BioMedical Engineering OnLine*, (open access), 10:86, ISSN: 1475-925X
9. Chase, JG, Lambermont, B, Starfinger, C, **Hann, CE**, Shaw, GM, Ghuysen, A, Kolh, P, Dauby, PC and Desaive, T (2011). "Subject-specific cardiovascular system model-based identification and diagnosis of septic shock with a minimally invasive data set: Animal experiments and proof of concept," *Physiological Measurement*, Vol 32(1), pp. 65-82, ISSN: 0967-3334
10. **Hann, CE**, Revie, JA, Stevenson, D, Heldmann S, Desaive, T, Froissart, CB, Lambermont, B, Ghuysen, A, Kolh, P, Shaw, GM and Chase, JG (2011). "Patient Specific Identification of the Cardiac Driver Function in a Cardiovascular System Model," *Computer Methods and Programs in Biomedicine*, Vol 101(2), pp. 201-207, ISSN: 0169-2607 (**invited**).
11. LeCompte, AJ, Chase, JG, Russell, G, Lynn, A, **Hann, CE**, Shaw, GM, Wong, XW, Blakemore, A and Lin, J (2011). "Modeling the glucose regulatory system in extreme preterm infants," *Computer Methods and Programs in Biomedicine*, Vol. 102(3), pp. 253-66, ISSN: 0169-2607.
12. Sundaresan, A, JG, Chase, **Hann, CE**, and Shaw, GM (2011). "Dynamic Functional Residual Capacity can be estimated using a Stress Strain Approach," *Computer Methods and Programs in Biomedicine*, Vol 101(2), pp. 135-143, ISSN: 0169-2607 (**invited**).
13. Chase JG, LeCompte, AJ, Suhaimi, F, Shaw, GM, Lynn A, Lin, J, Pretty, C, Razak N, Parente, J, **Hann, CE**, Preiser, JC and Desaive T (2011). "Tight glycemic control in critical care - The leading role of insulin sensitivity and patient variability: A review and model-based analysis," *Computer Methods and Programs in Biomedicine*, Vol 102(2), pp. 156-171, ISSN: 0169-2607, (**invited**).
14. Lin, J, Razak, NN, Pretty, CG, LeCompte, AJ, Docherty, PD, Parente, JD, Shaw, GM, **Hann, CE** and Chase, JG (2011). "A physiological Intensive Control Insulin-Nutrition-Glucose (ICING) model validated in critically ill patients," *Computer Methods and Programs in Biomedicine*, Vol 102(2), pp. 192-205, ISSN: 0169-2607.
15. Lin, J, Parente, JD, Chase, JG, Shaw, GM, Blakemore, A, LeCompte, AJ, Pretty, C, Razak, N, Lee, D, **Hann, CE**, Wang, S-H (2011). "Development of a Model-Based clinical Sepsis Biomarker for Critically Ill Patients," *Computer Methods and Programs in Biomedicine*, Vol 102(2), pp. 149-155. ISSN: 0169-2607 (**invited**).
16. Docherty, PD, Chase, JG, Lotz, TF, **Hann, CE**, Shaw, GM, Berkeley, JE, TeMorenaga, L, Mann, JI and McAuley, KA (2011). "Independent Cohort Cross-validation of the Real-time DISTq Estimation of Insulin Sensitivity," *Computer Methods and Programs in Biomedicine*, Vol 102(2), pp. 94-104, ISSN: 0169-2607 (**invited**).
17. LeCompte, AJ, Chase, JG, Lynn, A, **Hann, CE**, Shaw, GM, Lin J (2011). "Development of Blood Glucose Control for Extremely Premature Infants," *Computer Methods and Programs in Biomedicine*, Vol 102(2), pp. 181-191. ISSN: 0169-2607 (**invited**).
18. Moorhead, KT, Scotter, J, Chase, JG, **Hann, CE**, Hill, J, Endre, Z (2011). "Modelling Acute Renal Failure using Blood and Breath Biomarkers in Rats," *Computer Methods and Programs in Biomedicine* (**invited**), Vol 101(2), pp. 173-182, ISSN: 0169-2607.
19. Lotz, TF, Chase, JG, McAuley, KA, Shaw, GM, Docherty, PD, Berkeley, JE, Williams, SM, **Hann, CE** and Mann, JI (2010). "Design and Clinical Pilot Testing of the Model-Based Dynamic Insulin Sensitivity and Secretion Test (DISST)," *Journal of Diabetes Science and Technology (JoDST)*, Vol 4(6), pp. 1408-1423, ISSN: 1932-2968

20. Sundaresan A, Chase JG, **Hann, CE** and Shaw, GM (2010). "Cardiac output estimation using pulmonary mechanics in mechanically ventilated patients," *BioMedical Engineering OnLine*, 9: 80.
21. Preiser, JC, Suhaimi, F, Chase, JG, LeCompte, AJ, Shaw, GM, Pretty, CG, Lin, J, **Hann, CE** and Desaive, T (2010). "The critical role of carbohydrate administration in safe, effective TGC," *Clinical Nutrition*, 2010:5(Suppl 2):111, pp. 227, ISSN: 0261-5614.
22. Burden J, Cleland M, Conway, M, Falconer M, Green, R, Chase, JG, **Hann, CE**, Jermy M, Palmer C (2010). "Tracking a single cyclist during a team changeover on a velodrome track with Python and OpenCV," *Procedia Engineering*, Vol 2: pp. 2931-2935.
23. **Hann, CE**, Docherty P, Chase, JG, Shaw, G (2010). "A fast generalizable solution method for glucose control algorithms," *Mathematical Biosciences*, Vol 227(1), pp. 44-55.
24. Docherty, PD, Chase, JG, **Hann, CE**, Lotz, TF, Lin, J, McAuley, KA, Shaw, GM (2010). "The Identification of Insulin Saturation Effects during the Dynamic Insulin Sensitivity Test," *The Open Medical Informatics Journal* (open access), Vol 4, pp.141-148, ISSN: 1874-4311
25. Chase, JG, Starfinger, C, **Hann, CE**, Shaw, GM and Desaive, T (2010). "Model-based prediction of the patient-specific response to adrenaline," *The Open Medical Informatics Journal* (open access), Vol 4, pp. 149-163, ISSN: 1874-4311
26. Chase, JG, Mayntzhusen K, Docherty PD, Andreassen S, McAuley, KA, Lotz, TF, **Hann, CE** (2010). "A three-compartment model of the C-peptide-insulin dynamic during the DIST test," *Mathematical Biosciences*, Vol 228(2), pp. 136-146, ISSN: 0025-5564.
27. **Hann CE**, Aitchison, D, Kirk, D, Brouwers, E (2010). "Modelling and System Identification of a Stiff Stay Wire Fence Machine," *Proceedings of the Institution of Mechanical Engineers, Part B, Journal of Engineering Manufacture*, Vol 224(7), pp. 1069-1083.
28. **Hann CE**, Chase JG, Desaive, T, Froissart, CF, Revie J, Stevenson, D, Lambermont B, Ghuysen, A, Kolh, P and Shaw GM (2010). "Unique Parameter Identification for Cardiac diagnosis in critical care using minimal data sets," *Computer Methods and Programs in Biomedicine*, 99(1), pp. 75-87. ISSN: 0169-2607.
29. Docherty, PD, Chase, JG, Lotz, T, **Hann, CE**, Shaw, GM, Berkeley, J, Mann, JI and McAuley, KA (2009). "DISTq: An iterative analysis of glucose data for low-cost, real-time and accurate estimation of insulin sensitivity," *The Open Medical Informatics Journal* ([open access](#)), Vol 3, pp. 65-76, ISSN: 1874-4311
30. LeCompte, AJ, Chase, JG, Lynn, A, **Hann, CE**, Shaw, GM, Wong, XW and Lin, J (2009). "Blood Glucose Controller for Neonatal Intensive Care: Virtual trials development and 1st clinical trials," *Journal of Diabetes Science and Technology (JoDST)*, Vol 3(5), pp. 1066-1081, ISSN: 1932-2968 (**invited special symposium article on Artificial Pancreas Systems**).
31. **Hann, CE**, Hewett, D, Revie, JA, Chase, JG and Shaw, GM (2009). "Screening for Diabetic Retinopathy Using Computer Vision and Physiological Markers," *Journal of Diabetes Science and Technology (JoDST)*, Vol 3(4), pp. 819-834, ISSN: 1932-2968
32. Lotz, T, Goltenbott, U, Chase, JG, Docherty, PD and **Hann, CE** (2009). "A minimal C-peptide sampling method to capture peak and total pre-hepatic insulin secretion in model-based experimental insulin sensitivity studies," *Journal of Diabetes Science and Technology (JoDST)*, Vol 3(4), pp. 875-886, ISSN: 1932-2968
33. Chase, JG, Andreassen, S, Pielmeier, U, **Hann, CE**, McAuley, KA and Mann, JI (2009). "A Glucose-Insulin Pharmacodynamic Surface Modeling Validation and Comparison of Metabolic System Models," *Biomedical Signal Processing & Control (BSPC)*, Vol 4(4), pp. 355-363, ISSN: 1746-8094 (**invited special edition**).
34. Singh-Levett, I, **Hann, CE**, Deam, BL Mander, JB and Chase, JG (2009). "Real-Time Structural Health Monitoring of a Non-linear Four Storey Steel Frame Structure," *IEEE Sensors Journal*, Vol 9(11), pp. 1339-1346, ISSN: 1530-437X (**invited special edition on SHM**)

35. Sundaresan A, Yuta T, **Hann CE**, Chase JG, Shaw GM (2009). "A Minimal Model of Lung Mechanics and Model based Markers for Optimizing Ventilator Treatment in ARDS Patients," *Computer Methods and Programs in Biomedicine*, Vol 95(2), pp. 166-180, ISSN: 0169-2607.
36. **Hann, CE**, Chase, JG, Chen, XQ, Berg, C, Brown, RG and Elliot, RB (2009). "Strobe Imaging System for Digital Image-based Elasto-Tomography Breast Cancer Screening", *IEEE Trans on Industrial Electronics (IEEE TIE)*, Vol. 56(8), pp. 3195-3202 ISSN: 1557-9948.
37. Wong, XW, Chase, JG, LeCompte, AJ, **Hann, CE**, Lin J and Shaw GM (2009). "An adaptive clinical Type 1 diabetes control protocol to optimise conventional self-monitoring blood glucose and multiple daily injection therapy," *International Journal of Adaptive Control and Signal Processing (IJACSP)*, Vol 23(5), pp. 408-434, ISSN: 0890-6327 (**invited special issue entitled: "Trust Me, I'm a Doctor: From parsimonious models to pragmatic decision-making and control"**).
38. **Hann, CE**, Hewett, D, Chase, JG, Rabczuk, T, Sundaresan, A, Chen, XQ, Wang, W and Shaw, GM (2009). "Image Based Measurement of Alveoli Expansion in an Animal Model of a Diseased Lung," *International Journal of Computer Applications in Technology (IJCAT)*, Vol 39(1/2/3), pp. 58-65, ISSN: 0952-8091 (**invited**).
39. Brown, RG, **Hann, CE**, Chase, JG and Chen, XQ (2009). "Vision-based 3D Surface Motion Capture for the DIET Breast Cancer Screening System," *International Journal of Computer Applications in Technology*, Vol 39(1-3), pp. 72-78 (**invited**).
40. Nock, V, Ghanbari, A, Wang, W, Blaikie, R, Chase, JG, Chen, XQ and **Hann, CE** (2009). "Force Pattern Characterization of *C. elegans* in Motion," *International Journal of Computer Applications in Technology*, Vol 39(1-3), pp. 137-144 (**invited**).
41. Wolm P, Chen XQ, Chase JG, Pettigrew W and **Hann, CE** (2009). "Analysis of a PM DC Motor Model for Application in Feedback Design for Electric Powered Mobility Vehicles," *International Journal of Computer Applications in Technology*, Vol 39(1-3), pp. 116-122 (**invited**).
42. Wang WH, Chen XQ, Marburg A, Chase JG, and **Hann, CE** (2009). "Design of Low-Cost Unmanned Underwater Vehicle for Shallow Waters," *International Journal of Advanced Mechatronic Systems (IJAMechS)*, Vol 1(3), pp. 194-202, ISSN: 1756-8412
43. Wang, WH, Hewitt, D, **Hann, CE**, Chase, JG and Chen, XQ (2009). "Application of machine vision for automated cell injection," *International Journal of Mechatronics and Manufacturing Systems (IJMMS)*, Vol 2(1/2), pp. 120-134, ISSN: 1753-1039 (**invited, special edition on Advanced Mechatronics Systems**).
44. **Hann, CE**, Chase, JG, Ypma, MF, Elfring J, MohdNor, NH, Lawrence P and Shaw GM (2008). "The Impact of Parameter Identification Methods on Drug Therapy Control in an Intensive Care Unit," *The Open Medical Informatics Journal*, Vol 2, pp 92-104 (**invited**).
45. Chase, JG, LeCompte, AJ, Shaw, GM, Blakemore, A, Wong, J, Lin, J and **Hann, CE** (2008). "A Benchmark Data Set for Model-Based Glycemic Control in Critical Care," *Journal of Diabetes Science and Technology (JoDST)*, Vol 2(4), pp. 584-594, ISSN: 1932-2968. (**Comes with free download data set file and was made free immediately by the journal as a result**)
46. Starfinger, C, Chase, JG, **Hann, CE**, Shaw, GM, Lambermont, B, Ghuysen, A, Kolh, P, Dauby, PC and Desaive, T (2008). "Model-based identification and diagnosis of a porcine model of induced endotoxic shock with hemofiltration," *Mathematical Biosciences*, Vol 216(2), pp. 132-139, ISSN: 0025-5564
47. Desaive, T, Ghuysen, A, Kolh, P, Starfinger, C, **Hann, CE**, Shaw, GM and Chase, JG (2008). "Model-Based Diagnosis of Acute Pulmonary Embolism – Results From A Porcine Model," *Intensive Care Medicine*, Vol 34(Suppl 1), pp. S78, ISSN: 0342-4642
48. Desaive, T, Lambermont, B, Janssen, N, Ghuysen, A, Kolh, P, Dauby, PC, Starfinger, C, **Hann, CE**, Shaw, GM and Chase, JG (2008). "Model-Based Assessment of Right Ventricular Arterial

Coupling During Septic Shock – Results With a Porcine Model,” *Intensive Care Medicine*, Vol 34(Suppl 1), pp. S24, ISSN: 0342-4642

49. Wong, XW, Chase, JG, **Hann, CE**, Shaw, GM, Lotz, T, Lin, J and LeCompte, AJ (2008). “A Subcutaneous Insulin Pharmacokinetic Model for Computer Simulation in a Diabetes Decision Support Role: Model Structure and Parameter Identification,” Part 1 of 2, *Journal of Diabetes Science and Technology (JoDST)*, Vol 2(4), pp. 658-671, ISSN: 1932-2968 (**companion paper #1**).
50. Wong, XW, Chase, JG, **Hann, CE**, Shaw, GM, Lotz, T, Lin, J and LeCompte, AJ (2008). “A Subcutaneous Insulin Pharmacokinetic Model for Computer Simulation in a Diabetes Decision Support Role: Validation and Simulation,” Part 2 of 2, *Journal of Diabetes Science and Technology (JoDST)*, Vol 2(4), pp. 672-680, ISSN: 1932-2968 (**companion paper #2**).
51. Chase, JG, Shaw, GM, LeCompte, AJ, Lonergan, T, Willacy, M, Wong, XW, Lin, J, Lotz, T, Lee, DS and **Hann, CE** (2008). “Implementation and Evaluation of the SPRINT Protocol for Tight Glycaemic Control in Critically Ill Patients: A Clinical Practice Change,” *Critical Care, BMC (open access)*, Vol 12(2):R49, doi:10.1186/cc6868, ISSN: 1364-8535.
52. **Hann, CE**, Chase JG, Shaw GM, Wong J, Lin J, Lotz T and LeCompte A (2008). “The concept of minimal mathematical modelling to understand and improve glycemic control in Critical Care,” *Diabetes Research and Clinical Practice* 79(1):S43-S44.
53. Starfinger, Chase, JG, C, **Hann, CE**, Shaw, GM, Lambert, P, Smith, BW, Sloth, E, Larsson, A, Andreassen, S and Rees, S (2008). “Model-based identification of PEEP titrations during different volemic levels,” *Computer Methods and Programs in Biomedicine*, Vol 91(2), pp. 135-144, ISSN: 0169-2607.
54. Starfinger, Chase, JG, C, **Hann, CE**, Shaw, GM, Lambert, P, Smith, BW, Sloth, E, Larsson, A, Andreassen, S and Rees, S (2008). “Prediction of hemodynamic changes towards PEEP titrations at different volemic levels using a minimal cardiovascular model,” *Computer Methods and Programs in Biomedicine*, Vol 91(2), pg. 128-134, ISSN: 0169-2607.
55. Chase, JG, Shaw, GM, Blakemore, A, Wang, S, LeCompte, AJ, Wong, XW, Lotz, T, Lin, J and **Hann, CE** (2008). “High(er) Insulin Sensitivity Rules Out Sepsis in Critical Care,” *Diabetes*, Vol 57 (Suppl 1), pp. A23, ISSN: 0012-1797.
56. Blakemore, A, Wang, S, LeCompte, AJ, Wong, XW, Shaw, GM, Lin, J, Lotz, T, **Hann, CE** and Chase, JG (2008). “Model-based Insulin Sensitivity as a Sepsis Diagnostic in Critical Care,” *Journal of Diabetes Science and Technology (JoDST)*, Vol 2(3), pp. 468-477, ISSN: 1932-2968.
57. Wong, XW, Chase, JG, **Hann, CE**, Lotz, T, Lin, J, LeCompte, AJ and Shaw, GM (2008). “Development of a clinical type 1 diabetes metabolic system model and in silico simulation tool,” Part 1 of 2, *Journal of Diabetes Science and Technology (JoDST)*, Vol 2(3), pp. 424-435, ISSN: 1932-2968 (**invited journal symposium**).
58. Wong, XW, Chase, JG, **Hann, CE**, Lotz, T, Lin, J, LeCompte, AJ and Shaw, GM (2008). “In silico simulation of long-term Type 1 diabetes glycaemic control treatment outcomes,” Part 2 of 2, *Journal of Diabetes Science and Technology (JoDST)*, Vol 2(3), pp. 436-449, ISSN: 1932-2968 (**invited journal symposium**).
59. Wong, XW, Chase, JG, Shaw, GM, **Hann, CE**, Lotz, T, Lin, J, Singh-Levett, I and Hollingsworth, L (2008). “Simulation and initial proof of concept validation of a glycaemic regulation algorithm in critical care,” *Control Engineering Practice (CEP)*, Online June 2007, Vol 16(3), pp. 271-285, ISSN: 0967-0661.
60. Starfinger, C, Chase, JG, **Hann, CE** and Shaw, GM (2007). “Model-based hemodynamic analysis and prediction of PEEP interventions,” *Critical Care Medicine*, Vol 35(12 Suppl), pp. A86, ISSN: 0090-3493.
61. Lotz, T, Chase, JG, Shaw, GM, McAuley, KA, Wong, XW, Lin, J, LeCompte, A, **Hann, CE** and Mann, JI (2008). “Monte Carlo analysis of a new model-based method for insulin sensitivity testing,” *Computer Methods and Programs in Biomedicine*, 89(3):215-25, ISSN: 0169-2607.



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97. Doran, CV, Moorhead, KT, Hudson, NH, Chase, JG, Shaw, GM and **Hann, CE** (2004). "Derivative Weighted Active Insulin Control Modelling and Clinical Trials for ICU Patients," Medical Engineering and Physics, Vol 26(10), pp. 855-866, ISSN: 1350-4533.
98. **Hann, CE** and Hickman, MS (2002). "Projective Curvature and Integral Invariants", Acta Applicandae Mathematicae, 74: 177-193.

**Refereed Conference Papers and Abstracts: 156 - 36 invited (24%)**

1. Revie, JA, Stevenson, DK, Chase, JG, **Hann, CE**, Lambermont, BC, Ghuysen, A, Kolh, P, Shaw, GM and Desaive, T (2012). "Computer-based monitoring of global cardiovascular dynamics during acute pulmonary embolism and septic shock in swine" 32nd Symposium on Intensive Care and Emergency Medicine (ISICEM), Brussels, Belgium March 20-23, 1-page.
2. Paeme, S, Moorhead, KT, Chase, JG, **Hann, CE**, Lambermont, B, Kolh, P, Moonen, M, Lancellotti, P, Dauby, PC and Desaive, T (2011). "Structural Model of the Mitral Valve Included in a Cardiovascular Closed Loop Model," NCBME National Day on Bio-Engineering Conference, Nov 30, Brussels, 1-page.
3. Revie, JA, Stevenson, DJ, Chase, JG, **Hann, CE**, Shaw, GM, LeCompte, AJ, Lambermont, BC, Ghuysen, A, Kolh, P and Desaive, T (2011). "Model-based diagnosis of acute pulmonary embolism and septic shock in porcine trials," Health Research Society of Christchurch Annual Scientific Session, Nov 15, Christchurch, NZ, 1-page.
4. **Hann, CE**, Rao, AA, Snowdon, M, Winn, O, Wongvanich, N, Chen, XiaoQi (2011). "Minimal Modelling of Rocket Roll Response and Aerodynamic Disturbance in a Wind Tunnel," Proceedings of the 9<sup>th</sup> International IEEE Conference on Control & Automation (ICCA'11), Santiago, Chile, Dec 19-21.

5. Stevenson, D, **Hann, CE**, Chase, JG, Revie JA, Shaw, GM, Desaive, T, Lambermont, B, Ghuysen A, Kolh, P, Heldmann S (2011). "Processing aortic and pulmonary artery waveforms to derive the ventricle time-varying elastance," Proc 18<sup>th</sup> IFAC World Congress, Milan, Italy, August 28-September 2, 6-pages (**invited**).
6. Paeme, S, Moorhead, KT, Chase, JG, **Hann, CE**, Lambermont, B, Kolh, P, Moonen, M, Lancelotti, P, Dauby, PC and Desaive, T (2011). "Minimal cardiovascular system Model including A physiological description of progressive mitral valve orifice dynamics for studying valve dysfunction," ISB 2011, Brussels, Belgium, July 3-7, 3-pages.
7. Lotz, T, Muller, N, **Hann, CE** and Chase, J.G. (2011). "Minimal Elastographic Modeling of Breast Cancer for Model Based Tumour Detection in a Digital Image Elasto Tomography (DIET) System," Proceedings of the SPIE Medical Imaging Conference, Orlando, Florida, USA, 12-17 February 2011.
8. Revie, JA, Stevenson, DJ, Chase, JG, **Hann, CE**, LeCompte, AJ, Lambermont, B, Ghuysen, A, Kolh, P, Shaw, GM and Desaive, T (2011). "Model-based cardiovascular monitoring of large pore hemofiltration during endotoxic shock in pigs," 31st International Symposium on Intensive Care and Emergency Medicine (31st ISICEM), Brussels, Belgium, March 22-25, 1-page.
9. Revie, JA, Stevenson, DJ, Chase, JG, **Hann, CE**, Lambermont, B, Ghuysen, A, Kolh, P, Shaw, GM and Desaive, T (2011). "Model-based cardiovascular monitoring of acute pulmonary embolism in porcine trials," 31st International Symposium on Intensive Care and Emergency Medicine (31st ISICEM), Brussels, Belgium, March 22-25, 1-page.
10. Stevenson, DJ, Revie, JA, Chase, JG, **Hann, CE**, LeCompte, AJ, Shaw, GM, Lambermont, B, Kolh, P and Desaive, T (2011). "Pulmonary embolism diagnostics from the driver function," 31st International Symposium on Intensive Care and Emergency Medicine (31st ISICEM), Brussels, Belgium, March 22-25, 1-page.
11. Sundaresan, A, Chase, JG, **Hann, CE** and Shaw, GM (2011). "Optimal PEEP in Mechanically Ventilated Patients: A Clinical Study," 31st International Symposium on Intensive Care and Emergency Medicine (31st ISICEM), Brussels, Belgium, March 22-25, 1-page.
12. **Hann, CE**, Narbot M and MacAskill M (2010). "Diabetic Retinopathy Detection using Geometrical Techniques related to the Underlying Physiology," 25<sup>th</sup> International Conference of Image and Vision Computing New Zealand, 8-9 November, Queenstown 2010, 8-pages.
13. Shamsudin, S.S., Chen, X.Q., Wang, W.H., **Hann, C.E.**, Chase, J.G., "Neural Networks Based System Identification for an Unmanned Helicopter System", Proceedings of the Fourth Asia International Symposium on Mechatronics (AISM 2010), Singapore, 15-18 Dec. 2010, pp. 12-19 (**Best Paper Award**)
14. Shamsudin, S.S., Chen, X.Q., Wang, W.H., **Hann, C.E.**, Chase, J.G., Thijssen, B. and Pain, J. (2010). "Neural Networks Based System Identification for an Unmanned Helicopter," Taipei, Taiwan: 2010 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2010), 18-22 Oct 2010, 6-pages.
15. **Hann, CE**, Snowdon, M, Rao, A, Tang, R, Korevaar, A, Skinner, G, Keall, A, Chen, XQ and Chase, JG (2010). "Rocket Roll Dynamics and Disturbance – Minimal modelling and system identification," Proc 11th International Conference on Control, Automation, Robotics and Vision (ICARCV 2010), Singapore, Dec 7-10, 6-pages.
16. Desaive, T, Chase, JG, **Hann, CE**, Stevenson, D, Revie, JA, Lambermont, B, Morimont, P, Ghuysen, A, Kolh, P, Dauby, PC and Shaw, GM (2010). "Time varying elastance estimation in an 8 chamber cardiovascular system model," Proc of 23rd European Soc of Intensive Care Medicine (ESICM) Annual Congress, October 10-13, Barcelona, Spain, 1-page.
17. Preiser, J-C, Suhaimi, F, Chase, JG, LeCompte, AJ, Shaw, GM, Pretty, CG, Lin, J, **Hann, CE** and Desaive, T (2010). "The Critical Role of Carbohydrate Administration in Safe, Effective TGC," 32nd Excellence in Science, Practice and Education in Nutrition 2010 - 32nd Congress of Clinical Nutrition and Metabolism (ESPEN 2010), Nice, France, Sept 5-8, 1-page.

18. Kovacs, L, Gyorgy, A, Szalay, P, Benyo, B, Benyo, Z, **Hann, CE** and Chase, JG (2010). "Investigating the Applicability of qALPV Modeling to ICU Models for Glycaemic Control," CONTROL 2010, UK International Conf on Control, Coventry, UK, Sept 7-10, 6-pages (invited).
19. Lin, J, Razak, NN, Pretty, CG, LeCompte, AJ, Docherty, PD, Parente, JD, Shaw, GM, **Hann, CE** and Chase, JG (2010). "Intensive Control Insulin-Nutrition-Glucose Model Validated in Critically Ill Patients," CONTROL 2010, UK International Conf on Control, Coventry, UK, Sept 7-10, 6-pages (invited).
20. Docherty, PD, Chase, JG, Lotz, TF, **Hann, CE**, TeMorenaga, L, McAuley, KA, Shaw, GM, Berkeley, JE and Mann, JI (2010). "Evaluation of the Performances and Costs of a Spectrum of DIST Protocols," CONTROL 2010, UK International Conf on Control, Coventry, UK, Sept 7-10, 6-pages (invited).
21. Lin, J, Jamaludin, U, Docherty, PD, Razak, NN, LeCompte, AJ, Pretty, CG, **Hann, CE**, Shaw, GM and Chase, JG (2010). "Modeled Insulin Sensitivity and Interstitial Insulin Action from a Pilot Study of Dynamic Insulin Sensitivity Tests," CONTROL 2010, UK International Conf on Control, Coventry, UK, Sept 7-10, 6-pages (invited).
22. Shaw, GM, Chase, JG and **Hann, CE** (2010) "A Clinician's View of Engineering and Technology in Intensive Care - Model-based Therapeutics and Patient Outcomes," CONTROL 2010, UK International Conf on Control, Coventry, UK, Sept 7-10, 6-pages (invited, plenary paper, invited symposium opening paper).
23. Sundaresan, A, Chase, JG, **Hann, CE** and Shaw, GM (2010). "Prediction of Cardiac Output changes with response to PEEP on patients under mechanical ventilation," CONTROL 2010, UK International Conf on Control, Coventry, UK, Sept 7-10, 6-pages (invited).
24. Sundaresan, A, Chase, JG, **Hann, CE** and Shaw, GM (2010). "Model-based PEEP selection in mechanically ventilated patients – First clinical trial results," CONTROL 2010, UK International Conf on Control, Coventry, UK, Sept 7-10, 6-pages (invited).
25. Desaive, T, Lambermont, B, Ghuysen, A, Kolh, P, Morimont, P, Dauby, PC, Starfinger, C, **Hann, CE**, Shaw, GM and Chase, JG (2010). "Assessment of ventricular-arterial coupling with a model-based sensor," CONTROL 2010, UK International Conf on Control, Coventry, UK, Sept 7-10, 6-pages (invited).
26. Moorhead, KT, **Hann, CE**, Chase, JG, Paeme, S, Kolh, P, Dauby, PC and Desaive, T (2010). "A Simplified Rotational Spring Model for Mitral Valve Dynamics," CONTROL 2010, UK International Conf on Control, Coventry, UK, Sept 7-10, 6-pages (invited).
27. Paeme, S, Moorhead, KT, Chase, JG, **Hann, CE**, Lambermont, B, Kolh, P, Moonen, M, Lancellotti, P, Dauby, PC and Desaive, T (2010). "Mathematical model of the mitral valve and the cardiovascular system: Application for studying, monitoring and in the diagnosis of valvular pathologies," CONTROL 2010, UK International Conf on Control, Coventry, UK, Sept 7-10, 6-pages (invited).
28. Revie, JA, **Hann, CE**, Stevenson, D, Chase, JG, Desaive, T, Lambermont, B, Ghuysen, A, Kolh, P, Shaw, GM and Heldmann, S (2010). "A Model-based Approach to Cardiovascular Monitoring of Pulmonary Embolism," CONTROL 2010, UK International Conf on Control, Coventry, UK, Sept 7-10, 6-pages (invited).
29. Stevenson, D, **Hann, CE**, Chase, JG, Revie, JA, Shaw, GM, Desaive, T, Lambermont, B, Ghuysen, A, Kolh, P and Heldmann, S (2010). "Estimating the driver function of a cardiovascular system mode," CONTROL 2010, UK International Conf on Control, Coventry, UK, Sept 7-10, 6-pages (invited).
30. Lotz, T., Simpson, P.D., Stocker, D., **Hann, C.E.**, Chase, J.G. (2010), "In vitro evaluation of surface based non-invasive breast cancer screening with Digital Image based Elasto Tomography (DIET)", Proc IEEE Eng Med and Biol Soc (EMBS2010), Buenos Aires, Argentina, 31 Aug – 4 Sept

31. Feng, S., Lotz, T., Chase, J.G., **Hann, C.E.** (2010), "An Image Based Vibration Sensor for Soft Tissue Modal Analysis in a Digital Image Elasto Tomography (DIET) System", Proc IEEE Eng Med and Biol Soc (EMBS2010), Buenos Aires, Argentina, 31 Aug – 4 Sept
32. Burden, J., Cleland, M., Conway, M., Falconer, M., Green, R., Chase, J. G., Hann, C. E., Jermy, M. and Palmer, C. (2010) Tracking a single cyclist during a team changeover on a velodrome track with Python and OpenCV. Vienna, Austria: 8th Conference of the International Sports Engineering Association (ISEA), 12-16 Jul 2010. In *Procedia Engineering*, 2, 2, The Engineering of Sport 8 - Engineering Emotion, 2931-2935.
33. Revie, JA, **Hann, CE**, Stevenson D, Chase, JG, Heldmann S, Shaw, GM, Desaive, T, Froissart, CB, Lambermont, B, Ghuysen, A, and Kolh, P. (2010). "Model-based cardiac disease diagnosis in critical care," Health Research Society of Canterbury (HRSC) Clinical Meeting, Christchurch, April 22, 1-page
34. Stevenson, D, **Hann, CE**, Revie, JA, Chase, JG, Heldmann S, Shaw, GM, Desaive, T, Froissart, CB, Lambermont, B, Ghuysen, A, and Kolh, P. (2010). "Patient specific modelling of cardiac muscle activation," Health Research Society of Canterbury (HRSC) Clinical Meeting, Christchurch, April 22, 1-page
35. Docherty, PD, Chase, JG, Lotz, TF, TeMorenga, L, Mann, JI, McAuley, KA, Berkely, JE and **Hann, CE** (2010). "A comparison between the HOMA and the quick DIST for in-expensive insulin sensitivity identification," Health Research Society of Canterbury (HRSC) Clinical Meeting, Christchurch, April 22, 1-page
36. **Hann, CE**, Revie, JA, Hewett, D, Chase, JG and Shaw, GM (2010). "Screening for Diabetic Retinopathy Using Computer Vision and Physiological Markers," Health Research Society of Canterbury (HRSC) Clinical Meeting, Christchurch, March 26, 1-page
37. Shaw, GM, Chase, JG, Sundaresan, A and **Hann, CE** (2010). "What's different in Ventilation? ... One Size Does NOT Fit all!" Australia-New Zealand Intensive Care Society Scientific Meeting (ANZICS 2010), Hastings, New Zealand, March 3-5, 1-page (**invited - oral**).
38. **Hann, CE**, Sirisena, H, Wongvanich N (2010). "Simplified Modeling Approach to system Identification of Non-linear Boat Dynamics," 2010 American Control Conference (ACC2010), Baltimore, Maryland, USA, June 30 – July 2, 6-pages
39. Desaive, T, Starfinger, C, Chase, JG, **Hann, CE** and Shaw, GM (2009). "Model-based Cardiovascular Therapeutics: Capturing the patient-specific impact of inotrope therapy," 29es Journées de l'Hypertension Artérielle - 3rd International Meeting of the French Society of Hypertension, Paris, France, 17-18 December, 1-page.
40. Desaive, T, Paeme, S, Chase, JG, **Hann, CE**, Lambermont, B, Kolh, P, Moonen, M, Lancellotti, P, Dauby, P.C. and Barnett, A (2009). "Mitral valve dynamics in a closed-loop model of the cardiovascular system," 29es Journées de l'Hypertension Artérielle - 3rd International Meeting of the French Society of Hypertension, Paris, France, 17-18 December, 1-page.
41. **Hann, CE**, Chase, JG, Desaive, T, Froissart, C, Revie, J, Stevenson, D and Shaw, GM (2009). "Unique parameter identification of a cardiovascular system model using feedback control," 7<sup>th</sup> International Conference on Control and Automation (ICCA09), Christchurch, New Zealand, December 9-11, 6-pages
42. LeCompte, AJ, Lynn, A, Chase, JG, Shaw, GM, Lee, DS, Wong, XW, Lin, J and **Hann, CE** (2009). "Model-based targeted control with stochastic forecasting for regulation of glycemia in ELBW neonates," Proc 9th Annual Diabetes Technology Meeting (DTM2009), Nov 5-7, San Francisco, CA, 1-page.
43. LeCompte, AJ, Lynn, AM, Chase, JG, Shaw, GM, Lin, J, **Hann, CE** and Lee, DS (2009). "Blood Glucose Control in Preterm VLBW Infants Using Model- based Methods," 13th Perinatal Society of New Zealand Annual Scientific Meeting, October 16, Christchurch, NZ, 1-page abstract.
44. Moorhead, K.T., Hill, J.V., Chase, J.G., **Hann, C.E.**, Scotter, J.M. and Endre, Z.H. (2009) Correlation of Breath Markers with Current Gold Standards for Modelling Acute Renal Failure in

Rats. Dortmund, Germany: International Conference on Breath and Breath Odour Research 2009 (BREATH 2009), 26-30 Apr 2009.

45. Desaive, T, Chase, JG, Lambermont, B, Morimont, P, Ghuysen, A, Kolh, P, Dauby, PC, Starfinger, C, Shaw, GM and **Hann, CE** (2009). "Patient specific model of the cardiovascular system during septic shock," Proc of 21st European Soc of Intensive Care Medicine (ESICM) Annual Congress, October 11-14, Vienna, Austria, 1-page
46. Desaive, T, Chase, JG, Sundaresan, A, **Hann, CE**, Morimont, P, Lambermont, B, and Shaw, GM (2009). "Model-based assessment of dynamic FRC (DFRC)," Proc of 21st European Soc of Intensive Care Medicine (ESICM) Annual Congress, October 11-14, Vienna, Austria, 1-page
47. Desaive, T, Chase, JG, Starfinger, C, Lambermont, B, Ghuysen, A, Kolh, P, Dauby, PC, Shaw, GM and **Hann, CE** (2009). "Patient-specific modelling of the cardiovascular system – application to septic shock with a minimal data set," Proc 11th World Congress on Medical Physics and Biomedical Engineering, Munich, Germany, September 7-12, 4 pages.
48. **Hann, CE**, Chase, JG, Desaive, T, Froissart, C, Revie, J, Stevenson, D, Lambermont, B, Ghuysen, A, Kolh, P and Shaw, GM (2009). "Unique parameter identification for model-based cardiac diagnosis in critical care," 7th IFAC Symposium on Modelling and Control in Biomedical Systems (MCBMS2009), Aalborg, Denmark, August 12-14, 6-pages (**invited**)
49. **Hann, CE**, Chase, JG, Desaive, T, Starfinger, C, Lambermont, B, Ghuysen, A, Kolh, P and Shaw, GM (2009). "Model-based therapeutics for the cardiovascular system – a clinical focus," 7th IFAC Symposium on Modelling and Control in Biomedical Systems (MCBMS2009), Aalborg, Denmark, August 12-14, 6-pages (**invited**)
50. **Hann, CE**, Chase, JG, Revie, J, Hewett, D, and Shaw, GM (2009). "Diabetic Retinopathy Screening Using Computer Vision," 7th IFAC Symposium on Modelling and Control in Biomedical Systems (MCBMS2009), Aalborg, Denmark, August 12-14, 6-pages (**invited**)
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- Critically Ill and High Dependency Unit Patients: An In Silico Study,” Proc 6th IFAC Symposium on Modeling and Control in Biomedical Systems (MCBMS09), Aalborg, Denmark, August 12-14, 6-pages (**invited**).
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97. **Hann CE**, Starfinger C, Chase JG, Desaive T, Ghuysen A and Shaw GM (2007). "Model-based sensor of hemodynamics in critical care," 2nd International Conference on Sensing Technology (ICST 2007), November 26-28, 2007, Palmerston North, New Zealand.

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108. Berger, H-U, **Hann, CE**, Chase, JG, Broughton, B and Van Houten, E (2007). "Boundary Element Methods in Elastography – A first explorative study," Proc of the SPIE Medical Imaging Conference - Physiology, Function, and Structure from Medical Images, Feb 17-22, San Diego, USA, 12-pages.
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125. Singh-Levett, Chase, JG, Deam, BL and **Hann, CE** (2006). "Real-Time Integral Based Structural Health Monitoring," 19<sup>th</sup> Australasian Conference on Mechanics of Structures and Materials (ACMSM), 29 November – 1 December, Christchurch, New Zealand, 6-pages.

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132. Chase, JG, Lonergan, T, LeCompte, A, Willacy, M, Shaw, GM, Wong, XW, Lin, J, Lotz, TS and **Hann, CE** (2005). "Tight glucose control in critically ill patients using a specialized insulin-nutrition-table," 12<sup>th</sup> Intl Conference on Biomedical Engineering (ICBME), Singapore, Dec 7-10.
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138. **Hann, CE**, Chase, JG and Shaw, GM (2005). "Efficient Implementation of a Non-Linear Cardio-Vascular System Model for Real-Time Therapy Assistance in Critical Care," 12<sup>th</sup> Intl Conference on Biomedical Engineering (ICBME), Singapore, Dec 7-10
139. **Hann, CE**, Chase, JG, Andreassen, S, Smith, BW, and Shaw, GM (2005). "Simulating cardiac disease from onset with a minimal cardiac model including reflex actions," 12<sup>th</sup> Intl Conference on Biomedical Engineering (ICBME), Singapore, Dec 7-10.

140. Lotz, TF, Chase, JG, McAuley, KA, Shaw, GM, **Hann, CE** and Mann, JI (2005). "A Highly Correlated Method to Assess Insulin Resistance in Broad Populations," 12<sup>th</sup> Intl Conference on Biomedical Engineering (ICBME), Singapore, Dec 7-10.
141. Wong, XW, Chase, JG, Shaw, GM, Lin, J, Lotz, T and **Hann, CE** (2005). "Clinical Trials of Active and Adaptive Insulin and Nutrition Control to Control Hyperglycaemia in Critically Ill Patients," 2005 Canterbury Health Research Conference (CHSRC 2005), Christchurch, New Zealand, August 26-27, 1-page
142. Chase, JG, Lin, J, Lee, DS, Shaw, GM, Lotz, T, **Hann, CE** and Wong, XW (2005). "Modelling Stochastic Insulin Sensitivity Variability in Critical Care," 2005 Canterbury Health Research Conference (CHSRC 2005), Christchurch, New Zealand, August 26-27, 1-page
143. Chase, JG, Lotz, T, McAuley, KA, Shaw, GM, **Hann, CE**, Lin, J, and Mann, JI (2005). "Model-based Assessment of Insulin Resistance in Broad Populations," 2005 Canterbury Health Research Conference (CHSRC 2005), Christchurch, New Zealand, August 26-27, 1-page
144. **Hann, CE**, Chase J G, Andreassen S, Smith B W, Shaw G M (2005). "Diagnosis Using a Minimal Cardiac Model Including Reflex Actions". 18th European Society of Intensive Care Medicine Congress in Amsterdam, The Netherlands.
145. Hii, A, Chase, JG, **Hann, CE** and Van Houten, EEW (2004). "Normalized Cross-Correlation Method For Motion Imaging Of Human Skin," New Zealand Physics and Engineering in Medicine (NZPEM), Proc. of the 2004 Annual Conference of the Australasian College of Physical Scientists and Engineers in Medicine (ACPEM), Christchurch, New Zealand, Nov. 22-23
146. **Hann, CE**, Chase, JG, Shaw, GM and Smith, BW (2004). "Fast Identification Of A Minimal Cardiac Model," New Zealand Physics and Engineering in Medicine (NZPEM), Proc. of the 2004 Annual Conference of the Australasian College of Physical Scientists and Engineers in Medicine (ACPEM), Christchurch, New Zealand, Nov. 22-23
147. Lotz, T, Chase, JG, McAuley, KA, Lin, J, Shaw, GM and **Hann, CE** (2004). "Highly correlated model-based measures of insulin sensitivity," New Zealand Physics and Engineering in Medicine (NZPEM), Proc. of the 2004 Annual Conference of the Australasian College of Physical Scientists and Engineers in Medicine (ACPEM), Christchurch, New Zealand, Nov. 22-23
148. Chase, JG, Shaw, GM, Lin, J, Doran, CV, **Hann, CE**, Robertson, MB, Brown, PM, Lotz, T, Wake, GC and Broughton, B (2004). "Adaptive Bolus-Based Set-Point Regulation of Hyperglycemia in Critical Care," Proc 26<sup>th</sup> International Conf of IEEE Engineering in Med and Biology Society (EMBS 2004), San Francisco, CA, Sept 1-5, pp. 3463-3466, ISBN: 0-7803-8440-7.
149. Lin, J, Chase, JG, Shaw, GM, Lotz, T, **Hann, CE**, Doran, CV, and Lee, DS (2004). "Long Term Verification of Glucose-Insulin Regulatory System Model Dynamics," Proc 26<sup>th</sup> International Conf of IEEE Engineering in Med and Biology Society (EMBS 2004), San Francisco, CA, Sept 1-5, pp. 758-761, ISBN: 0-7803-8440-7.
150. Yuta, T, Chase, JG, Shaw, GM and **Hann, CE** (2004). "Dynamic Models of ARDS Lung Mechanics for Optimal Patient Ventilation," Proc 26<sup>th</sup> International Conf of IEEE Eng in Med and Biology Soc (EMBS 2004), San Francisco, CA, Sept 1-5, pp. 861-864, ISBN: 0-7803-8440-7.
151. **Hann, CE**, Chase, JG, Shaw, GM and Smith, BW (2004). "Computationally Efficient Velocity Profile Solutions for Cardiac Haemodynamics," Proc 26<sup>th</sup> International Conf of IEEE Eng in Med and Biology Soc (EMBS 2004), San Francisco, CA, Sept 1-5, pp. 944-947, ISBN: 0-7803-8440-7.
152. **Hann, CE**, Chase, JG, Shaw, GM and Smith, BW (2004). "Identification of Patient Specific Parameters for a Minimal Cardiac Model," Proc 26<sup>th</sup> International Conf of IEEE Engineering in Med and Biology Society (EMBS 2004), SF, CA, Sept 1-5, pp. 813-816, ISBN: 0-7803-8440-7.
153. Lotz, T, Chase, JG, Shaw, GM, **Hann, CE** and Macauley, KA (2004). "Advanced modeling of Glucose and Insulin Kinetics for Adaptive Tight Regulation of Hyperglycaemia," 2004 Canterbury Health Sciences Research Conference (CHSRC 2004), September 5-6, Christchurch.

154. Horn, B, Chase, JG, **Hann, CE** and Smith, BW (2004). "Augmented Minimal Model of the Cardiovascular System for Clinical Applications," 2004 Canterbury Health Sciences Research Conference (CHSRC 2004), September 5-6, Christchurch.
155. Yuta, T, Chase, JG, Shaw, GM and **Hann CE** (2004). "ARDS Lung Mechanics for Optimising Ventilator Treatment," 2004 Canterbury Health Sciences Research Conference (CHSRC 2004), September 5-6, Christchurch.
156. **Hann CE** (1999). "Numerical Signature Curves," New Zealand Mathematics Colloquium 1999, July 6-9, University of Canterbury, Christchurch, New Zealand (abstract).

## **PATENTS and ALLOWED APPLICATIONS: (Chrono and Status Order)**

### **Allowed/Published (1<sup>st</sup> peer review step in USPTO process):**

1. "Global Motion Invariant Signatures For Fast And Accurate Motion Tracking In A Digital Image-Based Elasto-Tomography System," US20080287807, Chase, Hann and Ray.
2. "Integral Based Parameter Identification Applied To Three Dimensional Tissue Stiffness. Reconstruction In A Digital Image-Based Elasto-Tomography System," US20080287780, Chase and Hann.

## **SUPERVISION OF RESEARCH STUDENTS:**

### **PhD:**

1. **Bart Milne;** PhD (Future Forest Research scholarship), Univ of Canterbury, *Robotisation of Steep Country Forestry Harvesting*, 2012 onwards (co-supervisor with Prof XiaoQi Chen)
2. **Rejina Choi;** PhD, Univ of Canterbury, *Nonlinear Adaptive Control for UAV*, 2012 onwards (co-supervisor with Prof XiaoQi Chen)
3. **Samuel Frei;** PhD (NZi3 industry scholarship + Trimble), Univ of Canterbury, *Accurate orientation using low-cost sensors*, 2012 onwards (primary supervisor)
4. **Malcolm Snowdon;** PhD (MSI TIFF), Univ of Canterbury, *Offline control system design using a virtual rocket database and minimal test launches*, 2010 onwards (primary supervisor)
5. **Avinash Rao;** PhD (MSI TIFF), Univ of Canterbury, *Advanced Real-Time Model-Based Rocketry Control System Development Methodology*, 2010 onwards (primary supervisor)
6. **Napasool Wongvanich;** PhD, *Simplified modelling approaches, parameter identification and control – application to autonomous systems*. Dept of Electrical and Computer Engineering. 2010 onwards (primary supervisor).
7. **James Revie;** PhD, *Coupled Cardio-Pulmonary Models for use in Mechanically Ventilated ICU Patients with Cardiac Dysfunction*. Dept of Mechanical Engineering. 2009 onwards with Prof Geoff Chase, and Dr Geoff Shaw. (Co-supervisor)
8. **Dave Stevenson;** PhD, Univ of Canterbury, Research Title: *Model-based Cardiac Diagnosis and Therapy in Critical Care*. Dept of Mechanical Engineering. 2009 onwards with Prof Geoff Chase, and Dr Geoff Shaw. (Co-supervisor)

9. **Kim Rait**; PhD, Univ of Canterbury, Research Title: *Modelling Rock Avalanches*. Dept of Civil and Natural Resources Engineering. 2009 onwards with Dr Elisabeth Bowman. (Co-supervisor)
10. **Katherine Moorhead**; completed PhD, *Implementation of Analytical Mathematics for SIFT-MS Medical Applications*. 2009 (Assistant supervisor)
11. **Ashwath Sundaresan**; PhD, Univ of Canterbury, Research Title: *Accounting for lung tissue stress and damage in mechanical ventilation*. Dept of Mechanical Engineering. 2008 onwards with Prof Geoff Chase, Prof Geoff Shaw and Dr Timon Rabczuk. (Co-supervisor)
12. **Paul Docherty**; PhD, Univ of Canterbury: *High Resolution Clinical Model-Based Assessment of Insulin Sensitivity*, 2008 onwards with Prof Geoff Chase and Dr Geoff Shaw. (Co-supervisor)
13. **Chris Pretty**; PhD, Univ of Canterbury, Research Title: *Optimising Drug Delivery for Treating Heart Failure and Shock in Critical Care*. Dept of Mechanical Engineering. 2008 onwards with Prof Geoff Chase and Dr Geoff Shaw. (Assistant supervisor)
14. **Richard Brown**; completed PhD, Univ of Canterbury, Research Title: *High-Speed 3D motion Sensing for a Digital Image-based Elasto-Tomography (DIET) Breast Cancer Screening System*. Dept of Mechanical Engineering. 2008, with Dr Geoff Chase. (Co-supervisor)
15. **Christina Starfinger**; completed PhD, Univ of Canterbury, Research Title: *Real time patient specific modeling of the cardiovascular system for therapy assistance in the Intensive Care Unit*. Dept of Mechanical Engineering. 2008 with Dr Geoff Chase and Dr Geoff Shaw. (Co-supervisor).
16. **Hans-Uwe Berger**; recently completed PhD, Univ of Canterbury, Research Title: *Boundary Element Methods for Inverse Problems in Soft Tissue Elastography*. Dept of Mechanical Engineering. 2009 with Dr Geoff Chase and Dr Eli Van Houten. (Assistant Supervisor)
17. **Thomas Lotz**; completed PhD, Univ of Canterbury, Research Title: *High Resolution Clinical Model-Based Assessment of Insulin Sensitivity*. Dept of Mechanical Engineering. 2007, with Dr Geoff Chase and Dr Geoff Shaw. (Assistant Supervisor)
18. **Jason Wong**; completed PhD, Univ of Canterbury, Research Title: *Subcutaneous Insulin Infusion control for Critically Ill and Ambulatory Patients*. Placed on Deans List. 2008 with Dr Geoff Chase and Dr Geoff Shaw. (Assistant Supervisor)
19. **Toshinori Yuta**; completed PhD, Univ of Canterbury, Research Title: *Analytical Modeling and Tradeoff Analysis of PEEP and Mechanical Ventilation for ARDS Patients* Dept of Mechanical Engineering. 2007 with Dr Geoff Chase and Dr Geoff Shaw. (Assistant Supervisor)
20. **Matthew Keir**; completed PhD, Univ of Canterbury, Research Title: *A Low-cost Hybrid Tracking System and Integrated Display Unit for Augmented Reality Applications* Dept of Mechanical Engineering. 2008 with Dr Geoff Chase. (Co-supervisor)
21. **Andrew Rudge**; completed PhD, Univ of Canterbury, Research Title: *Modelling and Control of Agitation-Sedation Dynamics in Critically Ill Patients*. Dept of Mechanical Engineering. 2005 with Dr Geoff Chase and Dr Geoff Shaw. (Assistant Supervisor)

#### **Masters:**

1. **Greg Skinner**; ME (FRST TIFF), Univ of Canterbury, *Wire straightener device construction and real-time modelling*, 2010-2011 with Dr David Aitchison (assistant supervisor)
2. **Darren Hewitt**; completed ME, Research Title: *Fast algorithms for seismic protection of large structures*. Dept of Mechanical Engineering. 2009-2010 with Prof Geoff Chase (Co-supervisor)
3. **Ismail Shujau**; completed ME, Univ of Canterbury: *Design and Analysis of a High Speed, Smart Materials Based Nano-Positioner*, 2004-2005 with Dr Geoff Chase. (Co-supervisor)
4. **Anthony Hii**; completed ME, Univ of Canterbury, *Cluster Tracking Algorithms for a DIET system*, 2004-2005 with Dr Geoff Chase. (Co-supervisor)
5. **Sam Houghton**; completed ME, Univ of Canterbury, *Integral-based Inverse Problem Solutions for DIET systems*, 2005-2006 with Dr Geoff Chase. (Co-supervisor)
6. **Ishan Singh-Levett**; completed ME, Univ of Canterbury: *Integral Based Real Time Health Structural Monitoring*, 2005-2006 with Dr Geoff Chase and Dr Bruce Deam. (Co-supervisor)
7. **Xuesong Chen**; completed ME, Department of Electrical and Computer Engineering, Univ of Canterbury: *Impact of Continuous Glucose Monitoring System on Model Based Glucose Control*, 2006-2007 with Dr Harsha Sirisena and Dr Geoff Chase (Co-supervisor)
8. **Crispen Berg**; completed ME, Univ of Canterbury: *Image Capture for a DIET System* with Dr Geoff Chase and Dr Eli Van Houten, 2005-2006. (Assistant supervisor)
9. **Carmen Doran**; M.E. with Distinction: Univ of Canterbury, Research Title: *Modelling and Control of Hyperglycaemia in Critical Care Patients*. Dept of Mechanical Engineering. 2004 with Dr Geoff Chase and Dr Geoff Shaw. (Assistant supervisor)



### **Third professional year Honours Thesis and Research Supervision:**

1. **2012:** total of 7 students
  - a. **Scion (Dr Richard Parker and Dr Tara Strand) reserved project:** “FlySensor – Atmospheric Kite Sensor,” Rodrigo Pellizzari and Andy Shang (ECE project)
  - b. **EPECentre (Dr Richard Strahan):** “Micro-electronics for Helium Filled Personal Blimp,” William Minnish (ECE + Mech project)
  - c. **Reserved project:** “Electric Vehicle Conversion,” Edward Harvey (ECE project)
  - d. **ECE and EPECentre:** “Power quality analysis of a 2m diameter, 1.5 kW, Swift Wind Turbine mounted on the ECE wing roof,” “Development and analysis of a pitch control system for a small wind turbine,” and “Development of a low-cost active turbulence generator using Pulse-Width-Modulation of airfoils in a vertical wind tunnel,” Andrew Kee, Peter Zhou and Timothy Yee, supported by Graeme Harris (Mech) for wind speed and turbulence characterization
2. **2011:** total of 14 students
  - a. **EPECentre (Dr Richard Strahan):** “Personal Blimp,” Mike Boys, Paul Duncan, Michael Glassford and Tom Harding (Mech + ECE project)
  - b. **EPECentre (Dr Richard Strahan):** “Electrical systems and micro-electronics for Helium Filled Personal Blimp,” Ben Norquay (Mech + ECE project)
  - c. **Sigjaws Charitable Trust (Mr Gary Watts):** “Automated Refuelling Station,” Jermin Tiu, Julian Pipe, Samuel Sanson and Kirstin Middelkoop (Mech + ECE project)
  - d. **Sigjaws Charitable Trust (Mr Gary Watts):** “Automated fuel pump for improving retail service provision in NZ Oil & Petroleum Industry,” Andrew Lewis (Mech + ECE project)
  - e. **ECE and EPECentre:** “Power quality analysis and scalability of small wind turbines in a vertical wind tunnel,” Nabil Adam (ECE project)
  - f. **Reserved project with Dr Wade Enright:** “Rocket initiated plasma channels,” Brett Clark and Yanosh Irani (ECE project)
  - g. **Nanotechnology group:** “Image processing software for biological cells,” Simon Gow (ECE project)
3. **2010:** total of 14 students
  - a. **Boundary LifeSciences:** “Non-contact Strain Measurement,” Ryan Fitzgerald, Hagen Stewart, Aaron Young, Yun Di
  - b. **SPARC & Cycling NZ:** “Image-Based Analysis and Tracking of Team Pursuit Cyclists,” Martin Conway, Malcolm Falconer, Jun Burden, Malcolm Cleland.
4. **2009:** total of 19 students
  - a. **Boundary LifeSciences:** “Non-contact Strain Measurement,” Ryan Fitzgerald, Hagen Stewart, Aaron Young, Yun Di
  - b. **SPARC & Cycling NZ:** “Image-Based Analysis and Tracking of Team Pursuit Cyclists,” Martin Conway, Malcolm Falconer, Jun Burden, Malcolm Cleland.
  - c. **Special Topic Research:** “H-Infinity Control Theory: Analysis and Application,” Robin Wareing, Matthew Adams, Robbie Blakelock.(0.1 EFTS per student)
  - d. **Special Topic Research:** “Swarm Intelligence for Self-Coordinated Control of a Multi-Agent System,” Ben Gibb (0.1 EFTS per student)
  - e. **Special Topic Research:** “Physiological Dynamic Systems Modeling of the Cardiovascular System,” Anne Barnett (0.1 EFTS per student)
  - f. **Special Topic Research:** “Rocket systems engineering,” Malcolm Snowdon, Avinash Rao, Robert Tang, Agnetha Korevaar, Greg Skinner, Alex Keall (0.1 EFTS per student)
5. **2008:** total of 2 students
  - a. **Special Topic Research:** “Computational Image Processing for automatically detecting Diabetic Retinopathy,” James Revie, Darren Hewett
6. **Final year Project Team 2007,** 4 students, *Optimising Ventilator Therapy in Critical Care*, sponsored by the Canterbury District Health Board with Prof Geoff Chase and Dr Geoff Shaw
7. **Xing-Wei (Jason) Wong;** 2004/2005 Christchurch School of Medicine and Health Sciences Summer Scholarship sponsored by the Canterbury Medical Research Foundation, *Active Insulin Control With Variable Feed Rates for Targeted Glucose Control in Critically Ill Patients* with Dr Geoff Chase and Dr Geoff Shaw.
8. **Active Insulin Control 5 Final year Project Team 2005,** 3 students, sponsored by the Canterbury District Health Board with Dr Geoff Chase and Dr Geoff Shaw
9. **Active Insulin Control 4 Final year Project Team 2004,** 3 students, sponsored by the Canterbury District Health Board with Dr Geoff Chase and Dr Geoff Shaw

### Undergraduate Research assistants:

1. **2012:** total of 5
  - a. **Lachlan Matchett:** “*Development of a supersonic launch vehicle,*” ECE Department scholarship, extended research work from summer, 2012
  - b. **David Wright:** “*Development of a supersonic launch vehicle and initial orbital mechanics calculations using ASTOS,*” ECE Department scholarship, extended research work from summer, 2012
  - c. **John Evans:** “*Construction of a wooden shelter for supersonic rocket launches from Birdlings Flat and aircraft search logistics and implementation for rocket recovery,*” ECE Department scholarship, 2012
  - d. **Laura King:** “*Development of a time-varying correlation method of unexpected quantities for the share market,*” ECE Department scholarship + external contribution from Jeremy Wyn Harris, 2012
  - e. **Angus Watson:** “*Development of sub-sonic rocket trajectory tracking using a highly accurate Trimble GPS unit,*” ECE Department scholarship + in-kind contribution of two GPS units from Trimble Navigation Ltd, 2012
2. **2011:** total of 3
  - a. **Lee Wilson:** “*Development of a software programme that models the orbital mechanics involved in launching a payload into low Earth orbit and specifies launch vehicle requirements,*” extended summer research work with Peter Beck (CEO) and Sam Houghton (Senior Engineer) of Rocket Lab, TBG subcontract, MSI, 2011.
  - b. **Jason McVicar:** “*Layout and implementation of a flow straightener for the wind turbine vertical wind tunnel,*” ECE Department scholarship, 2011
  - c. **Brett Clark:** “*Development of a wind speed sensor for rocket vertical wind tunnel,*” ECE Department scholarship, 2011
3. **David Stevenson;** HRC scholarship funded from Sir Charles Hercus Health Research Fellowship, “*Fast symbolically-based solution methods for cardiac models in critical care,*” \$5000, 2008
4. **Piers Lawrence;** HRC scholarship funded from Sir Charles Hercus Health Research Fellowship, “*Geometric Theory and Application of Integral-based Parameter Identification,*” \$5000, 2007

### Subcontracted work:

1. **Andre Geldenhuis:** “*Construction of Tree Climbing Robot,*” consultancy funding from Scion, 4/12-9/12
2. **Andre Geldenhuis:** “*Development of prototype robot for moving through steep country plantation forests,*” funding from Scion 12/11-2/12

### Summer research student supervision:

1. **2011-12:** total of 11
  - a. **Lachlan Matchett:** “*Development of a low cost inertial guidance system for a solid fuel powered rocket with robust recovery,*” University of Canterbury Summer scholarship, combined work with David Wright
  - b. **Samuel Frei:** “*Development of Road Smoothness Metrics and Methods for Analyzing 3D Topological Data,*” Scholarship from Trimble Navigation Ltd
  - c. **Andre Geldenhuis:** “*Wind speed characterization and camera sensing investigation using large kites above the Birdlings Flat rocket launch site,*” University of Canterbury Summer scholarship
  - d. **James Williams:** “*Wind flow quality analysis of two vertical wind tunnels,*” University of Canterbury Summer scholarship
  - e. **David Wright:** “*Development of a low cost inertial guidance system for a solid fuel powered rocket with robust recovery,*” Electrical and Computer Engineering Department scholarship, combined work with Lachlan Matchett
  - f. **Samuel Frei:** “*Water rocket parachute testing,*” Electrical and Computer Engineering Department scholarship
  - g. **Rodrigo Pellizzari:** “*Water rocket parachute and wind tunnel testing, and kite wind sensing development,*” Electrical and Computer Engineering Department scholarship
  - h. **Olivia Davidson:** “*Kite wind speed analysis, turbulence generation in a wind tunnel and patent search on Rocket control systems,*” Electrical and Computer Engineering Department scholarship

- i. **Alex Donaldson** (Auckland University student): “*Setting up Omni Phantom robotic device and PID control system testing*,” Electrical and Computer Engineering Department scholarship
- j. **Brett Clark**: “*Water rocket parachute testing*,” Electrical and Computer Engineering Department scholarship
- k. **Peter Tan**: “*Development of a gimbal frame for roll, pitch and yaw testing of a sounding rocket in a vertical wind tunnel*,” Electrical and Computer Engineering Department scholarship
2. **2010-11**: total of 9
  - a. **Jason McVicar**: “*Design and Construction of two Low-Cost, Vertical Suck-Down Wind Tunnels for Rocket and wind turbine testing*,” EPE centre scholarship
  - b. **Brett Clark**: “*Design and Construction of two Low-Cost, Vertical Suck-Down Wind Tunnels for Rocket and wind turbine testing*,” Electrical and Computer Engineering Department scholarship
  - c. **Olivia Winn**: “*Rocket roll dynamics modelling and simulation*,” Electrical and Computer Engineering Department scholarship
  - d. **Lee Wilson**: “*Airframe and Actuator Design*,” Electrical and Computer Engineering Department scholarship
  - e. **Kirstin Middelkoop**: “*Design, manufacture and testing of robust dual deployment recovery system*,” Electrical and Computer Engineering Department scholarship.
  - f. **Ben Phear**: “*Electronics hardware design and manufacture for UC rocketry project*,” half-time University of Canterbury scholarship.
  - g. **Ben Phear**: “*System instrumentation and controller hardware for the Joule Heating for Sterilization of Export Logs project*,” extended summer research work, EPE centre scholarship and Electrical and Computer Engineering Department scholarship.
  - h. **Tom Brennan**: “*Initial design and foundation hardware/software for UC rocketry project*,” half-time University of Canterbury scholarship
  - i. **David Wright**: “*Canard fin design and construction*,” part-time, Electrical and Computer Engineering Department scholarship
3. **2009-10**: total of 5
  - a. **Malcolm Snowdon**: “*Development of a low cost inertial guidance system for a solid fuel powered rocket with robust recovery*,” Univ of Canterbury scholarship.
  - b. **Avinash Rao**: “*Development of a low cost inertial guidance system for a solid fuel powered rocket with robust recovery*,” Univ of Canterbury scholarship.
  - c. **Paul Simpson**: “*DIET System Technology and FEA*,” Univ of Canterbury scholarship
  - d. **Genevieve Jenson**: Part-time Summer research, “*Data processing and analysis of continuous glucose monitoring for type 1 diabetes and Intensive Care Unit (ICU) patients*,” HRC scholarship
  - e. **Amy Clucas (high school student)**: Part-time Summer research, “*Data processing and analysis of type 1 diabetes*,” HRC scholarship
4. **2008-9**: total of 3
  - a. **Zoe Kirkman**; Part-time Summer research 2008/2009, *Physiological analysis and data management – application to Diabetic Retinopathy Screening and Intensive Care Unit Patients*. HRC scholarship..
  - b. **Anne Barnett**; Summer research 2008/2009, *Fast System ID Methods – Applications to Metabolic Systems and Control* with Prof. Geoff Chase, HRC scholarship.
  - c. **Napasool Wongvanich**; Summer research 2008/2009, *Sensor fusion, control systems modelling and identification – Applications to automatic helm stabilization in jet propulsion boats and ferries* with Prof. Harsha Sirisena (UC) and Dick Borrett, Mike Meade and Marilyn Lim (Hamilton Jet), FRST scholarship.
5. **2007-8**: total of 4
  - a. **James Revie**; Summer research 2007/2008, *Cardiac modelling and diagnosis* with Prof. Geoff Chase, HRC scholarship
  - b. **Darren Hewett**; Summer research 2007/2008, *Protective ventilation of the human lung* with Dr Timon Rabczuk and Prof. Geoff Chase, HRC scholarship
  - c. **Fiona Bennetts**; Summer research 2007/2008, *Optimal Ventilation Protocol Development and Pilot Trials in the Christchurch Hospital ICU* with Prof. Geoff Chase and Dr Geoff Shaw, HRC scholarship
  - d. **Ben Wong**; Summer research 2007/2008, *Minimal physiological modelling for improved parameter identification (part-time)* with Prof. Geoff Chase and *The building of a chaotic double pendulum/magnetic pendulum for forward prediction of chaotic mathematical models*," (part-time) with Dr Raazesh Sainudiin, Rodney Elliott and Paul de Lange
6. **2006-7**: total of 2

- a. **Piers Lawrence**; Summer research 2006/2007, *Fast algorithms for glucose control protocol testing* with Prof. Geoff Chase, HRC scholarship
  - b. **NoorHafiz MohdNor**; Summer research for Math 305 project, *Integral-based identification for physiological models* 2006/2007, with Prof. Geoff Chase
7. **2004-5**: total of 1
- a. **Monique Jackson**; Univ of Canterbury Summer Scholarship 2004/2005, *Adaptive Control and Nutrition Regulation Clinical Trials for Tight Glucose Control in the Christchurch Hospital ICU* with Dr Geoff Chase and Dr Geoff Shaw.

#### Visiting Research Student Supervision and Completions:

1. **Michael Sicard**; Institut Catholiques des Arts et Metiers, Toulouse, France – 2012 – *Design and minimal modelling of controlled turbulence in a vertical wind tunnel for predicting large scale use of small wind turbines at various sites in NZ*, 3 months
2. **Guillaume Strobbe**; Institut Catholiques des Arts et Metiers, Toulouse, France – 2012 – *Rocket trajectory and sensor drift modelling*, 3 months
3. **Maele Coic**; Graduate School of Electronic Engineering, ISEN Ecole d'ingenieurs – 2011 – *Electronics hardware and software development for the UC Rocketry Project*, 3 months
4. **Christeline Salmon**; Ecole Nationale Supérieure de Mécanique et d'Aérotechnique (ENSMA) – 2011 – *Wind turbine analysis and design in a vertical wind tunnel*, 4 months
5. **Florent Hache**; Ecole Nationale Supérieure de Mécanique et d'Aérotechnique (ENSMA) – 2011 – *The effect of wind speed, direction and variation on power output of small wind turbine*, 4 months
6. **Natalie Muller**; Ulm University of Applied Science – 2010 – *DIET Imaging Diagnostic Optimisation and Analysis*, 6 months with Dr Thomas Lotz
7. **Gael Couchy**, Université de Haut-Alsace, Alsace, France – 2010 – *Cardiovascular Systems Modeling and Signal Processing*, 6 months
8. **Loic Bonnafous**, Institut Supérieur de Technologie (IST) Toulouse, France – 2010 – *Dynamic Systems and Solutions for DIET Breast Cancer System Vibration Waves*, 6 months.
9. **Matthieu Narbot**, ENISE, St. Etienne, France – 2010 – *Computer Vision and the Diagnosis and Monitoring Diabetic Retinopathy*, 6 months
10. **Cecile Muller**, ENISE, St. Etienne, France – 2010 – *Computer Vision and SHM*, 6 months with Prof Geoff Chase
11. **Xiang Li**, Huazhong Univ of Science & Technology (HUST), China – 2009 – *Experimental Phantoms Using Silicone Materials for the DIET Breast Cancer Screening System*, 4 months with Dr Thomas Lotz
12. **Stefan Heldmann**; TU Darmstadt, Germany, 1 April to 30 August 2009 – *Minimal modelling of the cardiovascular system using minimal data sets – application to cardiac diagnosis in critical care*, 5 months with Prof Geoff Chase
13. **Pedram Zawarreja**; Shahid Beheshti University of Medical Sciences, November 1 2008 to 30 June 2009 – *Physiological modelling and system identification – application to model-based therapeutics in critical care*, 8 months with Prof Geoff Chase
14. **Jean-luc Cretier**; IFMA France, 1 February to 30 July 2009, *Experimental studies of blood flow and wall strain in human aneurysms*, 6 months with Dr Mark Jermy
15. **Stefan Becker**; TU Kaiserslautern, Kaiserslautern, Germany – *Modelling the heat transfer from a variable solar input into a convective air flow via extended surfaces*, 16 February to 5 June 2009, 4 months with Dr Alan Tucker
16. **Jan Koser**; TU Darmstadt, Germany, March 2009-October 2009 - *Depth estimation of rivers using surface topography and flow boundary conditions*, 8 months, with Dr Mathieu Sellier
17. **Emmanuel Trelluyer**; Université Pierre Et Marie Curie (Paris VI), France, April 2008 – June 2008 – *Interface control in two-layer flow*, 3 months, with Dr Mathieu Sellier
18. **Judith Stadler**; Hochschule Munchen, University of Applied Sciences, Munich, Germany, – *Heat Transfer*, February 2008-September 2008, 6 months, with Dr Alan Tucker
19. **Pierre-Antoine Mieczka**; Université de Technologie de Belfort Montbéliard, France – February 2008-July 2008 – *Computational Model-based Therapeutics in Critical Care*, 6 months with Prof Geoff Chase and Dr Geoff Shaw
20. **Claire Froissart**; Université de Technologie de Belfort Montbéliard, France – September 2007-February 2008 – *Cardiovascular Modelling and Diagnostics*, 6 months with Prof Geoff Chase and Dr Geoff Shaw
21. **Jos Elfring**; Eindhoven University of Technology, Holland – 2007 – *System Identification and Analysis of Biomedical and Dynamic Systems (joint project)*, 3 months with Prof Geoff Chase
22. **Michael Ypma**; Eindhoven University of Technology, Holland – 2007 – *System Identification and Analysis of Biomedical and Dynamic Systems (joint project)*, 3 months with Prof Geoff Chase

23. **Brian Juliussen:** Aalborg University, Aalborg, Denmark – 2007 – *Glycaemic Control in the Cardio-thoracic Unit (CTU)*, 10 months (50% in NZ and 50% in Denmark) with Prof Geoff Chase
24. **Rune Jensen:** Aalborg University, Aalborg, Denmark – 2007 – *Glycaemic Control in the Surgical Progressive Unit (SPCU)*, 5 months with Prof Geoff Chase
25. **Benjamin Petit:** ENISE, St Etienne, France – 2007 – *Breast Cancer Screening Using DIET and Image Processing (joint project)*, 5 months with Prof Geoff Chase
26. **Michael Wiertlewski:** ENISE, St Etienne, France – 2007 – *Breast Cancer Screening Using DIET and Image Processing (joint project)*, 5 months with Prof Geoff Chase
27. **Pierrick Becouze:** ENISE, St Jean St Maurice, France – 2006 – *Image Processing and Agitation Sensing in Critical Care*, 5 months with Prof Geoff Chase and Dr Geoff Shaw
28. **Uli Goltenbott,** Karlsruhe Universitat, Germany – 2005 – *C-Peptide and Metabolic Insulin Kinetics Modeling*, 6 months with Prof Geoff Chase
29. **Mirentxu Miguelgorry,** INSA Rouen, France – 2005 – *Structural Dynamics and Semi-Active Resettable Damping Systems*, 5 months with Prof Geoff Chase
30. **Fabrice Jandet:** ENISE, St Etienne, France – 2005 – *Computer Vision Motion Sensing for a DIET Screening System (joint project)*, 5 months with Prof Geoff Chase
31. **Edouard Ravni:** ENISE, St Etienne, France – 2005 - *Computer Vision Motion Sensing for a DIET Screening System (joint project)*, 5 months with Prof Geoff Chase

**FUNDING HISTORY:** Total = \$2.78M all sources since January 2004

**External Grants:**

1. “Construction of Tree Climbing Robot,” \$13,823 consultancy funding from Scion, 4/12-9/12
2. “Development of prototype robot for moving through steep country plantation forests,” \$1176 funding from Scion (formerly NZFRI), 12/11-2/12
3. “Development of Road Smoothness Metrics and Methods for Analyzing 3D Topological Data,” \$5000 funding from Trimble Navigation Ltd, 12/11-2/12
4. Rutherford Discovery Fellowship, “Advanced Rocket System Modelling and Control for Supersonic and Hypersonic Flight,” \$800,000, Royal Society of NZ, 12/11-12/15
5. “Continued development of a software programme that models the orbital mechanics involved in launching a payload into low Earth orbit and specifies launch vehicle requirements,” further extended research work with Peter Beck (CEO) of Rocket Lab, TBG subcontract, MSI, \$7200 for 12 weeks – part-time (30 hours per week), 3/11-5/11
6. “Development of a software programme that models the orbital mechanics involved in launching a payload into low Earth orbit and specifies launch vehicle requirements,” further extended research work with Peter Beck (CEO) of Rocket Lab, TBG subcontract, MSI, \$5500 for 10 weeks, 12/10-2/11
7. Two MSI New Zealand Capability PhD Scholarships with Rocket Lab Ltd, “Development of advanced sub-orbital rocket control systems,” \$216,800 including up to \$30,000 hardware funding from Rocket Lab, 8/10-8/13
8. FRST IIOF (Intl Investment Opportunities Fund) “Next Generation Monitoring and Diagnostics,” in collaboration with the University of Liege, Belgium, \$606,000, 1/6/09 – 1/6/12 (co-investigator).
9. Sir Charles Hercus Health Research Fellowship, “Model-based cardiac diagnosis and therapy in critical care” \$500,000, 1/07-1/11 (lead investigator)
10. FRST Post-Doctoral Grant “Modeling and Identification of Cardiovascular Haemodynamics for Improved Management of Critical Care Patients” \$216,000, 1/04-1/07
11. Christchurch School of Medicine and Health Sciences summer Scholarship sponsored by the Canterbury Medical Research Foundation, *Active Insulin Control With Variable Feed Rates for Targeted Glucose Control in Critically Ill Patients*, \$4000 for Xiag-Wei (Jason) Wong with Dr Geoff Chase and Dr Geoff Shaw.
12. Boundary Life Sciences summer Scholarship for Richard Brown 2004-2005, \$5,000
13. University of Otago School of Med Summer Scholarship 2005-6, “*SPRINT Glycaemic Control Pilot Study*,” \$4000, w/ Dr. G. Shaw and Dr. J. G. Chase

### **Joint Scholarship Grant Awards with Students:**

14. NZi3 Industry Scholarship with Trimble Navigation Ltd \$81,000 awarded to Samuel Frei for his research *Accurate Orientation Using Low Cost Sensors*, 2012-2014
15. FRST, Technology for Industry Fellowships, Summer Research. *Sensor fusion, control systems modelling and identification – Applications to automatic helm stabilization in jet propulsion boats and ferries* with Prof. Harsha Sirisena (UC) and Dick Borrett, Mike Meade and Marilyn Lim (Hamilton Jet), \$7680, 2008/2009,
16. UCi3 PhD Research Award, \$5000, awarded to Ashwath Sundaresan for his research *Accounting for lung tissue stress and damage in mechanical ventilation*, 2008-2010
17. UCi3 PhD Research Scholarship, \$90,000, awarded to Katherine Kok for her research *Model-based Cardiac Diagnosis and Therapy in Critical Care*, 2008-2010
18. TEC Top Doctoral Scholars Award with Richard Brown (applicant) and Dr. Geoff Chase, *“High-Speed 3D Motion Sensing for a Digital Image-based Elasto-Tomography (DIET) Breast Cancer Screening System,”* \$100,000, 4/05-4/08

### **Internal Grants:**

19. Department of Electrical and Computer Engineering scholarship 2012. *“Development of a supersonic launch vehicle,”* \$3450 for Lachlan Matchett
20. Department of Electrical and Computer Engineering scholarship 2012. *“Development of a supersonic launch vehicle and initial orbital mechanics calculations using ASTOS,”* \$1338 for David Wright
21. Department of Electrical and Computer Engineering scholarship 2012. *“Construction of a wooden shelter for supersonic rocket launches from Birdlings Flat and aircraft search logistics and implementation for rocket recovery ,”* \$500 for John Evans
22. Department of Electrical and Computer Engineering and external funding from Jeremy Wynn Harris 2012. *“Development of a time-varying correlation method of unexpected quantities for the share market”*, \$1875 for Laura King
23. Department of Electrical and Computer Engineering scholarship 2012. *“Development of sub-sonic rocket trajectory tracking using a highly accurate Trimble GPS unit,”* \$600 for Angus Watson + in-kind contribution of two GPS units from Trimble.
24. University of Canterbury Summer Scholarship 2011-12. *“Development of a low cost inertial guidance system for a solid fuel powered rocket with robust recovery,”* \$5000 for Lachlan Matchett
25. University of Canterbury Summer Scholarship 2011-12. *“Wind speed characterization and camera sensing investigation using large kites above the Birdlings Flat rocket launch site,* \$5000 for Andre Geldenhuis
26. University of Canterbury Summer Scholarship 2011-12. *“Wind flow quality analysis of two vertical wind tunnels,”* \$5000 for James Williams
27. Department of Electrical and Computer Engineering summer scholarship 2011-12. *“Development of a low cost inertial guidance system for a solid fuel powered rocket with robust recovery,”* \$4000 for David Wright
28. Department of Electrical and Computer Engineering summer scholarship 2011-12. *“Water rocket parachute testing,”* \$1000 for Samuel Frei
29. Department of Electrical and Computer Engineering summer scholarship 2011-12. *“Water rocket parachute and wind tunnel testing, and kite wind sensing development,”* \$5000 for Rodrigo Pellizzari
30. Department of Electrical and Computer Engineering summer scholarship 2011-12. *“Kite wind speed analysis, turbulence generation in a wind tunnel and patent search on Rocket control systems,”* \$500 for Olivia Davidson
31. Department of Electrical and Computer Engineering summer scholarship 2011-12. *“Setting up Omni Phantom robotic device and PID control system testing,”* \$2500 for Alex Donaldson
32. Department of Electrical and Computer Engineering summer scholarship 2011-12. *“Water rocket parachute testing,”* \$1000 for Brett Clark
33. University of Canterbury Summer Scholarship 2011-12. *“Development of a gimbal frame for roll, pitch and yaw testing of a sounding rocket in a vertical wind tunnel,”* \$5000 for Peter Tan
34. EPE centre summer scholarship 2010-11. *“Design and Construction of two Low-Cost, Vertical Suck-Down Wind Tunnels for Rocket and wind turbine testing,”* \$5000 for Jason McVicar

35. Department of Electrical and Computer Engineering summer scholarship 2010-11. "*Design and Construction of two Low-Cost, Vertical Suck-Down Wind Tunnels for Rocket and wind turbine testing,*" \$5000 for Brett Clark
36. Department of Electrical and Computer Engineering summer scholarship 2010-11. "*Rocket roll dynamics modelling and simulation,*" \$5000 for Olivia Winn
37. Department of Electrical and Computer Engineering summer scholarship 2010-11. "*Airframe and Actuator Design,*" \$4500 for Lee Wilson
38. Department of Electrical and Computer Engineering summer scholarship 2010-11. "*Design, manufacture and testing of robust dual deployment recovery system,*" \$4500 for Kirstin Middelkoop
39. Department of Electrical and Computer Engineering summer scholarship 2010-11. "*Canard fin design and construction,*" \$500 for David Wright.
40. EPE centre + Department of Electrical and Computer Engineering summer scholarship 2010-11. "*Electronics hardware design and manufacture for UC rocketry project,*" \$4500 for Ben Phear
41. University of Canterbury Summer Scholarship 2010-11. "*Electronics hardware design and manufacture for UC rocketry project,*" \$2500 for Ben Phear
42. University of Canterbury Summer Scholarship 2010-11. "*Initial design and foundation hardware/software for UC rocketry project,*" \$2500 for Tom Brennan
43. University of Canterbury Summer Scholarship 2009-10. "*Development of a low cost inertial guidance system for a solid fuel powered rocket with robust recovery,*" \$5000 for Malcolm Snowdon
44. University of Canterbury Summer Scholarship 2009-10. "*Development of a low cost inertial guidance system for a solid fuel powered rocket with robust recovery,*" \$5000 for Avinash Rao
45. University of Canterbury Summer Scholarship 2009-10 "*DIET System Technology and FEA,*" \$5000 for Paul Simpson
46. Department of Mechanical Engineering Equipment Grant 2009-10. *Development of a low cost inertial guidance system for a solid fuel powered rocket with robust recovery,*" \$5000
47. Department of Mechanical Engineering Summer Scholarship 2008-9 "*Fast System ID Methods – Applications to Metabolic Systems and Control,*" \$5000 for Anne Barnett with Prof. Geoff Chase
48. Department of Mechanical Engineering Summer Scholarship 2007-8 "*Optimal Ventilation Protocol Development and Pilot Trials in the Christchurch Hospital ICU,*" \$5000 for Fiona Bennetts with Prof. Geoff Chase and Dr Geoff Shaw
49. Department of Mechanical Engineering Summer Scholarship 2007-8 "*Protective ventilation of the human lung,*" \$5000 for Darren Hewett with Dr Timon Rabczuk and Prof. Geoff Chase
50. Department of Mathematics and Statistics Summer Scholarship 2007-8 "*The building of a chaotic double pendulum/magnetic pendulum for forward prediction of chaotic mathematical models,*" \$1000 for Ben Wong with Dr Raazesh Sainudiin (Math Dept, UC), Rodney Elliott and student Paul de Lange
51. Univ of Canterbury Summer Scholarship 2004-5 "*Adaptive Control and Nutrition Regulation Clinical Trials for Tight Glucose Control in the Christchurch Hospital ICU,*" \$4000 for Monique Jackson with Dr Geoff Chase and Dr Geoff Shaw.

## **INVITED SEMINARS, PRESENTATIONS, INTERVIEWS:**

- Interviewed by the Dominion Post and The Press on my working life story to date and was featured in "Your Weekend" 2012
- Interviewed by Radio NZ on Rocket research at the University of Canterbury, 2011
- Invited speaker for 10 top mathematics local high school students on why maths is so important, where it can lead and how it can be applied. Organised by College of Engineering, Friday 16 March, 2012
- 25<sup>th</sup> International Conference of Image and Vision Computing New Zealand, 8-9 November, Queenstown 2010
- UKACC International Conference on Control 2010, Coventry University, UK, September 7-10, 2010
- Health Research Society of Canterbury (HRSC) Clinical Meeting, Christchurch, March 26 2010
- 7<sup>th</sup> International Conference on Control and Automation (ICCA09), Christchurch, New Zealand, December 9-11

- Invited paper and presentation, 7<sup>th</sup> IFAC Symposium on Biological and Medical Systems (MCBMS 2009), Aalborg, Denmark, 12-14 August 2009.
- Invited speaker for the NZi3 seminar series on Image Processing and Computer Vision in Medicine, March 5, 2009.
- 15<sup>th</sup> Intl Conf on Mechatronics and Machine Vision in Practice (M2VIP), Auckland, New Zealand, Dec 2-4, 2008.
- Keynote speaker, 7<sup>th</sup> Australia-New Zealand Mathematics Convention, session on Applied dynamical Systems in Engineering and the Physical Sciences, 8-12 Dec, Christchurch, New Zealand, 2008.
- Invited paper and presentation at 17<sup>th</sup> IFAC World Congress, July 6-11, Seoul, Korea, 2008.
- Invited oral presentation at 7<sup>th</sup> International Diabetes Federation Western Pacific Region Congress, March 30-April 3, 2008, Wellington, New Zealand
- 2<sup>nd</sup> International Conference on Sensing Technology (ICST 2007), November 26-28, 2007, Palmerston North, New Zealand.
- The 19<sup>th</sup> Australasian Conference on the Mechanics of Structures and Materials (ACMSM), 29 November – 1 December, 2006, Christchurch, New Zealand
- 6<sup>th</sup> IFAC Symposium on Modelling and Control in Biomedical Systems (MCBMS), Reims, France, September 19-22.
- 14<sup>th</sup> International Federation of Automatic Control (IFAC) Symposium on System Identification (SYSID 2006), Newcastle, Australia, March 29-31.
- 2005 12<sup>th</sup> Intl Conference on Biomedical Engineering (ICBME), Singapore, Dec 7-10
- Part of the team of speakers for Dance of Mathematics organized by Dr Bill Baritomba, Senior Lecturer in Mathematics, at the University of Canterbury sponsored by the Royal Society of NZ to promote mathematics to the wider community. Invited to speak to Sefton Primary School on Medical Maths, June 30/ July 1, 2005.
- 2004 26<sup>th</sup> IEEE Engineering in Med and Biology Society (EMBS 2004), San Francisco, CA
- 2004 NZ Physics and Engineering in Medicine (NZPEM) Conference, Christchurch, New Zealand

## PROFESSIONAL AFFILIATIONS AND CONTRIBUTIONS:

- **Invited Editorial Board Member** of journal from Bentham, *The Open Medical Informatics Journal* commencing 2007 – PubMed indexed.
- **Invited Multi-Session and mini-symposium lead Organiser**, “*Biomedical Control: Clinical Applications, Systems and Methods*,” UKACC International Conference on Control 2010, Coventry University, UK, September 7-10, 2010 – attracted 43 papers from 10 countries including 4 papers from clinicians
- **Invited Session Co-Organiser**, “*Biomedical Parameter Identification: Methods and Clinical Applications*,” 14<sup>th</sup> IFAC Symposium on System Identification (SYSID 2006), Newcastle, Australia, March 29-31, 2006.
- **Member International Program Committee (IPC)**, UKACC International Conference on Control 2012, Cardiff, UK, 3-5 September 2012.
- **Member International Program Committee (IPC)**, IVCNZ 2010, 25<sup>th</sup> International Conference on Image and Vision Computing, Queenstown, November 8-9 2010.
- **Member International Program Committee (IPC)**, UKACC International Conference on Control 2010, Coventry University, UK, September 7-10, 2010.
- **Member International Program Committee (IPC)**, 7<sup>th</sup> IFAC Symposium on Modelling and Control in Biological and Medical Systems (MCBMS09), Aalborg, Denmark, August 12-14 2009.
- **Member Program Committee**, 23<sup>rd</sup> International Conference Image and Vision Computing New Zealand, Lincoln, Christchurch, New Zealand, November 26-28, 2008.
- **Member Scientific Committee**, 6<sup>th</sup> International Symposium on Active Noise and Vibration Control (ACTIVE 2006), Adelaide, Australia
- **Reviewer** Korean Society of Civil Engineers (KSCE) Journal of Civil Engineering
- **Reviewer** Diabetologia
- **Reviewer** IEEE Transactions on Automation Science and Engineering



- **Reviewer** Philosophical Transactions of the Royal Society A
- **Reviewer** Proceedings of the Institution of Mechanical Engineers, Part G, Journal of Aerospace Engineering
- **Reviewer** International Journal of Control
- **Reviewer** IEEE Transactions on Control Systems Technology
- **Reviewer** International Journal of Computational Methods
- **Reviewer** Journal of Heuristics
- **Reviewer** Engineering Structures
- **Reviewer** Journal of Applied Mathematics and Decision Sciences
- **Reviewer** Control and Intelligent Systems
- **Reviewer** Materials Characterization
- **Reviewer** Inverse Problems in Science and Engineering
- **Reviewer** KSCE Journal of Civil Engineering
- **Reviewer** Diabetes Research and Clinical Practice
- **Reviewer** IEEE Sensors Journal
- **Reviewer** IEEE Electronics Letters
- **Reviewer** IEEE Transactions on Industrial Electronics
- **Reviewer** Annals of Biomedical Engineering
- **Reviewer** Automatica
- **Reviewer** International Journal of Adaptive Control and Signal Processing
- **Reviewer** The Open Medical Informatics Journal
- **Reviewer** The Open Clinical Chemistry Journal
- **Reviewer** Diabetes Science and Technology
- **Reviewer** Pattern Recognition
- **Reviewer** IEEE Transactions on Information Technology in Biomedicine
- **Reviewer** Biomedical Signal Processing and Control
- **Reviewer** Artificial Intelligence in Medicine
- **Reviewer** Computer Methods and Programs in Biomedicine
- **Reviewer** Medical Engineering and Physics
- **Reviewer** Quality Technology and Quantitative Management
- **Reviewer** ASME J. Dynamic Systems, Measurement and Control
- **Reviewer** Journal of Micromechanics and Microengineering
- **Reviewer** Structural Control and Health Monitoring
- **Reviewer** Applied Mathematical Modelling
- **Reviewer** Smart Structures and Systems
- **Reviewer** Bioinspiration & Biomimetics
- **Reviewer** Physiological Measurement
- **Reviewer** Mathematical Biosciences
- **Reviewer** Journal of Micromechatronics
- **Reviewer** IEEE Transactions on Instrumentation & Measurement
- **Reviewer** IEEE Transactions on Biomedical Engineering
- **Reviewer** International Journal of Solids and Structures
- **Reviewer** Smart Materials and Structures
- **Reviewer** Iranian Journal of Science and Technology
- **Reviewer** 8<sup>th</sup> IFAC Symposium on Biological and Medical Systems (BMS2012), 29-31 August, 2012 – Budapest, Hungary
- **Reviewer** The 5<sup>th</sup> International Symposium on Bio- and Medical Informatics and Cybernetics (BMIC 2011), July 19 – July 22 2011 – Orlando, Florida, USA
- **Reviewer** 25<sup>th</sup> International Conference of Image and Vision Computing New Zealand, 8-9 November, Queenstown 2011
- **Reviewer** UKACC International Conference on Control 2010, Coventry University, UK, September 7-10, 2010.
- **Reviewer** International Conference on Modelling, Identification and Control, Okayama City, Japan, July 17-19, 2010.
- **Reviewer** 2010 IFAC Symposium on Dynamics and Control of Process Systems (DYCOPS 2010), July 7-9, Leuven, Belgium
- **Reviewer** 7<sup>th</sup> International Conference on Control and Automation, Christchurch, New Zealand, 9-11 December 2009
- **Reviewer** 7<sup>th</sup> IFAC Symposium on Biological Medical Systems, Aalborg, Denmark 12-14 August 2009

- **Reviewer** International Conference on Mechatronics and Embedded Systems (MESA08), October 12-15, 2008, Beijing, China
- **Reviewer** International Conference on Control & Automation (ICCA09), Christchurch, 9-11 December, 2009
- **Reviewer** 4<sup>th</sup> International IEEE Conference on Automation Science and Engineering (IEEE CASE 2008), Washington DC< USA, 23-26 August 2008.
- **Reviewer** The 2<sup>nd</sup> International Symposium on Bio- and Medical Informatics and Cybernetics (BMIC 2008), June 29 – July 2, 2008 – Orlando, Florida, USA
- **Reviewer** 17<sup>th</sup> IFAC World Congress, Seoul, Korea, July 6-11, 2008.
- **Reviewer** 23<sup>rd</sup> International Conference Image and Vision Computing (IVCNZ), Christchurch, New Zealand, 26-28 November 2008.
- **Reviewer** 6<sup>th</sup> IFAC Symposium on Modelling and Control in Biomedical Systems (MCBMS), Reims, France, September 19-22, 2006.
- **Reviewer** special interactive session on “dynamics and control of tensegrity structures”, 45<sup>th</sup> IEEE Conference on Decision and Control, San Diego, CA, USA, 13-15 December, 2006.
- **Reviewer** European Control Conference (ECC), Kos, Greece, July 2-5, 2007
- **Reviewer** 26<sup>th</sup> American Control Conference (ACC), New York, USA, July 11-13, 2007.
- **Reviewer** 45<sup>th</sup> IEEE Conference on Decision and Control (CDC06), San Diego, CA, USA
- **Reviewer** for “Mathematical Reviews” a division of the American Mathematical Society
- Member of the New Zealand Meteorological Society
- Session Chair and Co-Chair at a number of international conferences and symposia

## SELECTED RESEARCH STUDENT PLACEMENTS

- **Sam Houghton**, ME 2006, Senior Engineer, Rocket Lab Limited, New Zealand
- **Matthew Keir**, PhD 2008, Energy Analyst at Electricity Authority of New Zealand
- **Anthony Hii**, ME 2005, Consulting Engineer, Beca-Carter, Wellington, NZ