

Curriculum Vitae: **Surya P. N. Singh**

Information Technology and Electrical Engineering
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Research Interests

I am interested in robotics design & operation. By extending novel (deformable) systems to novel (non-Lambertian) environments through dynamic motion planning & control research and teaching I seek to facilitate operations beyond performance limits. This encompasses analysis, synthesis, simulation, & integrated design.

Education

- Ph.D.**, Stanford University April 2006
Mechanical Engineering and Electrical Engineering (minor)
Dissertation: *Self-contained Field Analysis of Dynamic Legged Locomotion*
- M.S.**, Carnegie Mellon University December 2001
Robotics
Thesis: *ARMS: Autonomous Robots for Military Systems*
(published as CMU Technical Report: CMU-RI-01-16)
- B.S.**, The University of Tennessee May 2000
Mechanical Engineering and Economics (minor) – *Summa cum laude*

Experience

- The University of Queensland** (Robot Design Laboratory) August 2011-*Present*
Senior Lecturer [Assistant Professor Equivalent] **Continuing [“Tenure”] Conferred – June 2016**
Established an emphasis in robotics design, control & planning and grew the mechatronics program from two to five academics. Lead research in compliant and assistive systems.
- The University of Sydney** (Australian Centre for Field Robotics) 2008-2011
Research Fellow
Lead research to leverage analytic models along with probabilistic system identification for agile control. This led to the Fast Motion Correction and GS-BiRRT algorithms, which were applied to autonomous excavation and the first fielded autonomous (blast-hole) drill rig (now in routine commercial operation).
- University of Western Australia** (School of Mechanical Engineering) 2006-2007
Visiting Lecturer & Fulbright Scholar
Field teleoperation and improved “display”/“sensing” tools for humanitarian landmine clearance operations.
- Stanford University** (Mechanical Engineering Design Division) 2002-2006
Research Associate (Robotics Locomotion Laboratory) and Teaching Assistant
Studied in-field sensing and estimation of agile locomotion, particularly galloping, leading to the first hybrid estimator for legged robots with integrated system identification and online center of mass estimation. Used for motion synthesis on KOLT (robot) and analysis (of galloping dogs outdoors).

Professional Qualifications

1. Graduate Certificate in Higher Education (University of Sydney) October 2009
2. Research Higher Degree Supervision (University of Sydney) June 2009
3. Engineer in Training in Mechanical Engineering (NCEES) June 2000

Honors and Awards

- U. Queensland, EAIT (Faculty), Teaching Excellence Award November 2014
- U. Queensland, EAIT (Faculty), Most Effective Teaching Nominations (8) 2012, 2013, 2014, 2017, 2018
- U. Sydney AMME (School) & FEIT (Faculty) Teaching Commendations March 2010
- UWA Individual Teaching Award nomination December 2007
- Fulbright Scholar (to Australia) 2006-2007
- NSF EAPSI Summer Scholar (to the Tokyo Institute of Technology) June-August 2005
- National Defense Science and Engineering Graduate (NDSEG) Fellowship 2001-2004
- Tau Beta Pi Fellowship (General Electric #1) 2001
- Barry Goldwater Scholar 1998-2000

Publications

Refereed articles: 82, Patents: 4 Granted (+2 pending), Number of citations: >1900, h-Index: 18

Journal:

1. C. Clemente, C. Cooper, P. Withers, C. Freakley, **S. Singh** and P. Terrill, The private life of echidnas: using accelerometry and GPS to examine field biomechanics and assess the ecological impact of a widespread, semi-fossorial monotreme, *Journal of Experimental Biology*, 219(20):3271-3283, 2016.
2. A. Doshi, A. Postula, A. Fletcher, **S. Singh**, "Development of micro-UAV with integrated motion planning for open-cut mining surveillance," *Microprocessors and Microsystems*, **39(8)**:829-835, Nov. 2015.
3. **S. Singh** and H. Kurniawati, "An Algorithmic Approach for Modern Robotics Education & Practice," *IEEE Robotics and Automation Magazine* (Accepted as Regular Paper).
4. P. Pounds and **S. Singh**, "Samara: Biologically inspired self-deploying sensor networks," *IEEE Potentials*, **34(2)**:10-14, March 2015.
5. **S. Singh** and K. Waldron, "A Stance Period Approach for Simplified Observation of Galloping as Applied to Canines," *Robotica*, **30(4)**:627-633, July 2012.
6. **S. Singh**, R. Fitch, and S. Williams, "A Research-Driven Approach to Undergraduate Robotics Education," *Computers in Education Journal*, **20(4)**, Oct-Dec 2010.
7. K. Seiler, **S. Singh**, S. Sukkarieh, and H. Durrant-Whyte, "Using Lie Group Symmetries for Fast Corrective Motion Planning," *The International Journal of Robotics Research*, **31**:151-166, 2012.
8. J. Ma, A. Wittek, **S. Singh**, G. Joldes, T. Washio, K. Chinzei, and K. Miller "Evaluation of accuracy of non-linear finite element computations for surgical simulation: study using brain phantom," *Computer Methods in Biomechanics and Biomedical Engineering*, **13(6)**:783-794, December 2010.
9. K. Waldron, J. Estremera, P. Csonka, and **S. Singh**, "Analyzing Bounding and Galloping Using Simple Models," *Journal of Mechanisms and Robotics*, **1**:011002:1-11, February, 2009.
10. M. Matsuoka, A. Chen, **S. Singh**, et al., "Autonomous Helicopter Tracking and Localization Using a Self-Locating Camera Array," *International Journal of Robotics Research*, **26(2)**:205-215, 2007.
11. J. G. Nichol, **S. Singh**, K. J. Waldron, L. R. Palmer, and D. E. Orin. "System Design of a Quadrupedal Galloping Machine," *International Journal of Robotics Research*, **23(10-11)**:1013-1027, 2004.

Book Chapters:

12. P. Pounds, T. Potie, F. Kendoul, **S. Singh**, R. Jurdak and J. Roberts, Automatic Distribution of Disposable Self-Deploying Sensor Modules, *Experimental Robotics*. Springer Berlin Heidelberg, **109**: 535-543, 2016.
13. C. Ham, S. Lucey and **S. Singh**, "Absolute Scale Estimation of 3D Monocular Vision on Smart Devices," *Mobile Cloud Visual Media Computing*, Springer Intl. Pub., **V**: 329-535, 2015.
14. B. Douillard, J. Underwood, V. Vlaskine, A. Quadros and **S. Singh** "A pipeline for the segmentation and classification of 3D point clouds. *Experimental Robotics*. Springer Berlin Heidelberg, **79**: 585-600, 2014.
15. **S. Singh**, P. Pounds and H. Kurniawati, "I-Ball: A Programmable Sporting Aid for Children with a Visual Impairment to Play Soccer," *Universal Access in Human-Computer Interaction. Design Methods, Tools and Interaction Techniques for Inclusion*, Series: Springer Lecture Notes in Computer Science, **4556**: 584-591, 2013.
16. G. Maeda, **S. Singh** and D. C. Rye, Iterative Autonomous Excavation, *Field and Service Robotics*, Series: Springer Tracts in Advanced Robotics, **92**:369-382, 2012.
17. K. Seiler, **S. Singh** and H. Durrant-Whyte, "Using Lie Group Symmetries for Fast Corrective Motion Planning," *Algorithmic Foundations of Robotics IX*, Series: Springer Tracts in Advanced Robotics, **68**, Springer, 37-52, 2010.
18. M. Freese, **S. Singh**, W. Singhose, E. Fukushima and S. Hirose, "Terrain Modeling and Following Using a Compliant Manipulator for Humanitarian Demining Applications," *Field and Service Robotics*, Vol 62, Springer, 3-12, 2010.
19. **S. Singh** and K. Waldron, "Towards High-Fidelity On-Board Attitude Estimation via a Hybrid Optical and Inertial Approach," In *Experimental Robotics IX*, Series: Springer Tracts in Advanced Robotics, **21**, 589-598, 2006.

Conference (Refereed):

20. C. Morley-Drabble and **S. Singh**, "One Soft Robot: A Complementary Design & Control Strategy for a Pneumatically Powered Soft Robot," *Proc. IEEE Advanced Innovations in Mechatronics*, 2018.
21. A. Redulla and **S. Singh**, "Simulating Differential Games with Improved Fidelity to Better Inform Cooperative & Adversarial Two Vehicle UAV Flight," *Proc. IEEE Simulation, Modelling, and Programming in Robotics (SIMPAP)*, 2018.

22. C. Ham, M. Chang, S. Lucey, and **S. Singh**, “Metric Monocular Depth from Small Motion Video Accelerated,” *Proc. of the Int. Conf. on 3D Vision (3DV)*, 2017.
23. S. Alam, **S. Singh**, and U. Abeyaratne, “Considerations of Handheld Respiratory Rate Estimation via a Stabilized Video Magnification Approach” *Proc. of the IEEE Engineering in Medicine and Biology Conference (EMBC 2017)*, 2017, 4293-4296.
24. C. Ham, M. Chang, S. Lucey, and **S. Singh**, “Metric Monocular Depth from Small Motion Video Accelerated,” *Proc. of the Int. Conf. on 3D Vision (3DV)*, 2017.
25. C. Ham, **S. Singh** and S. Lucey, “Occlusions are Fleeting – Texture is Forever: Moving Past Brightness Constancy”, *Proc. Winter Conference on Applications of Computer Vision (WACV)*, 2017.
26. E. M Kidman, M. D'Souza and **S. Singh**, “A Wearable Device with Inertial Motion Tracking And Vibro-Tactile Feedback For Aesthetic Sport Athletes Diving Coach Monitor,” *Proc. Signal Processing and Communication Systems (ICSPCS)*, December 2016, 1-6.
27. A. Holston and **S. Singh**, “A Design and Control Strategy for a Compliant Delta Manipulator,” *Proc. Australian Conference on Robotics and Automation (ACRA)*, Dec. 2016.
28. J. Song, T. Zastrow, **S. Singh**, S. Wilson and R. Brijbal, “EPI-GUIDE: Towards a Disposable, Low-Cost Guide for Freehand Ultrasound Support During Epidural Procedures,” *Proc. Australian Conference on Robotics and Automation (ACRA)*, Dec. 2016.
29. D. Dansereau, **S. Singh**, J. Leitner, “Interactive Computational Imaging for Deformable Object Analysis,” *Proc. International Conference on Robotics and Automation (ICRA)*, May 2016.
30. R. Strydom, **S. Singh** and M. Srinivasan, “Biologically Inspired Interception: a Comparison of Pursuit and Constant Bearing Strategies in the Presence of Sensorimotor Delay”, *Proceedings of the IEEE Conference on Robotics and Biomimetics (ROBIO)*, December 2015, 2442-2448.
31. K. Seiler, H. Kurniawati and **S. Singh**, “GPS-ABT: An Online and Approximate Solver for POMDPs with Continuous Action Space,” *Proc. International Conference on Robotics and Automation (ICRA)*, May 2015, 2290-2297.
32. N. Kottege, C. Parkinson, P. Moghadam, A. Elfes and **S. Singh**, “Energetics-Informed Hexapod Gait Transitions Across Terrains,” *Proc. International Conference on Robotics and Automation (ICRA)*, May 2015, 5140-5147.
33. H. Wang, H. Kurniawati, **S. Singh** and M. Srinivasan, “In-silico Behavior Discovery System: An Application of Planning in Ethology”, *Proc. International Conference on Automated Planning and Scheduling (ICAPS)*, June 2015, 296-305.
34. **S. Singh**, A. Wittek, H. Subramanian and P. Silburn, “Adaptive selective fast motion correction methods to support super-accurate targeting in deep brain stimulation”. *Proc. Sensorimotor Control 2015*, p. 11.
35. A. Snoswell and **S. Singh**, “Light Field De-blurring for Robotics Applications,” *Proc. Australian Conference on Robotics and Automation (ACRA)*, Dec. 2014, 1-6.
36. C. Ham, S. Lucey and **S. Singh**, “Hand Waving Away Scale,” *Proc. European Conference on Computer Vision (ECCV)*, 2014, 279-293.
37. **S. Singh**, H. Kurniawati, K. Naveh, J. Song and T. Zastrow, “CHARM: A Platform for Algorithmic Robotics Education & Research,” *Proc. International Conference on Intelligent Robots and Systems (IROS)*, Sept. 2014, 2602-2607.
38. **S. Singh**, H. Kurniawati, P. Pounds, C. Freakley, W. Wilson and L. Arvier, “Soundly Located: Programmable Sounds to Assist Localization in Visual Impaired Sport,” *Proc. of the Workshop on Assistive Robotics for Individuals with Disabilities*, Sept. 2014.
39. **S. Singh**, P. Pounds, H. Kurniawati, L. Arvier, B. MacFie and G. Gosens, “Developing a programmable ‘Interactive Ball’ for junior blind sports” *11th International Conference on Low Vision*, 2014.
40. **S. Singh**, W. Wilson, A. Malicka, P. Pounds and H. Kurniawati, “On the use of ‘Smart Tones’ to Aid the Perception and Location of a Moving Ball by the Visually Impaired,” *Proc. 32nd World Congress of Audiology*, 2014.
41. P. Pounds, T. Potie, K. Farid, **S. Singh**, R. Jurdak and J. Roberts, “Automatic Distribution of Disposable Self-Deploying Sensor Modules,” *Proc. International Symposium on Experimental Robotics (ISER)*, 2014.
42. A. Doshi, A. Postula, **S. Singh**, A. Fletcher, “Development of control platform for micro-UAVs with integrated motion planning in wind.” *Proc. IEEE 3rd Conference on Embedded Computing (MECO)*, 28-31, 2014
43. C. Ham, **S. Singh** and M. Kearney, “Learning-based Model Predictive Control and User Feedback in Home Automation”, *Proc. International Conference on Intelligent Robots and Systems (IROS)*, 2718-2724, 2013.
44. M. Freese, **S. Singh** and E. Rohmer, “V-REP: a Versatile and Scalable Robot Simulation Framework”, *Proc. International Conference on Intelligent Robots and Systems (IROS)*, 1321-1326, 2013.
45. H. Wang, H. Kurniawati, **S. Singh** and M. Srinivasan, “Animal Locomotion In Silico: A POMDP-Based Tool to Study Mid-Air Collision Avoidance Strategies in Flying Animals,” *Proc. Australian Conference on Robotics and Automation (ACRA)*, 2013, 1-6

46. D. Butterworth, B. Han, **S. Singh**, "Predictably un-predictable --- on the implementation of a Walking Pattern Generator for the full-sized humanoid robot HUBO2 using Model Predictive Control," *Proc. ACRA*, 2013.
47. A. Doshi, **S. Singh**, A. Postula, "An Online Motion Planning and Control Strategy for UAVs in Wind using Reduced Order Forward Models," *Proc. ACRA*, 2013.
48. P. Pounds and **S. Singh**, "Integrated Electro-Aeromechanical Structures for Low-Cost, Self-Deploying Environment Sensors and Disposable UAVs," *Proc. of the International Conference on Robotics and Automation*, 4459-4466, 2013.
49. A. Doshi, **S. Singh** and A. Postula, "An Online Feedback Motion Planning and Control Strategy for UAVs in Wind," *Proc. of the Australian Conference on Robotics and Automation (ACRA)*, December 2012.
50. G. Maeda, **S. Singh** and D. Rye, "Learning Disturbances in Autonomous Excavation," *Proc. International Conference on Intelligent Robots and Systems (IROS)*, 2599-2605, 2012.
51. C. J. Clemente and **S. Singh**, Obstacle Negotiation for High Speed Legged-Robots. Inspiration from Bipedal Lizards, Robotics: Science and Systems (RSS) Workshop on Bio-inspired Robotics, 2012.
52. G. Maeda, **S. Singh** and D. Rye, "Improving operational space control of heavy manipulators via open-loop compensation," *Proc. Proc. International Conference on Intelligent Robots and Systems (IROS)*, 725-731, 2011.
53. B. Tefay, B. Eizad, P. Crosthwaite, **S. Singh** and A. Postula, "Design of an Integrated Electronic Speed Controller for Compact Robotic Vehicle," *Proc. of the Australian Conference on Robotics and Automation (ACRA)*, Dec. 2011.
54. K. Waldron and **S. Singh**, "Resolving the Paradox of Asymmetry in the gallop gait," IFToMM 2011 World Congress, June 2011.
55. S. O'Callaghan, **S. Singh**, A. Alempijevic and F. Ramos, "Learning Navigational Maps by Observing Human Motion Patterns," *Proc. of the International Conference on Robotics and Automation (ICRA)*, 4333-4340, 2011
56. G. Maeda, **S. Singh**, H. Durrant-Whyte, "A Tuned Approach to Feedback Motion Planning with RRTs under Model Uncertainty," *Proc. of the International Conference on Robotics and Automation (ICRA)*, 2288-2294, 2011.
57. S. O'Callaghan, **S. Singh**, A. Alempijevic and F. Ramos, "Learning Navigational Maps by Observing Human Motion Patterns," *Proc. of the International Conference on Robotics and Automation (ICRA)*, 4333-4340, 2011
58. G. Maeda, **S. Singh**, H. Durrant-Whyte, "A Tuned Approach to Feedback Motion Planning with RRTs under Model Uncertainty," *Proc. of the International Conference on Robotics and Automation (ICRA)*, 2288-2294, 2011
59. **S. Singh** and K. Axelrod, "Coordinated Steering for an Uncalibrated Pan-Tilt-Zoom Camera Array," *Proc. of the Australian Conference on Robotics and Automation (ACRA)*, Dec. 2010.
60. N. Kirchner, A. Alempijevic, **S. Singh**, *et al.*, "RobotAssist - a Platform for Human Robot Interaction Research," *Proc. ACRA*, Dec. 2010.
61. M. Freese, **S. Singh**, F. Ozaki, N. Matsuhira, "V-REP: A Versatile 3D Robot Simulator," *Proc. of the Second Int. Conf. on Simulation, Modeling and Programming for Autonomous Robots (SIMPAN)*, Nov. 2010.
62. G. Maeda, **S. Singh**, H. Durrant-Whyte, "Feedback Motion Planning Approach for Nonlinear Control using Gain Scheduled RRTs," *Proc. of the International Conference on Intelligent Robots and Systems*, 119-126, Oct. 2010.
63. X. Fan, **S. Singh**, F. Opolzer, *et al.*, "Integrated Planning and Control of Large Tracked Vehicles in Open Terrain," *Proc. of the International Conference on Robotics and Automation*, 4424 -4430, May 2010.
64. **S. Singh** and K. Waldron, "Generalized Dog Motion Measurements to Support a Simple Model of Rotary Galloping Locomotion," *Proc. of the 12th International Conference on Climbing and Walking Robots (CLAWAR)*, World Scientific, 2009.
65. **S. Singh**, "A Traceable Inertial Calibration Procedure Suited for MEMS Sensing," *Proc. of the RSS 2009 Workshop on Performance Evaluation and Benchmarking for Next Intelligent Robots and Systems*, 2009.
66. **S. Singh**, S. Trujillo and K. Waldron, "A Screw Representation for Aiding State Estimation with Application to Dynamic Quadrupedal Locomotion," *ROMANSY*, 2008.
67. **S. Singh**, "Comparison of Field Quadruped Motion Tracking", *Biorobotics Workshop at 2008 International Conference on Robotics and Automation*, May 2008.
68. **S. Singh** and K. Waldron, "Robotic Harness for the Field Assessment of Galloping Gaits," *Proceedings of the 2007 International Conference on Intelligent Robots and Systems (IROS)*, October 2007, 4247-4252.
69. K. Waldron, J. Estremera, P. Csonka, **S. Singh**, "Thinking About Bounding and Galloping Using Simple Models," *Proceedings of the 10th Int. Conference on Climbing and Walking Robots (CLAWAR)*, July 2007.
70. **S. Singh** and K. Waldron, "A Hybrid Motion Model for Dynamic Quadrupedal Locomotion," *Proceedings of the 2007 International Conference on Robotics and Automation (ICRA)*, April 2007, 4337-4342.

71. **S. Singh**, M. Freese, J. Trevelyan, "Contributions on a Design Direction for Future Humanitarian Demining Robots," *Proceedings of the 2007 International Conference on Robotics and Automation (ICRA)*, Workshop on Robotics in Challenging and Hazardous Environments, April 2007.
72. **S. Singh**, P. Csonka and K. Waldron, "Optical Flow Aided Motion Estimation for Legged Locomotion," *Proc. of the 2006 International Conference on Intelligent Robots and Systems (IROS)*, October 2006, 1738–1743.
73. M. Freese, **S. Singh**, E. Fukushima and S. Hirose, "Bias-Tolerant Terrain Following Method for a Field Deployed Manipulator," *Proceedings of the 2006 International Conference on Robotics and Automation (ICRA)*, May 2006, 175-180.
74. **S. Singh** and K. Waldron, "Attitude Estimation for Dynamic Legged Locomotion Using Range and Inertial Sensors," *Proceedings of the 2005 International Conference on Robotics and Automation (ICRA)*, April 2005, 3935–3940.
75. **S. Singh** and K. Waldron, "Design and Evaluation of an Integrated Planar Localization Method for Desktop Robotics," *Proceedings of the 2004 International Conference on Robotics and Automation (ICRA)*, April 2004, 1109–1114.
76. **S. Singh** and K. Waldron, "Towards High-Fidelity On-Board Attitude Estimation via a Hybrid Optical and Inertial Approach," In *Experimental Robotics IX*, **21**, M. H. Ang and O. Khatib (Eds.), 2006, 589–598.
77. **S. Singh** and S. Thayer, "Development of an Immunology-Based Multi-Robot Coordination Algorithm for Exploration & Mapping," *Proceedings of the 2002 Proc. International Conference on Intelligent Robots and Systems (IROS)*, October 2002, 2735–2739.
78. **S. Singh** and S. Thayer, "Kilobot Search and Rescue Using an Immunologically Inspired Approach," *Distributed Autonomous Robotic Systems (DARS)*, **5**, 2002, 300-305.
79. **S. Singh** and S. Thayer, "A Foundation for Kilorobotic Exploration." *Proceedings of the Congress on Evolutionary Computation (CEC 2002)*, May 2002, 1033-1038.
80. **S. Singh** and S. Thayer, "Immunology Directed Methods for Distributed Robotics: A Novel, Immunity-Based Architecture for Robust Control & Coordination," *Proceedings of SPIE: Mobile Robots XVI*, **4573**, Nov. 2001, 44-55
81. **S. Singh** and C. Riviere, "Physiological Tremor Amplitude During Vitreoretinal Microsurgery," *Proceedings of the 28th Annual Northeast Bioengineering Conference*, April, 2002, 171-172.
82. **S. Singh** and S. Everett, "Sensor, Model, and Variable Velocity Telerobotic Assistance in Surgical and Biomedical Environments," Tennessee Conference on Biomedical Engineering, April 1999.

Patents

Granted

1. **US 8612084** (AU 2010295227) – A system and method for autonomous navigation of a tracked or skid-steer vehicle
2. **US 8886382** (AU 2010242541) – Method and system for regulating movement of an autonomous entity between zones
3. **US 9129236** (AU 2010237608) – Drill hole planning
4. **US 9146553** (AU 2010242542) – Control system for autonomous operation

Applications (Pending)

5. US20160061581 – Scale estimating method using smart device
6. US20160061582 – Scale estimating method using smart device and gravity data

Grants and Research Awards

External Grants:

1. Hybrid Control and Learning for Autonomous Cyber Operations, co-CI with Drs. Elfes, Kurniawati, Bruenig, and Portmann, **DST Project 2017**, \$200k.
2. Biomechanics Meets Robotics: Methods for Accurate and Fast Needle Targeting, Chief Investigator (CI) with Drs. Wittek, Miller, Hannaford, Fichtinger, **ARC Discovery Project 2016**, \$490k. (15% success rate)
3. *Smart-Ball: Development and Deployment of Sporting Aids for Visually-Impaired Children*, Chief Investigator (CI) with Drs. Pounds and Kurniawati, **Ian Potter Foundation**, \$20k (10% success rate)
4. *Rio Tinto Centre for Mine Automation Renewal*, Planning and Control Research Lead with Prof. Hugh Durrant-Whyte, et al. **Rio Tinto Technology and Innovation Group**, ~\$5M (total centre grants: \$35M)
5. *Bodies in Space*, CI with Drs. Dullin and Sinclair, **ARC Linkage Projects 2010 - Round 2**, \$210k (18% success rate)
6. *Mechatronics Course Support for "System Configuration & Simulation for Supervised Teleoperation of Automated Ship Loading" project*, PI, **Rio Tinto Iron Ore**, \$6k
7. *Robotic and Autonomous Mines, Improvised Explosive Devices And Counter-Measures*, Co-PI (with Prof. J. Trevelyan), **Defence Systems Analysis Division (DSTO)**, \$50k

Competitive Internal Grants:

8. *Joint UQ/TUM Workshop on Cyberphysical Systems*, co-CI with Prof. Bergmann (lead CI), Prof. Bruenig, Dr. Kurniawati, Dr. Pounds, and A/Prof. Portmann, **UQ Global Strategy and Partnerships Seed Funding Scheme: Round One 2017**, \$10k.
9. *Increasing Student Engagement In Active Learning Through Feedback On Pre-Reading Quizzes*, co-CI with Profs. Drinkwater, Davis, Birkett, and Howes, **UQ Teaching Innovation Grant**, \$119k.
10. *Platypus++: A Smart, Open, Cross-Campus Randomized Assignment Peer Review System*, lead CI with Mr Dekker, et al. **UQ Gated Pipeline Round 1** (office of DVC (Academic)), \$98k.
11. *How do Western Australian echidnas handle the cold? Cutting edge technology (integrated temperature, light, accelerometer and GPS sensors) will answer this question about one of Australia most enigmatic animals*, CI with Drs. Clemente, Withers, Terrill, and Cooper, \$16k.
12. *Sense, Control, Act: Measure the Universe, control the world*, CI with A/Prof. Wilson and Dr Kearney, **UQx/EDx Online Course Development Grant**, \$150k (1 of 4 at UQ, only one in Engineering)
13. *Platypus: An Open, Question-Based Peer Review Electronic Assignment System*, CI with Mr Dekker, Drs Kearney and Jahn, and Ms Fink, **UQ EAIT Faculty TQA Strategic Funding Grant**, \$41k.
14. *Robotics Design Laboratory*, CI joint with Prof. Graham Schaffer (lead design and scope for an integrated mechatronics teaching and research space), **UQ Space Grant**, \$435k.
15. *Probe Smartly and Deeply: Using Biopotentials and Steerable Needles for Super-Targeting in Deep Brain Stimulation Procedures*, **UQ Early Career Researcher Grants Scheme 2013**, \$20k (15% success rate)
16. *Deep Brain Deformation: Simulating and Factoring Dynamic Neural Tissue Deformation as a Result of Rigid Probe Insertion as Seen During Subthalamic Nucleus Deep Brain Stimulation Procedures*, CI, **UWA/UQ Bilateral Research Collaboration Awards**, 2012, \$11k
17. *Hybrid Inertial Measurement and Thermography for Super Robust Motion Capture*, CI, **UQ New Staff Startup Research Scheme**, 2012, \$12k
18. *An Instrumented Treadmill for Understanding the Forces Responsible for Walking and Running Under Different Conditions in Both Normal and Clinical Populations*, co-CI (with Prof. Creswell), **UQ Major Equipment Grant**, \$160k
19. *Fast Motion Correction: Reliable Agility from People to Robots*, sole CI, UQ Near Miss Fund, \$28k.
20. *Research-Enhanced Robotics Education*, CI (with Drs. Williams and Fitch), **Strategic Teaching Enhancement Projects** (U. Syd.), 2011, \$55k
21. *Optimal Methods for Miniature Navigation from Multiple Inertial Measurements and Gait-tuned Estimation Software with Biomedical and Robotic Applications,*” Principal Investigator (PI), **ARC/UWA Research Grants Scheme 2008**, \$8k
22. *Mechatronics Infrastructure Support Grant*, CI, **UWA Teaching and Learning Committee Award**, \$8k

Teaching Experience

The University of Queensland

- Advanced Controls and Robotics (METR 4202) 2012, 2013, 2014, 2015, 2016, 2017, 2018
- Systems: Signals and Controls (ELEC 3004) (**New course**) 2012, 2013, 2014, 2015, 2016, 2017
- Mechatronic System Design Project II (METR 3800) 2011
- Sense, Control, Act (Sense101x) (Proposed edX MOOC course) 2014

The University of Sydney

- Introduction to Mechatronics (MTRX 1701) 2008, 2009, 2010, 2011
- Experimental Robotics (MTRX 4700 -- with Drs. Fitch and Williams) 2009, 2010, 2011

University of Western Australia

- Mechatronics Design (MCTX 3420) 2008
- Mechanisms and Multibody Systems (MECH3422 – with Prof. K. Miller) 2008

Stanford University

- Stress, Strain, and Strength (ME 80 – Teaching assistant under A/Prof. B. Pruitt) 2004, 2005
- Introduction to Sensors (ME 220 – Teaching assistant under Prof. T. Kenny) 2002, 2004

Postgraduate Students Supervised

Doctoral:

- Christopher Ham (co-supervised with Dr. Simon Lucey, CMU).
- Debajyoti Karmaker (co-supervised with Dr. Mandyam Srinivasan , QBI)
- Aaron Snonwell
- Adam Stacey (co-supervised with Dr. Donald Dansereau, Stanford)

Masters:

- Resmy Pillai

Graduated Doctoral:

- Mr. Reuben Strydom – Now Research Lead with Boeing Research Australia, co-supervised with Dr. Mandyam Srinivasan (QBI), UQ 2017. Thesis: Bio-inspired Strategies for Autonomous Aerial Navigation, Guidance and Interception.
- Mr. Haibo Wang – Now Technical Lead for GroupOn (China). Co-supervised with Profs. Kurniawati and Srinivasan). UQ 2015. Thesis: In-Silico Behavior Discovery System
- Dr. Guilherme Maeda – now a postdoc with Prof. Jan Peters at Technische Universitaet Darmstadt. Co-supervised with Prof. Durrant-Whyte, Rye & Manchester U. Sydney, 2013. Thesis: *Learning and Reacting with Inaccurate Prediction: Applications to Autonomous Excavation*
- Dr. Konstantin Seiler. Co-supervised with Prof. Durrant-Whyte and Sukkarieh, U. Sydney, (2014). Thesis: *Fast trajectory generation and correction for non-holonomic systems exploiting Lie group symmetries*

Graduated Masters:

- Mr. Hadrien Vrba, U. Sydney, 2010, *Coordinated Motion Control of a Robotic Excavator*
- Mr. Jiajie Ma, UWA, 2009 (co-supervised with Dr. Adam Wittek), *Experimental Validation of Viscoelastic Constitutive Models by X-Ray Feature Tracking*

Outreach and Professional Service

Outreach & Public Lectures

1. Robotics Education in Remote Schools Pilot (at Rottneest Island School, Western Australia)
2. Murdoch College Invited Seminar – *Robotics & Design: Today & Tomorrow*
3. Fulbright Seminar – *Robotics for the Everyday from the Everyday*

Media Coverage:

1. Scope TV (Network Ten's children's science show): Interesting Sports 2 (Aired nationally April, 25, 2015)
2. ABC News TV (Aired nationally January 4, 2015)
3. Robotics Panelist for ABC TV's, *New Inventors* (March 16, 2011).
4. Profiled in E. Klarreich, "Artificial Immune Systems," *Nature*, **415**:468-470, 2002.

Invited Seminars:

1. Oregon Statue University (June 2018)
2. UNSW (August 2018)
3. INRIA (Strasbourg, June 2017)
4. Mawson Robotics (January 2016)
5. Orica (Helidon, December 2015)
6. Accenture Australia (November 2015)
7. U. of Technology Sydney (September 2015)
8. Google (Sydney, July 2015)
9. Google (Self-driving Car Team, April 2014)
10. University of Tennessee, ME (April 2014)
11. University of Washington, Biorobotics (Dec 2012)
12. UQ, Health Sciences (Nov 2012)
13. UQ, Biological Sciences (July 2012)
14. Queensland U. of Tech. CyPhy (July 2012)
15. UQ, Queensland Brian Institute (March 2012)
16. Colorado School of Mines, ME (Feb 2012)
17. CSIRO, Queensland (January 2012)
18. University of Melbourne (Nov 2011)
19. UQ, Engineering Seminar (Nov 2011)
20. MIT, Robot Locomotion Group (July 2011)
21. UCLA, Electrical Engineering (June 2011)
22. Ohio State University, ME (Nov 2010)
23. Cornell, Computer Science (Sept 2010)
24. UT Arlington, ME (May 2010)

Peer Review of Conference, Journals, Grants and Theses:

1. International Journal of Robotics Research (IJRR)
2. Mechanism and Machine Theory
3. IEEE Transactions on Robotics (TRO)
4. Journal of Field Robotics (JFR)
5. Australian Journal of Mechanical Engineering (AJME)
6. Robotica
7. Robotics and Autonomous Systems
8. International Conference on Intelligent Robots and Systems (IROS)
9. International Conference on Robotics and Automation (ICRA)
10. International Symposium on Robotic Research (ISER)
11. Robotics: Science and Systems (RSS)
12. Workshop on the Algorithmic Foundations of Robotics (WAFR)

Workshops Organized:

1. Finance Chair, **Simulation, Modeling, and Programming for Autonomous Robots** (IEEE SIMPAR) 2018.
2. General Chair, **Australasian Conference on Robotics and Automation** (ACRA) 2016.
3. Organizer and Chair, **Robot Design and Control: Advanced Robot Motion**, RSS 2013.
4. Organizer and Chair, **Integrated Planning and Control Workshop**, RSS 2011.
5. Organizer and Chair, **Biorobotics: Research Advances, Standards, & Education** Workshop, ICRA 2008.
6. Organizer, **RAS Chapter and Student Leaders meeting**, ICRA 2008.

Administrative Committees:

1. **Research Committee Member**, The University of Queensland (UQ) ITEE (2017)
2. **Mechatronics Program Director**, UQ (2011-2102, 2015-2016).
3. **Student Activities Chair**, IEEE-RAS (2005-2007)
4. **Mechatronics Education Committee**, UWA (2006-2007)

Governance:

1. **EAIT (Faculty) Ethics Committee**, ITEE Representative, UQ 2017-2018.
2. **Sustainability Officer**, Engineers Australia (2009-2010)
3. **Mechanical Engineering Design Division Student Representative** (2003-2004)
4. **Stanford Committee on Research** (2002-2005)
5. **Graduate Student Council** (2002-2004)

Collaborators

Alan Bowling (U. Texas, ME)	Karol Miller (UWA, ME)
Chris Clemente (USQ, Biology)	Denny Oetomo (U. Melbourne, ME)
Andrew Cresswell (UQ, Human Movement)	Damien O'Meara (NWSIS)
Kay Crossley (UQ, Health Sciences)	Marcus Pandy (U. Melbourne, ME)
Stuart Crozier (U. Queensland, ITEE)	Jan Peters (Technische Universität Darmstad)
Bertrand Douillard (TRI)	Paul Pounds (UQ, Robotics Design Laboratory)
Hugh Durrant-Whyte (UK Defense)	Fabio Ramos (U. Sydney, School of Inf. Technologies)
Darren Dutto (CalPoly Pomona, Kinesiology)	Peter Silburn (UQ, APCN)
Blake Hannaford (U/Washington, BioRobotics Lab)	Peter Sinclair (U. Sydney, Human Movement)
Shigeo Hirose (Tokyo Institute of Tech, ME)	Mandyam Srinivasan (UQ, Queensland Brian Institute)
Michael Kearney (UQ, ME)	Russ Tedrake (MIT, CSAIL)
Hanna Kurniawati (UQ, Robotics Design Laboratory)	Kenneth Waldron (Univ. Tech. Sydney)
Simon Lucey (CMU, CI2CV)	Adam Wittek (UWA, ME)
Ross McAree (UQ, ME)	Stefan Williams (U. Sydney, AMME)

Professional Society Membership

1. IEEE and IEEE Robotics and Automation Society (RAS)
2. ASME
3. Engineers Australia
4. Tau Beta Pi

Citizenship

U.S. and Australian citizenship holder