For enquiries, contact:

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Building J07, Level 4, University of Sydney, NSW 2006, Australia.

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F: +61 2 9351 7060
E: enquiry@aeromech.usyd.edu.au
W: sydney.edu.au/engineering/aeromech/

Designed and produced in-house by the School of Aerospace, Mechanical & Mechatronic Engineering,
University of Sydney
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We are pleased to publish this report which reflects the research strengths and achievements in the School of Aerospace, Mechanical and Mechatronic Engineering (AMME) for 2009. The school has a number of world class research groups and has continued to maintain its position as the dominant research school in the faculty, and one of the leading engineering research schools in the country. During the year $4.6 million of new research funding was obtained, 241 research articles and books were published, 115 research students were under supervision and 24 research students completed. With 27 permanent academic staff members the performance per capita places us on a par with the top engineering schools in the world. I would like to thank all the staff whose hard work and dedication has produced this outstanding research profile.
Organisational Overview

Academic Staff

Head of School
Prof Steve Armfield

Professors
Armfield, Steven
Behnia, Masud
Durrant-Whyte, Hugh
Mai, Yiu-Wing
Masri, Assaad
Nebot, Eduardo
Tanner, Roger
Tong, Liyong
Ye, Lin

Emeritus Professors
Bilger, Robert
Bird, Graeme
Steven, Grant

Honorary Professors
Brandwood, Arthur
Henderson, Le Roy
Kent, John
Zhang, Liangchi

Adjunct Professors
Chamitoff, Gregory
Rose, Francis

Associate Professors
Dunstan, Colin
Ruys, Andrew
Sukkarieh, Salah

Honorary Associate Professors
Diwan, Ashish
Wong, Shing-Chung
Youssef, Peter

Adjunct Associate Professors
Lowe, Allen
Roger, Greg
Zheng, Rong

Senior Lecturers
Auld, Douglass
Brooker, Graham
Gibbens, Peter
Karkenahalli, Srinivas

Adjunct Senior Lecturers
Jabbarzadeh, Ahmad
Kirkpatrick, Michael
Li, Qing
Liao, Xiaozhou
McHugh, Paul
Rye, David
Scheduling, Steven
Williams, Stefan
Wong, Kee Choon
Zreiqat, Hala

Honorary Senior Lecturer
Bilston, Lynne

Adjunct Senior Lecturers
Uthayakumaran, Surjani

Lecturer
Wu, Xiaofeng

Honorary Lecturers
Boughton, Phillip
Stone, Hugh

Adjunct Lecturer
Bates, Peter

Associate Lecturers
Briozzo, Paul
Fiford, Rod

Adjunct Associate Lecturer
Gonzalez, Carlos

Honorary Associates
Bilger, Robert

Research Staff

ARC Future Fellow
Liu, Hong Yuan

International Visiting Research Fellow
Shabana, Yasser

ARC APD
Chang, Li
Nguyen, Thai

Australian Postdoctoral Fellow
Lu, Ye

Research Fellows
Bailey, Tim
Brooks, Alex
Bryson, Mitchell
Deng, Shiqiang
Elinas, Pantelis
Fitch, Robert

University of Sydney Bridging Support Fellow
Li, Wei

University Postdoctoral Research Fellows
Mo, Maosong
Wu, Chengtig

University Postdoctoral Research Fellows
Kaupp, Tobias
Mahon, Ian
Maikereko, Alexei
Milkumyan, Arman
Milkumyan, Narek
Monteiro, Sildomar
Murphy, Richard
Mylvaganam, Kausala
Nieto, Juan
Nattleton, Eric
Perera, Lochan
Peynot, Thierry
Pizarro, Oscar
Singh, Surya
Vasudevan, Shrihari
Velonaki, Mari

Post Doctoral Fellows
Ali, Yasser
Baji, Avinash
Chen, Yiqing Annie
Dai, Shao Cong

Postdoctoral Research Associates
Dasari, Aravind
Jakuba, Mike
Luo, Quantian
Luo, Zhen
Nguyen, Van Ky Quan
Pramanik, Alakesh
Qi, Fuzhong
Ramos, Fabio
Starner, Sten
Udwin, Mohammad
Sharif
Wang, Yanbo
Williamson, Nicholas
Yaroshchuky, Pavel
Zhou, Shiwei

Postdoctoral Research Associates
Lu, ZuFu
Wang, Guocheng
## Organisational Overview

### Research Staff

<table>
<thead>
<tr>
<th>Research Associates</th>
<th>Lee Wo, Duane Lin, Daniel Chun-Fan Ramaswamy, Yogambha Wang, Dong</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Douglas, Bertrand Dunn, Matthew Gu, Ying</td>
</tr>
<tr>
<td>Senior Research Engineers (CRC-AS)</td>
<td>Qi, Ben Beehag, Andrew</td>
</tr>
<tr>
<td>Research Assistant</td>
<td>James, Barbara</td>
</tr>
</tbody>
</table>

### Administrative Staff

<table>
<thead>
<tr>
<th>Project Officer</th>
<th>Du Toit, Lanita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative Officers</td>
<td>Hunter-Smith, Lisa Liang, Wendy (Undergraduate Studies) Martin, Vinita (Head of School’s Office) Olip, Ruth Santos, Tessie Sawtell, Olga</td>
</tr>
<tr>
<td>Sexton, Bronwyn (Postgraduate Studies)</td>
<td>Tetradis, Natasha</td>
</tr>
<tr>
<td>Administrative Assistant</td>
<td>Gonzales, Susan</td>
</tr>
<tr>
<td>Computer Systems Officer</td>
<td>Fiford, Rod</td>
</tr>
</tbody>
</table>

### Workshop Staff

<table>
<thead>
<tr>
<th>Senior Technical Officers</th>
<th>Technical Officers</th>
<th>Geier, Matthew Hale, Timothy Head, Adrian Karkada, Stanley Keep, Steve Kim, Yeop Klemme, Stanley Lal, Ritesh Maclean, Andrew Mercer, Duncan Nichani, Vijay Oliver, Bruce O'Shannessy, Robert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumberland, Greg (Manager, AMME Workshop-On Leave)</td>
<td>Attia, Muhammad Esa Atzmon-Simon, Barak Bandara, Dharmapriya Beauport, Jean-Gerard Brown, Stuart Calleija, Mark Chan, Pak Hung (Victor) Connolly, Laura Crundwell, Bruce Fan, Xiuya</td>
<td></td>
</tr>
<tr>
<td>Elder, Greg (Acting Manager, AMME Workshop)</td>
<td>Geier, Matthew Hale, Timothy Head, Adrian Karkada, Stanley Keep, Steve Kim, Yeop Klemme, Stanley Lal, Ritesh Maclean, Andrew Mercer, Duncan Nichani, Vijay Oliver, Bruce O'Shannessy, Robert</td>
<td></td>
</tr>
<tr>
<td>Stenger, Duncan (Acting Manager, AMME Workshop)</td>
<td>Geier, Matthew Hale, Timothy Head, Adrian Karkada, Stanley Keep, Steve Kim, Yeop Klemme, Stanley Lal, Ritesh Maclean, Andrew Mercer, Duncan Nichani, Vijay Oliver, Bruce O'Shannessy, Robert</td>
<td></td>
</tr>
</tbody>
</table>

| Technical Assistants | Mear, Paul Potts, John |

<table>
<thead>
<tr>
<th>Technical Assistants</th>
<th>Randle, Jeremy Riviere, Greg Rodgers, Craig Sadrossadat, Amir Scaysbrook, Brian Shearing, Trevor Todhunter, John</th>
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<tbody>
<tr>
<td>Technical Assistants</td>
<td>Randle, Jeremy Riviere, Greg Rodgers, Craig Sadrossadat, Amir Scaysbrook, Brian Shearing, Trevor Todhunter, John</td>
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</table>

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<tr>
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<th>Randle, Jeremy Riviere, Greg Rodgers, Craig Sadrossadat, Amir Scaysbrook, Brian Shearing, Trevor Todhunter, John</th>
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<tbody>
<tr>
<td>Technical Assistants</td>
<td>Randle, Jeremy Riviere, Greg Rodgers, Craig Sadrossadat, Amir Scaysbrook, Brian Shearing, Trevor Todhunter, John</td>
</tr>
</tbody>
</table>
# Organisational Overview

**Visiting Professors/ Scholars**

<table>
<thead>
<tr>
<th>Bao, Ronghao</th>
<th>Horikiri, Fumimasa</th>
<th>Pottie, Gregory</th>
<th>Viejo, Diego</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cazorla, Miguel</td>
<td>Ila, Viorela</td>
<td>Qiu, Wan-Qi</td>
<td>Wang, Yongguang</td>
</tr>
<tr>
<td>Chen, Chang-Rong</td>
<td>Kim, Chul-Ho</td>
<td>Shi, Dean</td>
<td>Williams, Gordon</td>
</tr>
<tr>
<td>Chrigui, Mouldi</td>
<td>Letty, Camille</td>
<td>Su, Liying</td>
<td>Wu, Cuilan</td>
</tr>
<tr>
<td>Cotterell, Brian</td>
<td>Ma, Haitao</td>
<td>Tang, Youhong</td>
<td>Xu, Shi-Ai</td>
</tr>
<tr>
<td>Gao, Cun-Fa</td>
<td>Mastorakos, Epinondas</td>
<td>Vidal-Calleja, Teresa</td>
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<td></td>
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</tbody>
</table>

**Occupational Trainees**

<table>
<thead>
<tr>
<th>Amiot, Marie</th>
<th>Hobbs, Kevin</th>
<th>Posch, Andre</th>
<th>Wang, Chao</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bastos, Guilherme</td>
<td>Koerner, Fabian</td>
<td>Potthast, Christian</td>
<td>Yang, Lin</td>
</tr>
<tr>
<td>Bernou, Mathieu</td>
<td>Li, Xiongkui</td>
<td>Roohaniesfahani, Seyediman</td>
<td>Zuolei, Sun</td>
</tr>
<tr>
<td>Cadena, Cesar</td>
<td>Malios, Aggelos</td>
<td>Schellekens, Michael</td>
<td>(Samuel)</td>
</tr>
<tr>
<td>Cai, Guipeng</td>
<td>Miao, Xiaoting</td>
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<tr>
<td>Canepa, Andrea</td>
<td>Ndayra, Mario</td>
<td></td>
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<tr>
<td>Cui, Wei</td>
<td>Pang, Rui</td>
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<tr>
<td>Guerrero, Pablo</td>
<td>Peng, Haikuo</td>
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</tbody>
</table>
### Research and Teaching Grants Awarded in 2009

**Australian Research Council (ARC) Discovery Grants**

LI (Qing) $300,000  
Topology optimisation of periodic structures for stent design

LI (Wei) and Swain (ARF) $600,000  
Topography optimization of implants for enhancing osseointegration

MASRI, BILGER and Mastorakos $654,000  
Strongly transient processes in turbulent combustion

PIZZARO, WILLIAMS (QEII) (et al) $798,000  
Cost-effective autonomous technologies for long term monitoring of marine protected areas

TANNER $410,000  
Modelling soft viscoelastic solids

**Australian Research Council (ARC) Linkage Grants**

BEHNIA, ARMFIELD and NAGARATHINAM $288,000  
AECOM

LIAO $301,000  
Electron microscope project

**Australian Research Council (ARC) Linkage Infrastructure, Equipment and Facilities Grants (LIEF)**

CAIRNEY (*Electron Microscope*), Liao, Mai (et al) $1,200,000  
Advanced focused ion beam (FIB) / scanning electron microscopes (SEM) for nanometre scale characterisation and fabrication

SHEN (*Civil Engineering*), Liao, Mai (et al) $260,000  
Split Hopkinson bar facility for high strain rate testing of materials

**Australian Research Council (ARC) Future Fellowship**

LIU $624,300  
Fatigue life prediction of nano-filler modified composites

**National Health and Medical Research Council Grant (NHMRC)**

ZREIQAT and DUNSTAN $539,500  
Harnessing the physiological effects of strontium and zinc to produce novel biomaterials for orthopaedic applications

**Rebecca L Cooper Medical Research Foundation Grant**

ZREIQAT $20,000  
Developing novel scaffolds for osteochondral defects and orthopaedic prosthetic coatings for bone tissue regeneration and implant osseointegration

**University of Sydney Early Career Researcher Scheme (ECR)**

WU $30,000  
Design and implementation for satellites formation flying control using one-bit processing

**University of Sydney Major Equipment Scheme (ME)**

LIAO $37,000  
Model 691 precision ion polishing system with a cold Stage

MASRI $32,000  
A third harmonic generator & wavelength meter for the high speed imaging of CH₂O

WILLIAMS $40,000  
Iver2 AUV, base vehicle with side scan SONAR

ZREIQAT $30,000  
Cell culture system, UV spectrometer, digital imaging system
Appointments and Promotions

Dr Qing Li is promoted to Associate Professor.
Professor Liyong Tong is appointment Pro Dean in the Faculty.
Dr Hala Zreiqat is promoted to Associate Professor/ Principal Research Fellow.

Awards and Honours and Partnerships

ACFR signed a strategic partnership with BAE Systems to support research in autonomous systems (worth $1.5m/year for initial period of 5 years).

Professor Hugh Durrant-Whyte was elected as a Member of the Australian Academy of Science on 24th March, 2009

Professor Hugh Durrant-Whyte received the Clunies Ross Award for his critical role in raising the visibility of Australian Robotics in government industry, academia and the community.

Drs Peter Gibbens and Michael Kirkpatrick were jointly awarded the inaugural AMME teaching award.

Ms Yogambha Ramaswamy won the best oral presentation by a student at the 19th annual conference of the Australasian Society for Biomaterials and Tissue Engineering Held at the University of New South Wales, Sydney, Australia, 21-23rd Jan 2009. This Award was sponsored by the New South Wales office for Science and Medical Research.

Dr Stefan Williams was awarded an ARC Super Science Fellowship position.

Professor Lin Ye published a volume in the Springer Lecture Notes on Applied Computational Mechanics series.

Dr Hala Zreiqat was awarded a World Class Grant for the meeting "Tissue Engineering and Regenerative Medicine: The next 20 years" hosted and co-sponsored by the University of Sydney in November 2010.
Aerospace Research

Research Group

**Design Optimisation Research**

Dr K Srinivas  
P: +61 2 9351 4289  
k.srinivas@usyd.edu.au  
(Also a member of the Biomedical, Fluid Dynamics Research Groups & Finite Element Analysis Research Center)

- Hierarchical Asynchronous Parallel Evolutionary Algorithms (HAPEAs)
- Robust evolutionary methods for multi-objective and Multidisciplinary Design Optimisation (MDO) in Aeronautics.
- Grid free flow-solvers and evolutionary algorithms.
- Adaptive aerofoils/wings design and optimisation using evolutionary algorithms.

**Smart Structures Research**

Professor Liyong Tong  
P: +61 2 9351 6949  
Liyong.tong@sydney.edu.au  
(Also a member of Finite Element Analysis Research Center)

Research interests are mainly concerned with modeling behaviors of composite and smart structures. Current research areas and projects include:
- Failure analysis and damage tolerance of adhesive bonded composite joints
- Modeling behavior of 3D reinforced composite materials, including transverse stitching
- Behavior of composite plates and shells
- Smart structures using PZT sensors/actuators, including damage detection and performance control of thin-walled structures

**Flight Simulation and Control**

Dr Peter Gibbens  
P: +61 2 9351 7350  
peter.gibbens@sydney.edu.au

The Variable Stability Flight Simulator (VSFS) is an exclusive project to the University of Sydney, a national first. In addition to the application of the VSFS to AMME flight mechanics courses, the simulator offers significant potential in other areas. For instance, current post-graduate study is being performed with the aim of producing an avionics course based on the simulator systems. Other post-graduate projects involve guidance and control (landing and flight path) using visual systems - simulated with the VSFS.

**Space Engineering Research**

Associate Professor Salah Sukkarieh  
P: +61 2 9351 8154  
salah@acfr.usyd.edu.au  
(Also a member of Australian Center for Field Robotics ACFR)

- Planetary Rover Systems
- Navigation in GPS denied environments
- Multi-robot systems for Space
- Multi-Satellite Navigation and Control
Space Engineering Research
(continued)

Dr Doug Auld
P: +61 2 9351 2336
doug.auld@sydney.edu.au
(Also a member of the Fluid Dynamics Research Group)

The DSMC (Direct Molecular Simulation - Monte Carlo Method) gas flow simulation technique was pioneered by Emeritus Professor Graeme Bird in this School. The method was originally used for simulation of rarefied gas flow around re-entry vehicles, but has now progressed to the stage of being a useful tool for solving a large range of aerodynamic and aerospace problems such as:
1. Simulation of flow separation in near continuum region
2. Rankine-Heugonot weak/strong shock reflection solutions
3. Nano-Fluid Simulations
4. Investigation of stability of low Reynolds number flows

Dr Xiaofeng Wu
P: +61 2 9036 7053
xiaofeng.wu@sydney.edu.au

- Small Satellite bus design
- Fault tolerance systems design
- Remote sensing

Unmanned Aerial Vehicle (UAV) Research

Dr KC Wong
P: +61 2 9351 2347
kc.wong@sydney.edu.au

Current UAV related research activities include the following:
- Autonomous remote sensing using UAVs;
- Decentralised navigation and control of autonomous flight vehicles;
- Simultaneous localisation and map building for autonomous flight vehicles;
- Design and development of rapid prototype UAVs;
- Wind-tunnel and flight based experimental research in aerodynamics and flight performance;
- Modelling of engine/propeller performance and aircraft stability characteristics;
- High fidelity aircraft model development for simulation based control system validation;
- Trajectory optimisation and autonomous guidance for unmanned aircraft;
- Sensor fusion strategies for state estimation using multiple redundant sensors, including Global Positioning Systems (GPS);
- Using GPS for aircraft attitude determination;
- System identification methods and neural networks for fault detection and reconfiguration;
- Robustness analysis of control laws in the presence of uncertain dynamics and wind gusts;
- Robust nonlinear high-performance manoeuvre tracking for autonomous aircraft;
- Autonomous safe recovery and landing of a UAV;
- Terrain following for autonomous flight vehicles;
- Integration of available technologies into operational UAV systems;
- Real-time flight control software synthesis for UAVs;
- Design and fabrication of airframe components using advanced composite materials.
### Emeritus Professors
- Prof Bird, Graeme
- Prof Steven, Grant

### Honorary/Adjunct Staff
- Dr Bates, Peter
- Prof Chamitoff, Gregory
- Dr Houghton, Ron
- Dr Stone, Hugh

### Research Fellow
- Dr Bryson, Mitchell

### Research Associate
- Dr Gu, Ying

### Postdoctoral Fellows
- Dr Luo, Quantian
- Dr Luo, Zhen
- Dr Nguyen, Van Ky Quan

### Research Students
- Jimenez Jaramillo, Juan Pablo
- Kiang, Jademond
- Lawrance, Nicholas Robert
- Jonathon
- Lee, Chang-Joon
- Lin, Jiangzi
- Lupton, Todd William
- Medagoda, Eran Dimantha
- Bandara
- Moscoso Lavagna, Luis
- Reid, Alistair Smyth
- Tsai, Allen Chung-Yao
- Vasista, Srinivas
- Yang, Kwang Jin

### Research Grants*

<table>
<thead>
<tr>
<th>Sponsor/Grant Name</th>
<th>Chief Investigator [other AMME investigators]</th>
<th>Project Title</th>
<th>Duration</th>
<th>Awarded Amount ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat and Livestock Australia Ltd/Research Support</td>
<td>A/Prof Salah Sukkarieh</td>
<td>UAV surveillance systems for the management of woody weed infestations</td>
<td>May 2008- Nov 2010</td>
<td>285,000</td>
</tr>
<tr>
<td>Department of Agriculture, Fisheries and Forestry (Federal)/Research Support</td>
<td>A/Prof Salah Sukkarieh</td>
<td>Using UAVs and innovative classification algorithms in the detection of cacti</td>
<td>Mar 2009-Dec 2010</td>
<td>108,577</td>
</tr>
<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Prof Liyong Tong</td>
<td>Morphing flexible structures with PLZT based optical actuators</td>
<td>Jan 2007-Mar 2010</td>
<td>351,942</td>
</tr>
<tr>
<td>Asian Office of Aerospace Research and Development (USA)/Research Support</td>
<td>Prof Liyong Tong</td>
<td>Active pin reinforced sandwich panels</td>
<td>Jan 2007-Sep 2010</td>
<td>79,738</td>
</tr>
</tbody>
</table>

* Figures obtained from the Research Office, University of Sydney
**2009 Publications**

**Book Chapters**


**Conference Papers**

Auld, D J 2009, Investigation of Boundary Slip Conditions for DSMC Simulation of Transonic Flow, 26th International Symposium on Rarefied Gas Dynamics 2008, American Institute of Physics, United States, 519-524


Hall, A P, Wong, K C 2009, Coaxial Helicopter with Fully Controlled Flapping Feedback Rotors, 3rd Australasian Unmanned Air Vehicles Conference 2009, Defence Science and Technology Organisation, Australia

Luo, Q T, Tong, L 2009, Use of optically transparent lead lanthanum zirconate titanate as actuators and sensors, 2nd International Conference on Smart Materials and Nanotechnology in Engineering SMN 2009, SPIE, United States, 749311-1-749311-8

**Non-refereed Proceedings and Abstracts**


Lee, C-J, Srinivas, K 2009, Grid considerations for computing cerebral aneurysm with stent, The 6th International Intracranial Stent Meeting 2009, GCOE Institute of Fluid Science, Tohoku University, Sendai, Japan, 60-60


**Journal Papers**


Luo, Q T, Tong, L 2009, Energy release rates for interlaminar delamination in laminates considering transverse shear effects, Composite Structures, 89(2), 235-244


Luo, Z, Tong, L, Ma, H 2009, Shape and topology optimization for electrothermomechanical microactuators using level set methods, Journal of Computational Physics, 228(9), 3173-3181

Nguyen, V K, Tong, L 2009, Coupled algorithms for piezoelectric actuator design optimization for shape control of smart structures, International Journal of Computational Methods, 6(4)


Plain, K P, Tong, L 2009, Traction law for inclined through-thickness reinforcement using a geometrical approach, Composite Structures, 88(4), 558-569

Biomedical Engineering Research

Research Group

A/Professor Andrew Ruys
P: + 61 409 127 002
andrew.ruys@sydney.edu.au
(Also a member of Materials and Structures Research Group CAMT)

Biomaterial synthesis & testing

Dr Hala Zreiqat
P: + 61 2 9351 2392
hala.zreiqat@sydney.edu.au

Skeletal tissue engineering; Biomaterials and scaffolds development; Arthritis and other musculoskeletal conditions; Bone; Cartilage; Orthopaedics and Dental biomaterials

A/Professor Colin Dunstan
P: + 61 2 9351 7127
colin.dunstan@sydney.edu.au
Bone cell regulation; Biomaterials; Cancer metastasis to bone; Osteoporosis

Dr Qing Li
P: + 61 2 9351 8607
qing.li@sydney.edu.au
(Also a member of Materials and Structures Research Group CAMT & Finite Element Analysis Research Center)

Computational scaffold tissue engineering; Remodelling for orthopaedics; Dental biomechanics and biomaterials; Computational design for periodic microstructural materials-Optimisation of structural topology

Academics
Dr K Srinivas

Adjunct/ Honorary Academics
Prof Brandwood, Arthur
A/Prof Bilston, Lynne
Dr Boughton, Philip
A/Prof Diwan, Ashish
A/Prof Roger, Greg
A/Prof Youssef, Peter

Research Fellows
Dr Li, Wei
Dr Wu, Chengtie

Postdoctoral Fellows
Dr Lu, ZuFu
Dr Wang, Guocheng
Dr Zhou, Shiwei

Research Associates
Lin, Chun-Fan (Daniel)
Ramaswamy, Yogambha

Honorary Associates
Dr Binder, Waltraud (Trudie)
Dr Liu, Jane (Zizhen)
Dr Mitra, Ashish
Dr Nahar, Kazi Kamrun
Dr Swain, Michael

Research Assistant
James, Barbara

Research Students
Boughton, Elizabeth Anne
Cadman, Joseph Edward
Chen, Yuhang
Field, Clarice Jasper
Lau, Howard
Lok, Peter Yin Cheung
Miles, Brad Peter
Nandakumar, Deepika
Rungsiyakull, Chaiy
Soh, Khian Leong Edwin
Yu, Nicole Y C
Zhang, Zhongpu

Project Officer
Merry, Lisa
## Biomedical Engineering Research

### Research Grants*

<table>
<thead>
<tr>
<th>Sponsor/Grant Name</th>
<th>Chief Investigator [other AMME investigators]</th>
<th>Project Title</th>
<th>Duration</th>
<th>Awarded Amount ($)</th>
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<tr>
<td>DVC Research/Bridging Support Grant</td>
<td>A/Prof Qing Li</td>
<td>CFD driven topological design for coronary stents</td>
<td>Jan 2009-May 2010</td>
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<td>Australia Malaysia Institute/Research Support</td>
<td>A/Prof Qing Li</td>
<td>Enhancing dental education through computational modelling</td>
<td>Mar 2009-Mar 2011</td>
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<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>A/Prof Qing Li [Dr Wei Li]</td>
<td>Computational scaffold optimisation for tissue engineering</td>
<td>Jan 2007-Jun 2010</td>
<td>215,000</td>
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<td>DVC Research/Bridging Support Fellowship</td>
<td>Dr Wei Li</td>
<td>Multiscale bone remodelling and its application in implantable prosthetic device</td>
<td>Jan 2009-Dec 2009</td>
<td>50,000</td>
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<tr>
<td>Australian Research Council/Linkage Projects (LP)</td>
<td>A/Prof Andrew Ruys</td>
<td>Oxide bioceramics for drug delivery</td>
<td>Jan 2006-Nov 2010</td>
<td>86,275</td>
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<td>Australian Research Council/Linkage Projects (LP)</td>
<td>A/Prof Andrew Ruys [A/Prof Qing Li; Dr Wei Li]</td>
<td>Cochlear implants: Identifying current paths through computational modelling of MRI data</td>
<td>Jan 2007-Dec 2010</td>
<td>102,346</td>
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<tr>
<td>DVC Research/Postdoctoral Research Fellowship Scheme</td>
<td>Dr Chengtie Wu</td>
<td>Biomaterials chemical and topographical modification for tissue engineering</td>
<td>Jan 2007-Dec 2009</td>
<td>267,838</td>
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<tr>
<td>National Health and Medical Research Council/Career Development Awards</td>
<td>A/Prof Hala Zreiqat</td>
<td>Molecular mechanisms controlling the maintenance and differentiation of skeletal tissue/device interface for biomedical engineering applications</td>
<td>Jan 2006-Dec 2010</td>
<td>436,250</td>
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<tr>
<td>Rebecca L Cooper Medical Research Foundation/Equipment Grant</td>
<td>A/Prof Hala Zreiqat</td>
<td>Developing novel scaffolds for osteochondral defects and orthopaedic prosthetic coatings for bone tissue regeneration and implant ossointegration</td>
<td>Jan 2009-Dec 2009</td>
<td>20,000</td>
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<tr>
<td>National Health and Medical Research Council/Project Grants</td>
<td>A/Prof Hala Zreiqat [A/Prof Colin Dunstan]</td>
<td>Novel coatings for orthopaedic implants</td>
<td>Jan 2009-Dec 2011</td>
<td>430,125</td>
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<tr>
<td>Australian Research Council/Linkage Projects (LP)</td>
<td>A/Prof Hala Zreiqat [Dr Chengtie Wu]</td>
<td>Scaffolds for bone tissue regeneration and use in orthopaedic applications</td>
<td>Jan 2009-Dec 2012</td>
<td>504,000</td>
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</table>

* Figures obtained from the Research Office, University of Sydney
Biomedical Engineering Research

2009 Publications

**Records obtained from the Integrated Research Management Application (IRMA), University of Sydney**

**Book Chapters**


**Conference Papers**

Chen, K, Li, Q, Li, W, Lau, H, Ruys, A J, Carter, P 2009, Three-Dimensional finite element modeling of cochlear implant induced electrical current flows, IEEE International Conference on Computational Intelligence for Measurement Systems and Applications CIMSA 2009, Institute of Electrical and Electronics Engineers (IEEE ), United States, 5-7

Field, C 2009, Finite Element based predictions of mandibular bone remodelling around three-unit Fixed Partial Dentures (FPD) , International Conference on Modelling, Simulation and Identification (MSI 2009), ACTA Press, USA, 695-035

Hamzaid, NA, Fornusek, C, Ruys, A J, Davis, G M 2009, Development of an Isokinetic FES Leg Stepping Trainer (iFES-LST) for Individuals with Neurological Disability , 2009 IEEE 11th International Conference on Rehabilitation Robotics (ICORR2009), IEEE, Japan/online, 480-485


Li, W, Lin, D, Li, Q, Swain, M V 2009, Monitoring Natural Frequency for Osseointegration and Bone Remodeling Induced by Dental Implants, IEEE International Conference on Computational Intelligence for Measurement Systems and Applications CIMSA 2009, Institute of Electrical and Electronics Engineers (IEEE ), United States, 223-225

**Non-refereed Proceedings**


**Journal Papers**


Hou, S, Li, Q, Long, S, Yang, X, Li, W 2009, Crashworthiness design for foam filled thin-wall structures, Materials and Design, 30(6), 2024-2032

Lin, D, Li, Q, Li, W, Rungsiyakull, P, Swain, M V 2009, Bone Resorption Induced by Dental Implants with Ceramics Crowns, Australasian Ceramic Society. Journal, 45(2), I-7


Lin, D, Li, Q, Li, W, Zhou, S, Swain, M V 2009. Design optimization of functionally graded dental implant for bone remodeling, Composites Part B: Engineering, 40(7), 668-675


Mak, W Y, Shao, X, Dunstan, C R, Seibel, M J, Zhou, H 2009, Biphasic Glucocorticoid-Dependent Regulation of Wnt Expression and Its Inhibitors in Mature Osteoblastic Cells, Calcified Tissue International, 85(6), 538-545


Rungsiyakull, C, Rungsiyakull, P, Li, Q, Li, W, Swain, M V 2009, The effect of implant-supported all ceramic cantilever bridge on bone remodelling, Australasian Ceramic Society. Journal, 45(1), 1-9


Zhang, Z, Li, Q, Li, W, Swain, M V 2009, Transient Modelling of Thermal Processing for Ceramic Prostheses, Australasian Ceramic Society Journal, 45(2), 40-48

The Centre for Advanced Materials Technology (CAMT) was established in 1989 at the University of Sydney, Australia. The aims of CAMT are to conduct high quality fundamental research in materials science and technology and to promote collaboration with industry in the design, engineering, development and manufacturing technology of advanced materials, which can give a competitive edge to new products and processes. It has a widely recognised international and national reputation for high quality research, equipped with state-of-the-art facilities of processing, characterisation and mechanical testing.

CAMT carries out investigations and R&D projects for industry. Technology transfer to industry occurs through workshops, short courses and seminars. The Centre has an international exchange program and supports postgraduate students in advanced materials technology. CAMT is one of partners of CRC-ACS (Cooperative Research Centre for Advanced Composite Structures).

Research Group

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Materials science and engineering; advanced fibre composites; polymer blends; forming, joining and welding; biomimetics, biomaterials and biomechanics; failure analysis and diagnosis; mechanical behaviour of materials (metals, polymers, ceramics, composites, etc); fracture and fatigue mechanics; friction and wear; advanced thin films; eco-materials; smart materials and structures

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Materials science; property profile of composite materials (fatigue and fracture, residual strength, long-term properties, structure-property relationship and microscopic characterisation); interlaminar stresses and delamination in composite laminates; manufacturing techniques and processing models for high performance polymer composites; composites design; rehabilitation of infrastructure using fibre composites, polymer composite tribology and epoxy adhesive joints for engineering structures
Materials & Structures Research

Centre for Advanced Materials Technology (CAMT)

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Academics
Dr Li, Qing
A/Prof Ruys, Andrew

Adjunct Academics
Prof Rose, Francis

Research Fellows
Dr Deng, Shiqiang
Dr Du, Xusheng
Dr Liu, Hong-Yuan
Dr Mo, Maosong
Dr Mylvaganam, Kausala
Dr Nguyen, Thai
Dr Sheng, Jun
Dr Tekyeh Marouf, Bahereh
Dr Yasser, Shabana

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Dr Chang, Li
Dr Chen, Yiqing Annie
Dr Dasari, Aravind
Dr Lu, Ye
Dr Pramanik, Aloksesh
Dr Uddin, Mohammad Sharif
Dr Wang, Yanbo

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Dr Lu, Chunsheng
Dr Qin, Qing Hua
Dr Wong, Shing-Chung
Prof Zhang, Liyangchi
Dr Zhang, Xin-Ping

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Dr Qi, Ben
Wang, Dong

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Santos, Tessie

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Oliver, Bruce
Shearing, Trevor

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Abtahi, Mojtaba
Fang, Yujiang
Huang, Nao
Mustapha, Samir Ahmad
Ni, Song
Wang, Gongtao
Zhu, Yiwei

Research Grants*

<table>
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<tr>
<th>Sponsor/Grant Name</th>
<th>Chief Investigator [other AMME investigators]</th>
<th>Project Title</th>
<th>Duration</th>
<th>Awarded Amount ($)</th>
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<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Dr Xusheng Du</td>
<td>Novel nanostructured high energy cathode material</td>
<td>Jan 2007-Jun 2010</td>
<td>260,000</td>
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<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Dr Chang Li</td>
<td>Towards new generations of lubricants using nanoparticles</td>
<td>Jan 2008-Dec 2010</td>
<td>290,000</td>
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<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Dr Xiaozhou Liao</td>
<td>Transmission electron microscopy investigation of the deformation mechanisms of nanostructured materials</td>
<td>Jan 2007-Dec 2011</td>
<td>980,000</td>
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<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Dr Xiaozhou Liao [Dr Yanbo Wang]</td>
<td>Atomistic mechanisms of the mechanical behaviour of nanostructured silicon carbide films</td>
<td>Jan 2009-Dec 2011</td>
<td>300,000</td>
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<tr>
<td>Australian Research Council/Future Fellowships (FT)</td>
<td>Dr Hong-Yuan Liu</td>
<td>Fatigue life prediction of nanofiller modified composites</td>
<td>Nov 2009-Dec 2013</td>
<td>624,300</td>
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<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Dr Ye Lu</td>
<td>Fundamentals of damage identification in tubular structures using guided waves</td>
<td>Jan 2009-Dec 2011</td>
<td>300,000</td>
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* Figures obtained from the Research Office, University of Sydney
<table>
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<th>Sponsor/ Grant Name</th>
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<th>Project Title</th>
<th>Duration</th>
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<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Prof Yiu-Wing Mai</td>
<td>Some outstanding mechanics problems in layered ferroelectromagnetic composites with enhanced magnetoelectric effect</td>
<td>Jan 2006-Mar 2010</td>
<td>490,000</td>
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<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Prof Yiu-Wing Mai</td>
<td>Nanostructure design and toughening mechanisms of novel thermosets</td>
<td>Jan 2008-Dec 2011</td>
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<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Dr Thai Nguyen</td>
<td>Developing a new technology: advanced surface hardening and grinding in a single operation</td>
<td>Apr 2008-Apr 2011</td>
<td>305,000</td>
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<tr>
<td>Cooperative Research Centre for Advanced Composite Structures/Research Support</td>
<td>Prof Lin Ye</td>
<td>CRC advance composite structures II - Program 1 aerospace composites</td>
<td>Jan 2005-Dec 2009</td>
<td>360,734</td>
</tr>
<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Prof Lin Ye</td>
<td>Fundamental roles of nanoparticles in CF/EP composites</td>
<td>Jan 2008-Dec 2010</td>
<td>303,000</td>
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<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Prof Lin Ye</td>
<td>Fundamentals of active sensor network for damage identification in engineering structures</td>
<td>Jan 2008-Dec 2010</td>
<td>375,000</td>
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<tr>
<td>Australian Research Council/Linkage Projects (LP)</td>
<td>Prof Liangchi Zhang</td>
<td>Novel cutting picks for mining industry and an Australian standard</td>
<td>Jan 2006-Jul 2009</td>
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<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Prof Liangchi Zhang</td>
<td>Damage-free surfacing of large brittle wafers with on-machine flatness control</td>
<td>Feb 2007-Jan 2012</td>
<td>1,202,882</td>
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<tr>
<td>University of Queensland/Shared Research Support</td>
<td>Prof Liangchi Zhang</td>
<td>Effect of chemo-mechanical grinding on surface integrity of single crystal silicon substrates</td>
<td>Jan 2007-Dec 2009</td>
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<td>Australian Research Council/Linkage Projects (LP)</td>
<td>Prof Liangchi Zhang</td>
<td>Non-destructive characterisation of residual stresses for the silicon-on-sapphire technology</td>
<td>Jan 2008-Jul 2009</td>
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<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Prof Liangchi Zhang</td>
<td>An innovative manufacturing technology enabling new generations of hip joint prosthesis</td>
<td>Jan 2008-Dec 2012</td>
<td>1,860,000</td>
</tr>
</tbody>
</table>
2009 Publications**

**Records obtained from the Integrated Research Management Application (IRMA), University of Sydney

**Books**

**Book Chapters**
Liao, X, Huang, X 2009, Transmission electron microscopy of bulk nanostructured metals, Bulk Nanostructured Materials, Wiley - VCH Verlag, Germany, 327-342
Mo, M, Du, X S 2009, Building Nonmagnetic Metal Oxide and Bimetallic Nanostructures - Potential Applications in Life Sciences, Mixed Metal Nanomaterials, Wiley - VCH Verlag, Weinheim, 161-196

**Conference Papers**

**Non-refereed Proceedings and Abstracts**
Heng, DWC, Ogawa, K, Cutler, D J, Chan, H, Raper, J, Ye, L, Yun, J 2009, Investigating the Unique Dissolution Behaviour of Nanoparticles, 6th International Conference for Conveying and Handling of Particulate Solids (CHoPS+ICBMH), Engineers Australia Pty. Ltd., Barton, ACT Australia, 567-575
Deng, S, Zhang, J, Ye, L 2009, Effects of Chemical Treatment and Mixing Methods on Fracture Behaviour of Halloysite-Epoxy Nanocomposites, Seventeenth International Conference on Composite Materials (ICCM17), The Institute of Materials, Minerals and Mining, UK, Edinburgh, UK, E4-

**Journal Papers**

Chang, L, Zhang, L 2009, Deformation mechanisms at pop-out in monocrystalline silicon under nanoindentation, Acta Materialia, 57(7), 2148-2153


Dasari, A B, Yu, Z, Mai, Y 2009, Electrically conductive and super-tough polyamide-based nanocomposites, Polymer, 50(16), 4112-4121

Dasari, A B, Yu, Z, Mai, Y 2009, Fundamental aspects and recent progress on wear/scratch damage in polymer nanocomposites, Materials Science and Engineering R-Reports, 63(2), 31-80

Dasari, A B, Yu, Z, Mai, Y, Cai, G, Song, H 2009, Roles of graphite oxide, clay and POSS during the combustion of polyamide 6, Polymer, 50(6), 1577-1587


Deng, S, Zhang, J, Ye, L 2009, Halloysite-epoxy nanocomposites with improved particle dispersion through ball mill homogenisation and chemical treatments, Composites Science and Technology, 69(14), 2497-2505


Gamonpilas, C, Charalambides, M, Williams, J G 2009, Determination of large deformation and fracture behaviour of starch gels from conventional and wire cutting experiments, Journal of Materials Science, 44(18), 4976-4986


Heng, DWC, Ogawa, K, Cutler, D J, Chan, H, Raper, J, Ye, L, Yun, J 2009, Pure drug nanoparticles in tablets: what are the dissolution limitations?, Journal of Nanoparticle Research, , 1-12


Li, F, Meng, G, Ye, L, Lu, Y, Kageyama, K 2009, Dispersion analysis of Lamb waves and damage detection for aluminum structures using ridge in the time-scale domain, Measurement Science and Technology, 20(9), 095704-1-095704-10


Liu, S, Ying, J, Zhou, X, Xie, X, Mai, Y 2009, Dispersion, thermal and mechanical properties of polypropylene/magnesium hydroxide nanocomposites compatibilized by SEBS-g-MA, Composites Science and Technology, 69(11-12), 1873-1879


Mo, M, Wang, D, Du, X S, Ma, J, Qian, X, Chen, D, Qian, Y 2009, Engineering of Nanotips in ZnO Submicrorods and Patterned Arrays, Crystal Growth & Design, 9(2), 797-802


Patel, Y, Blackman, B, Williams, J G 2009, Determining fracture toughness from cutting tests on polymers, Engineering Fracture Mechanics, 76(18), 100-2730

Patel, Y, Blackman, B, Williams, J G 2009, Measuring fracture toughness from machining tests, Institution of Mechanical Engineers Proceedings Part C, 223(12)


Shan, G, Yang, W, Yang, M, Xie, B, Fu, Q, Mai, Y 2009, Investigation on Tensile Deformation Behavior of Semi-Crystalline Polymers, Journal of Macromolecular Science: Part B - Physics, 48, 799-811


Wang, D, Ye, L, Lu, Y, Su, Z 2009, Probability of the presence of damage estimated from an active sensor network in a composite panel of multiple stiffeners, Composites Science and Technology, 69(13), 2054-2063


Wang, Y, Liao, X, Zhu, Y 2009, Grain refinement and growth induced by severe plastic deformation, International Journal of Materials Research (formerly Zeitschrift für Metallkunde), 100(12), 1632-1637


Wong, E, Mai, Y 2009, The damped dynamics of printed circuit board and analysis of distorted and deformed half-sine excitation, Microelectronics Reliability, 49(8), 916-923


The Finite Element Analysis Research Center (FEARC) has been a part of the School of Aerospace, Mechanical and Mechatronic Engineering at The University of Sydney since July 1992. The center’s primary aim is to serve as a national focus for research in Finite Element Analysis.

Research Group

The academic members of the center include:

**Director**
Prof Tong, Liyong  
(Aerospace Research Group)

**Emeritus Professor**
Prof Steven, Grant

**Research Fellows**
Dr Qing Li  
(Biomedical Research Group)
Dr Wei Li  
(Biomedical Research Group)
Dr K Srinivas  
(Aerospace Research Group)

The staff and associates of FEARC are very active in a large range of topics, samples of which are given below:

- FE analysis for the draping of cloth structures for aircraft or garment.
- Error estimation in dynamic and buckling FEA analysis.
- FE Modelling of Piezo-elastodynamics for the control of very flexible structures.
- Evolutionary structural optimisation.
- FE Modelling and design optimisation of dental structures.
- FE modelling of biomechanical processes such as spinal manipulation or hip implants or prosthesis.
- Crack tracking algorithms for fracture mechanics.
- FEA modelling of acoustics and fluid/structure interaction.
Rheology Research

Research Group

Professor Roger Tanner
P: + 61 2 9351 7153
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- Rheology
- Polymer processing
- Computational mechanics

Dr Ahmad Jabbarzadeh
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ahmad.jabbarzadeh@sydney.edu.au
- Nano-rheology and nano-tribology
- Boundary condition and wall slip at the fluid-solid interface
- Characterizing material properties by molecular level simulations
- Novel 3D nano-structures, the origin of high rigidity for ultra-thin liquid films
- Low friction states of films only a few nanometers thick
- Linking material properties and molecular architecture en route to design of customized purpose materials
- Using molecular simulations to study crystallization of polymers

Honorary/Adjunct Staff
Prof Fan, Xijun
Dr Pereira, Gerald
Dr Uthayakumaran, Surjani
A/Prof Zheng, Rong

Research Associate
Lee Wo, Duane

Research Students
Bertervas, Erwan
Lee-Wo, Duane
Ramin, Leyla

Postdoctoral Fellows
Dr Dai, Shao Cong
Dr Qi, Fuzhong

Research Grants

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<th>Project Title</th>
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<tr>
<td>DVC Research/Bridging Support Grant</td>
<td>Dr Ahmad Jabbarzadeh</td>
<td>Lubrication at the atomic scale</td>
<td>Jan 2009-Dec 2009</td>
<td>50,000</td>
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<tr>
<td>Cooperative Research Centre for Polymers/Research Support</td>
<td>Professor Roger Tanner</td>
<td>Project 4.1 effect of additives on polymer properties</td>
<td>Jan 2006-Dec 2012</td>
<td>234,009</td>
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<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Professor Roger Tanner</td>
<td>Mullins-type effects in soft filled viscoelastic solids</td>
<td>Jan 2007-Dec 2009</td>
<td>280,985</td>
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</table>

* Figures obtained from the Research Office, University of Sydney
2009 Publications**

**Records obtained from the Integrated Research Management Application (IRMA), University of Sydney

**Journal Papers**


Lee Wo, D, Tanner, R I 2009, The impact of blue organic and inorganic pigments on the crystallization and rheological properties of isotactic polypropylene, Rheologica Acta, Online


Tanner, R I, Qi, F 2009, Stretching, shearing and solidification, Chemical Engineering Science, 64(22), 4576-4579

Tanner, R I, Qi, F, Housiadas, K 2009, A differential model for the rheological properties of concentrated suspensions with weakly viscoelastic matrices, Rheologica Acta, Online(2), 46-

**Non-refereed proceedings and abstracts**

Tanner, R I, Dai, S C, Qi, F, Newberry, M, Bekes, F 2009, Basic dough rheology and the Kieffer Test, 5th International Symposium on Food Rheology and Structure, ETH Zurich, Zurich, Switzerland, 348-351

Xue, S, Barton, G W, Tanner, R I 2009, Heat Transfer within a Furnace for Drawing Microstructured Optical Fibres, 18th International Conference on Plastic Optical Fibers (POF 2009), University of Sydney, CD-rom, 4 pages-

Tanner, R I, Lee Wo, D, Zheng, R, Costa, F 2009, Impact of Colorants on Polypropylene Rheology, Advances in Polymer Science and Technology 1, Trauner Verlag, Linz, Austria, 143-143

Tanner, R I 2009, Yielding behaviour without an explicit yield stress for soft materials, XXII International Congress of Theoretical and Applied Mechanics, ICTAM, South Australia

The Australian Centre for Field Robotics (ACFR) is based in the School of Aerospace, Mechanical and Mechatronic Engineering at The University of Sydney, and is dedicated to the research, development, application and dissemination of field robotics principles.

The group has substantial experimental facilities including three laboratories and a field test site, a range of experimental and production vehicles, industry-quality mechanical and electrical design and fabrication facilities, and employs the latest in embedded computing, sensing and control technologies.

The ACFR is now the largest robotics and automation research group in Australia and is also one of the largest of its kind in the world.

**Research and Industry Partnerships**

- ARC Centre of Excellence for Autonomous Systems (CAS)
- CRC Mining Australia
- Rio Tinto Centre for Mine Automation
- Centre of Expertise in Defence Autonomous & Uninhabited Vehicle Systems, DSTO, Australian Government
- Centre for Autonomous Aerospace Systems
- Centre for Social Robotics
- IMOS AUV Facility
- Academic Capability Partner - BAE Systems

**Key Research Areas**

The Fundamental Research Program focuses on enabling technologies in four key areas. These areas draw together common themes and research priorities from the applied research program with the goal of supporting long-term developments across the whole field robotics area.

- **Perception**, sensing, representations of information, the modelling and management of uncertainty, data fusion and perceptual interpretation.
- **Control**, of individual micro and macro machines, of heterogeneous groups of platforms and sensors, and of contact and interaction with the environment and each other.
- **Learning**, supervised and unsupervised learning in unstructured and dynamic environments, multi-agent learning, pattern recognition and concept formation.
- **Systems**, design and optimisation of “systems of systems”, modelling and management of complexity, large scale systems theory, and modelling of information flow.

These themes define the science of field robotics and represent the main focus of ACFR. The projects ensure that the many threads of the fundamental research programs are brought together and that a bridge exists to further commercial development of research results.
Robotics Research

Australian Centre for Field Robotics (ACFR)

Back to Index

Research Group

Professor Hugh Durrant-Whyte
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- Demonstration of non-Gaussian Decentralised Data Fusion (DDF) concepts on multiple heterogeneous autonomous systems
- To develop weed detection methodologies and weed destruction methods that can be implemented in an autonomous non-herbicidal weeding system
- High-speed on-road autonomous ground vehicle manoeuvres
- Unmanned agricultural operations

Dr David Rye
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Systems Research (Perception and Control):
- Fish-Bird (an interactive kinetic artwork in which two robots in the form of wheelchairs communicate with their audience, and with each other, through movement and written text.);
- CAS outdoor research demonstrator (generic UGV platform for testing control, perception and learning algorithms)

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Perception research

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Perception research
- Fish-Bird
- CAS Outdoor Research Demonstrator
- Investigation and development of appropriate multi-sensor systems to monitor/estimate foodstuff temperature, mass and moisture content, and foodstuff chemical/protein changes

Associate Professor Salah Sukkarieh
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salah@acfr.usyd.edu.au

UAV systems for agriculture and ecosystem management
- Decentralised navigation and control of UAVs
- Simultaneous localisation and map building for UAVs

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Perception research
- Fish-Bird
- CAS Outdoor Research Demonstrator
- Investigation and development of appropriate multi-sensor systems to monitor/estimate foodstuff temperature, mass and moisture content, and foodstuff chemical/protein changes

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- Long-term operation of a robotic ground vehicle in an outdoor environment
- Undersea vehicles
- Fish-Bird

Dr Graham Brooker
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Sensor research
Australian Centre for Field Robotics (ACFR)

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Dr Singh, Surya
Dr Velonaki, Mari

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Dr Bailey, Tim
Dr Melkumyan, Arman
Dr Pizarro, Oscar

Research Associates
Dr Brooks, Alex
Dr Bryson, Mitchell
Dr Douillard, Bertrand
Dr Elinas, Pantelis
Dr Fitch, Robert
Dr Jakuba, Michael
Dr Kaupp, Tobias
Dr Mahon, Ian
Dr Monteiro, Sildomar
Dr Murphy, Richard
Dr Nettleton, Eric
Dr Perera, Lochana
Dr Peynot, Thierry
Dr Ramos, Fabio
Dr Vasudevan, Shrihari

Administrative Staff
Hunter-Smith, Lisa
Olip, Ruth
Sawtell, Olga
Tetradis, Natasha
Wang, Christy (Finance)

Technical Staff
Attia, Muhammed Esa
Bandara, Dharmapiya
Beaupot, Jean-Gerard
Callejja, Mark
Chan, Pak Hung (Victor)
Connolly, Laura
Fan, Xiuya
Geier, Matthew
Hale, Timothy
Head, Adrian
Keep, Steve
Kim, Yeop
Klemme, Stanley
Lal, Ritesh
Maclean, Andrew
Mercer, Duncan
Mifsud, Christopher
Miller, Timothy
Nichani, Vijay
Randle, Jeremy
Rodgers, Craig
Sadrossadat, Amir

Research Students
Abuhashim, Tariq
Agamennoni, Gabriel
Ahans, Nasir
Allen, Thomas Luke
Barkby, Stephen Alexander
Bender, Asher
Blair, Allan Harry
Brown, Iain Duncan
Brunner, Christopher
Joseph
Desai, Shital Harshad
Friedman, Ariell Lee
Gan, Seng Keat
Gomez Escobar, Jairo
Alejandro
Guizilini, Victor
Hemakumara, Madu Prasad
Hernandez Gutierrez, Andres
Hill, Andrew John
Hung, Calvin Kai-Yuan
Innes, Christopher John
Johnson, David Graham
Karumanchi, Sisir Babu
Kuo, Victor Che-Jung
Lawrence, Nicholas Robert
Jonathon
Lupton, Todd William
Mariam, Nazifa
Medagoda, Lashika Janith
Bandara
O’Callaghan, Simon
Reid, Alistair Smyth
Robertson, Scott William
Harman
Silvera Tawil, David
Steinberg, Daniel
Van De Ven, Joop Johannes
Wilhelmus
Vial, John Francis Stephen
Wood, David Kenneth
Yang, Kwang Jin
### Research Grants*

<table>
<thead>
<tr>
<th>Sponsor/ Grant Name</th>
<th>Chief Investigator [other AMME investigators]</th>
<th>Project Title</th>
<th>Duration</th>
<th>Awarded Amount ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian Research Council/Federation Fellowships (FF)</td>
<td>Prof Hugh Durrant-Whyte</td>
<td>Data fusion and perception in autonomous networks</td>
<td>Jan 2007-Dec 2011</td>
<td>1,606,210</td>
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<tr>
<td>Technological Resources Pty Ltd/Research Support</td>
<td>Prof Hugh Durrant-Whyte</td>
<td>Rio tinto centre for mine automation</td>
<td>Jan 2007-Dec 2011</td>
<td>18,500,000</td>
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<tr>
<td>University of California - Berkeley (USA)/Shared Research Support</td>
<td>Prof Hugh Durrant-Whyte</td>
<td>BRAIN tactical sensor networks</td>
<td>Jan 2008-Dec 2009</td>
<td>268,800</td>
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<tr>
<td>University of Pennsylvania (USA)/Shared Research Support</td>
<td>Prof Hugh Durrant-Whyte</td>
<td>MAST: Micro Autonomous Systems and Technology</td>
<td>May 2008-Nov 2013</td>
<td>304,836</td>
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<tr>
<td>Australian Research Council/Centres of Excellence (CE)</td>
<td>Prof Hugh Durrant-Whyte [Prof Eduardo Nebot]</td>
<td>Centre for autonomous systems</td>
<td>Jan 2003-Dec 2010</td>
<td>15,200,000</td>
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<td>DVC Research/Postdoctoral Research Fellowship Scheme</td>
<td>Dr Michael Jakuba</td>
<td>Efficient multiple plume source search</td>
<td>Sep 2008-Sep 2011</td>
<td>245,293</td>
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<tr>
<td>DVC Research/Bridging Support Fellowship</td>
<td>Dr Oscar Pizarro</td>
<td>Automated marine habitat classification</td>
<td>Jan 2009-Dec 2009</td>
<td>50,145</td>
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<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Dr Fabio Ramos</td>
<td>Learning from uncertain and missing labelling in relational data</td>
<td>Jan 2008-Dec 2010</td>
<td>235,944</td>
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<tr>
<td>Meat and Livestock Australia Ltd/Research Support</td>
<td>A/Prof Salah Sukkarieh</td>
<td>UAV surveillance systems for the management of woody weed infestations</td>
<td>May 2008-Nov 2010</td>
<td>285,000</td>
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<tr>
<td>Department of Agriculture, Fisheries and Forestry (Federal)/Research Support</td>
<td>A/Prof Salah Sukkarieh</td>
<td>Using UAVs and innovative classification algorithms in the detection of cacti</td>
<td>Mar 2009-Dec 2010</td>
<td>108,577</td>
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<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Dr Mari Velonaki</td>
<td>Physicality, Tactility, Intimacy: Interaction between Humans and Robots</td>
<td>Jan 2009-Dec 2013</td>
<td>753,757</td>
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<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Dr Stefan Williams</td>
<td>Autonomous exploration and characterization of benthic habitats linked to oceanographic processes</td>
<td>Jan 2008-Dec 2010</td>
<td>134,000</td>
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<tr>
<td>Department of Innovation, Industry, Science and Research (Federal)/National Collaborative Research Infrastructure Strategy (NCRIS)</td>
<td>Dr Stefan Williams [ Dr Michael Jakuba; Dr Oscar Pizarro]</td>
<td>Use of Autonomous Underwater Vehicle at the IMOS AUV facility</td>
<td>Jul 2008-Jun 2013</td>
<td>1,582,499</td>
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<tr>
<td>Australian Research Council/Linkage Projects (LP)</td>
<td>Dr Stefan Williams [Dr Michael Jakuba; Dr Oscar Pizarro]</td>
<td>Autonomous repeatable surveys for long term monitoring of marine habitats</td>
<td>Jan 2009-Dec 2011</td>
<td>320,000</td>
</tr>
</tbody>
</table>

*Figures obtained from the Research Office, University of Sydney*
Robotics Research

Australian Centre for Field Robotics (ACFR)

Back to Index

2009 Publications**

**Records obtained from the Integrated Research Management Application (IRMA), University of Sydney

Books

Brooks, A.M. Parametric POMDPs: Planning in Continuous Spaces for Mobile Robot Navigation. VDM, Saarbrücken, Germany

Kaupp, T. Human-Robot Collaboration: A Probabilistic Approach. VDM, Saarbrücken, Germany

Ramos, F.T. Recognising, Representing and Mapping in Field Robotics: A Statistical View to Perception in Unstructured Environments. VDM, Saarbrücken, Germany

Williams, S.B. Efficient Solutions to Autonomous Mapping and Navigation Problems. VDM, Saarbrücken, Germany

Edited Book


Book Chapters


Curated and Catalogued Works of Art


Conference Papers


Douillard, B., Brooks, A. & Ramos, F. ‘A 3D laser and vision based classifier’. Proc. 2009 Fifth Int. Conf. on Intelligent Sensors, Sensor Networks and Information Processing, pp. 295–300, Melbourne, Australia, 7–10 December

Elinas, P. ‘Multigoal planning for an autonomous blasthole drill’. Proc. 9th Int. Conf. on Automated Planning and Scheduling, pp. 342–345, Thessaloniki, Greece, 19–23 September


Freese, M., Singh, S.P.N., Singhose, W., Fukushima, E.F. & Hirose, S. ‘Terrain modeling and following using a compliant manipulator for humanitarian demining applications’ Proc. 7th Int. Conf. on Field and Service Robotics, 10 pp., Cambridge, USA, 14–16 July.

Gan, S.G., Yang, K. & Sukkarieh, S. ‘3D Path planning for a rotary wing UAV using a Gaussian process occupancy map’ Proc. 2009 Australasian Conf. on Robotics and Automation, 6 pp., Sydney, Australia, 2–4 December.


Melkoumian, N.S., Melkoumian, A.S. & Wu, C.Q. ‘Suggestion of a method for predicting different response characteristics including major cracks induced by blast loading in concrete slabs using machine learning’. Proc. 8th Int. Conf. on Shock and Impact Loads on Structures, Adelaide, Australia, 6 pp., 2–4 December.

Melkoumian, N., Nebot, E. & Nettleton, E. ‘Online density reduction algorithm for non-homogenous multidimensional datasets with sequential input’ Proc. 2009 Australasian Conf. on Robotics and Automation, 10 pp., Sydney, Australia, 2–4 December


Rao, D. & Williams, S.B. ‘Large-scale path planning for underwater gliders in ocean currents’. Proc. 2009 Australasian Conf. on Robotics and Automation, 8 pp., Sydney, Australia, 2–4 December


Schneider, S., Murphy, R., Monteiro, S.T. & Nettleton, N. ‘On the development of a hyperspectral library for autonomous mining systems’ Proc. 2009 Australasian Conf. on Robotics and Automation, 10 pp., Sydney, Australia, 2–4 December.


Steinberg, D., Bender, A. & Friedman, A. ‘Toward selection of a propulsion method for a long range benthic imaging AUV’ Proc. 16th Int. Symp on Unmanned Untethered Submersible Technology, 8 pp., New Hampshire, USA, 23–26 August.


Williams, S.B., Pizarro, O.R., Jakuba, M. & Barrett, N. ‘AUV benthic habitat mapping in south eastern Tasmania’, Proc. 7th Int. Conf. on Field and Service Robotics, 10 pp., Massachusetts, USA, 14–17 July

Worrall, S., Orchansky, D, Nebot, E., & Schweikart, V. ‘Improving situation awareness in mining application with a high integrity collision avoidance system’ Proc. 2009 IFAC Workshop on Automation in Mining, Mineral and Metal Industry, 6 pp., Chile, 14–16 October.


Journal Papers


Worrall, S., Orchansky, D. & Nebot, E. ‘Improving situation awareness in mining application with a high integrity collision avoidance system’, Australasian Mine Safety J., vol. 4, pp. 94–97

Thermodynamics and Fluids Research

Combustion

Research Group

Professor Assaad Masri
P: + 61 2 9351 2288
assaad.masri@sydney.edu.au

Lifted flames;
Incineration of halons and CFC's;
Chemical inhibition of halons in flames;
Experimental investigations of methanol and ethanol flames;
PDF-Monte Carlo calculations of turbulent non-premixed flames

Honorary Associates
Prof Bilger, Robert
Prof Kent, John
A/Prof Lowe, Allen

Postdoctoral Fellows
Dr Starner, Sten
Dr Yaroshchyk, Pavel

Research Associates
Dr Dunn, Matthew
Dr Gounder, James

Research Students
Al-Harbi, Ahmed
Badra, Jihad
Juddoo, Mrinal
O’Loughlin, William

Research Grants*

<table>
<thead>
<tr>
<th>Sponsor/ Grant Name</th>
<th>Chief Investigator [other AMME investigators]</th>
<th>Project Title</th>
<th>Duration</th>
<th>Awarded Amount ($)</th>
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<tbody>
<tr>
<td>Fitch Engineering Pty Ltd/Research Support</td>
<td>Prof Assaad Masri</td>
<td>Optimisation of heat transfer in a furnace heating (or cooling) metal strips</td>
<td>Jan 2007-Dec 2009</td>
<td>23,000</td>
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<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Prof Assaad Masri</td>
<td>Investigations of surface-gas reactions and mixing in micro-combustion</td>
<td>Jan 2008-Dec 2010</td>
<td>390,000</td>
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<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Prof Assaad Masri [Prof Robert Bilger]</td>
<td>Finite rate chemistry effects in turbulent combustion</td>
<td>Jan 2007-Dec 2010</td>
<td>500,000</td>
</tr>
</tbody>
</table>

* Figures obtained from the Research Office, University of Sydney
Thermodynamics and Fluids Research

Combustion

2009 Publications**

**Records obtained from the Integrated Research Management Application (IRMA), University of Sydney

Book Chapter

Kent, J H 2009, Prediction of particulates in turbulent diffusion flames by conditional moment closure, Combustion Generated Fine Carbonaceous Particles, KIT Scientific Publishing, Germany, 605-618

Conference Papers


Juddoo, M, O'Loughlin, W, Masri, A R, Bilger, R W 2009, Extinction and Re-ignition in Piloted Non-Premixed Flames as Observed with High-Speed LIF-OH Imaging, Australian Combustion Symposium 2009, University of Queensland, Australia, 75-78


Journal Papers


Hall, R D, Masri, A R, Yaroshchyk, P, Ibrahim, S 2009, Effects of position and frequency of obstacles on turbulent premixed propagating flames, Combustion and Flame, 156(2), 439-446


Mobini, K, Bilger, R W 2009, Parametric study of the Incompletely Stirred Reactor modeling, Combustion and Flame, 156(9), 1818-1827

Mortensen, M, Bilger, R W 2009, Derivation of the conditional moment closure equations for spray combustion, Combustion and Flame, 156(1), 62-72

Thermodynamics and Fluids Research

Fluid Dynamics

Research Group

Professor Steve Armfield
P: + 61 2 9351 2927
steven.armfield@sydney.edu.au
Computational Fluid Dynamics (CFD);
Stratified flows;
Natural convection flows;
Turbulence

Dr Michael Kirkpatrick
P: + 61 2 9351 2675
michael.kirkpatrick@sydney.edu.au
Computational Fluid Dynamics (CFD);
Stratified flows;
Atmospheric flows

Professor Masud Behnia
P: + 61 2 9036 9518
masud.behnia@sydney.edu.au
Heat and mass transfer;
Electronic cooling;
Ventilation

Academics
Dr Auld, Doug
Dr K Srinivas

Honorary Staff
Prof Henderson, Le Roy

Postdoctoral Fellow
Dr Williamson, Nicholas

Research Students
Aberra, Tilek
Bartos, Nick
Dittko, Karl Albert

Fakhim, Babak
Gillam, Natalie
Hattori, Tae
Ling, Jack
Luthfi,
Rollo, Jennifer Louise
Tang, Chi Yan

Research Grants*

<table>
<thead>
<tr>
<th>Sponsor/Grant Name</th>
<th>Chief Investigator [other AMME investigators]</th>
<th>Project Title</th>
<th>Duration</th>
<th>Awarded Amount ($)</th>
</tr>
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<tbody>
<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Prof Steven Armfield [Dr Michael Kirkpatrick]</td>
<td>Investigation and optimisation of displacement ventilation and cooling systems</td>
<td>Jan 2009-Dec 2012</td>
<td>$300,000</td>
</tr>
<tr>
<td>Australian Research Council/Linkage Projects (LP)</td>
<td>Prof Steven Armfield [Dr Michael Kirkpatrick]</td>
<td>Freshening, mixing and purging of riverine saline ponds by freshwater overflow</td>
<td>Jan 2005-Dec 2010</td>
<td>$132,400</td>
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<tr>
<td>Australian Research Council/Discovery Projects (DP)</td>
<td>Prof Steven Armfield [Dr Michael Kirkpatrick]</td>
<td>Stability, transition and heat transfer in thermally coupled natural convection boundary layers</td>
<td>Jan 2006-Dec 2009</td>
<td>$570,000</td>
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<tr>
<td>James Cook University/Shared Research Support</td>
<td>Prof Steven Armfield [Dr Michael Kirkpatrick]</td>
<td>Transport by Natural Convection in Reservoir Sidearms</td>
<td>Jan 2008-Jul 2009</td>
<td>$90,000</td>
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</table>

* Figures obtained from the Research Office, University of Sydney
Thermodynamics and Fluids Research

Fluid Dynamics

2009 Publications**

**Records obtained from the Integrated Research Management Application (IRMA), University of Sydney

Conference Papers


Journal Papers

Bednarz, T, Lin, W, Patterson, J, Lei, L, Armfield, S W 2009, Scaling for unsteady thermo-magnetic convection boundary layer of paramagnetic fluids of Pr> 1 in micro-gravity conditions, International Journal Of Heat And Fluid Flow, 30(6), 1157-1170


Lin, W, Armfield, S W, Patterson, J, Lei, C 2009, Prandtl number scaling of unsteady natural convection boundary layers for Pr>1 fluids under isothermal heating, Physical Review E (Statistical, Nonlinear, and Soft Matter Physics), 79(6), 066313-1-066313-8


Odeh, S, Behnia, M 2009, Improving Photovoltaic Module Efficiency Using Water Cooling, Heat Transfer Engineering, 30(6), 499-505


Graduates 2009

Doctor of Philosophy

Andersen, Peter Williams
Model Predictive Control for a Tail-Sitting UAV

Chan, Mingli Cynthia
Synthesis and Testing of Functionally Graded Carbon-Fibre-Reinforced Ceramic Matrix Composites

Douillard, Bertrand Robert
Laser and Vision Based Classification in Urban Environments

Dunn, Matthew
Finite-Rate Chemistry Effects in Turbulent Premixed Combustion

Goktogan, Ali Haydar
A Software Framework for Seamless R&D of a Networked UAS

Jiracheewanun, Sujin
A Numerical Investigation of Side Heated Cavity and Cooling Flows

Lin, Chun-Fan
Computational Modeling, Analysis of Metallic and Functionally Graded Dental Implant Induced Bone Remodelling and Design Optimisation

Melkumyan, Narek
Surface-Based Mapping for Unstructured Environments

Ramaswamy, Yogambha
Novel Modified Calcium Silicate Based Ceramics for Bone Tissue Regeneration

Rigby, Paul
Autonomous Spatial Analysis using Gaussian Process Models

Seltzer, Rocio
Determination of Non-Linear and Time-Dependent Mechanical Properties of Polyamide 6/Organoclay Nanocomposites by Novel Indentation Methodologies

Singh, Nirmal Kaur Waalib
Metastable Entangled Ordered Structures in Predeformed and Preconditioned Polymer Optical Fibres

Thompson, Paul Robert
A Novel, Augmented Graph Approach for Estimation in Localisation and Mapping

Wang, Xuyan Rosalind
Learning and Classification of Hyperspectral Images

Worrall, Stewart James
Providing Situation Awareness in Complex Multi-Vehicle Operations

Master of Philosophy (Research)

Chapman, Airlie Jane
Cooperative Multi-Vehicle Decision Making using a Landmark Position Based Communication Network

Liao, Xu Dong
CFD Analysis of Horizontal Axis Wind Turbine

Zhou, Mengjian
Fracture Behaviour of Epoxy Nanosilica Composites and Interleaved CF/EP Composites

Master of Engineering (Course work)

Honours
Cao, Yang
Chung, Eunice Siaw Kiat
Hassan, Mohamed Ibrahim
Shan, Mao
Yu, Jia Ni

Merit
Araujo Navarro, Karina
Ayerakwa, Peter Kwame
Chen, Xi
Jia, Ying Jie
Liu, Jie
Ma, Laqin
Shi, Yuening
Upender, Vineet
Yu, Cheng Zhong
Zhong, Tiezheng
Zuo, Ning

Pass
Huang, Qing
Lin, Yufeng
Liu, Biye
Liu, Yichuan
Formula SAE is a student engineering competition where teams design, construct and race a small open-wheeled racing car intended for use in weekend autocross competitions. All research, design and manufacture must be completed within a period of 12 months to prepare for the annual event held by the Society of Automotive Engineers Australasia. The three-day event scores teams on their design, costing and marketing skills as well as dynamic events of skid pad, acceleration, autocross and endurance.

Dr Andrei Lozzi on this year’s FSEA Competition

It is my pleasure and pride to be able to say that the 09 team have provided us with a spectacularly capable and attractive little car. As Ettore Bugatti more or less said, a design is not perfect unless it is also aesthetically perfect. This little gem has rewarded the somewhat daring switch by the 08 team to a sophisticated 2 cylinder Aprilia engine from the previous robust but pedestrian 4 cylinder engines. In 08 the team worked long and hard to make, from stem to stern, a revolutionary new car, at the end the result was a promising but an unreliable package. Anyway, it would be hard to overstate the contribution of the ingenuity and dedication of the 08 team and of our technicians that guide them.

This year the team upgraded much of the car and solved a string of problems, one at the time. The problem solving and upgrading went on till the final event of the program, when the ‘Great Aprilia Car’ finally demonstrated that it in the hands of our best, it could get around with the best.

Overall we came 8th out of 24 entries, of which a few did not even show. We began poorly but the car got better and better. At the final and most important events we ran about sixth. This is very satisfying because it revealed the potential of the basic design. The top cars are quite amazing and were driven by what looked to me to be professional level race car drivers. Next year we plan to intensely develop this car. We will have about 10 students upgrading and developing the car and about the same number researching and prototyping new and improved components for 2011. Many of the top cars do not seem to be designed and made just by the students. This may not seem fair but the world is never fair and by actually designing, by analyzing and manufacturing their own cars our graduates will be better engineers.

The work that our students carry out towards the design and construction of our cars should impress the most demanding prospective employer.
The fearless team is shown next, I will mention just the thesis members:

Car development team:

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jared Holmes</td>
<td>Crush zone &amp; team leader</td>
</tr>
<tr>
<td>Geoff Goh</td>
<td>Brakes</td>
</tr>
<tr>
<td>Sean O’Connor</td>
<td>Exhaust &amp; cooling</td>
</tr>
<tr>
<td>Donald Maloney</td>
<td>Intake</td>
</tr>
<tr>
<td>Dai Bang Nguyen</td>
<td>Electronics</td>
</tr>
<tr>
<td>Faez Fadhlillah</td>
<td>Suspension</td>
</tr>
<tr>
<td>Mitchell Smart</td>
<td>Frame</td>
</tr>
<tr>
<td>Robert Muir</td>
<td>Finance</td>
</tr>
<tr>
<td>Stephanie Fulton</td>
<td>Human resources</td>
</tr>
<tr>
<td>Michael Martin</td>
<td>Drive train</td>
</tr>
<tr>
<td>James Curl</td>
<td>Body shell</td>
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Research & development team:

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
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<tbody>
<tr>
<td>Cole Fitzpatrick</td>
<td>Carbon fiber wheels</td>
</tr>
<tr>
<td>Tim Roffey</td>
<td>Drive train</td>
</tr>
<tr>
<td>Edward McMillan</td>
<td>Hydraulic gear shifter</td>
</tr>
<tr>
<td>Carlo Chiavarola</td>
<td>Al honeycomb tests</td>
</tr>
<tr>
<td>Blake Mair</td>
<td>Al honeycomb chassis</td>
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<tr>
<td>Vinh Dang</td>
<td>Torsion rig</td>
</tr>
<tr>
<td>Perry Nock</td>
<td>Moment of inertia rig</td>
</tr>
</tbody>
</table>
Engineering Sydney hosted its annual Research Conversazione on Friday 30 October 2009. The annual Research Conversazione is the Faculty of Engineering and Information Technologies’ major annual event to showcase the research undertaken by students over the past year. It is an ideal opportunity for industry representatives and alumni to network and make contact with the engineers of the future.

There were 37 posters presented from the School of Aeronautical, Mechanical & Mechatronic Engineering, which were judged by the relevant industry representatives and academics from the Faculty for the following prizes generously sponsored by Shelston IP and Watermark Patent Attorneys.

**Shelston IP Best Poster Awards - Undergraduates**

- Abel-John Buchner (Aeronautical)
- Susan Graham (Biomedical)
- Nejteh Demirian (Mechanical)
- Dushyant Rao (Mechatronics)
- Daniel Wilson (Space)

**Shelston IP Best Poster Awards - Postgraduates**

- Derrick Ho (Aeronautical)
- Peter Lok (Biomedical)
- Mojtaba Abtahi (Mechanical)
- Iain Brown (Mechatronics)

**Watermark Best Poster Awards in Biomedical Engineering**

Winner: Nicole Yu
Runner-up: Boon-Zhi Quah
Performance Overview

Research Income Awarded in 2009 for Projects Commencing in 2010*

<table>
<thead>
<tr>
<th>Grant Type</th>
<th>Amount ($)</th>
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<tr>
<td>ARC Grants</td>
<td>$3,975,300</td>
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<td>NHMRC Grants</td>
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<tr>
<td>Industry/ Private Funds</td>
<td>$72,000</td>
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<td><strong>Total</strong></td>
<td><strong>$4,587,350</strong></td>
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</tbody>
</table>

*Figures obtained from the Research Office, University of Sydney
Performance Overview

Back to Index

Research Output†

The publications reported and approved for the University’s Higher Education Research Data Collection (HERDC) are reported below.

![Research Publications 2002-2009](Figure 2: Research Publications 2002-2009)

**A1**: Authored research books published by commercial publisher (3)

**B1**: Authored research chapters in commercially published books (11)

**C1**: Refereed articles in scholarly journals (155)

**E1**: Full written papers that are published and peer reviewed (72)

† Figures obtained from the Integrated Research Management Application (IRMA), University of Sydney
Performance Overview

Postgraduate Supervision and Completions

Figure 3: Total number of enrolled Master of Philosophy and PhD students (2000–2009)

Figure 4: PhD and MPhil completions. (2000 – 2009)