



# Taste of Research

## Summer Scholarships 2016/17

Never Stand Still

Engineering



Have you ever wondered what research is about?

Or whether you would be interested in a research career?

To give you an opportunity to find out, the Faculty of Engineering offers **Taste of Research Summer Scholarships**.

More than 60 scholarships funded by the Faculty and its nine schools.

Visit [www.engineering.unsw.edu.au](http://www.engineering.unsw.edu.au) for:

1. A complete list of projects
2. Detailed description of each project
3. Project supervisor contact details
4. Apply online

### Eligibility

- You must be a high achieving third-year\* undergraduate student enrolled in a full-time program (second-year students may be considered in special circumstances)
- Students with WAM  $\geq 75$  are encouraged to apply.
- You must be enrolled in a relevant program at UNSW or another Australian or New Zealand University
- You must submit an application form by 21 August, 2016
- You may be a local or an international student

\*Students undertaking a combined undergraduate degree (e.g. BE/BE, BE/BCom) may apply if entering their final year of study in 2017. This exemption does not apply to students enrolled in a BE/MBiom or BE/ME.

### Benefits

- \$500 per week stipend (tax exempt)
- UNSW Bachelor of Engineering students may use their Taste of Research Summer Scholarship project towards their Industrial Training requirements (up to 6 weeks)

### Availability

- The scholarships are available in a variety of research areas for a period of 12 weeks from 21 November 2016 to 24 February 2017.

### For Further Information

Faculty of Engineering,  
Administrative Unit  
Alman Yeung  
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CRICOS Provider Number 00098G

## Graduate School of Biomedical Engineering

### Lauren Kark

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### Physiological Measurement

Development of a device for rapid detection of falls in elderly people  
*Michael Stevens, Nigel Lovell*

Painless blood collection using microneedles  
*Robert Nordon, Zahra Faraji Rad*

### Biomaterials and Tissue Engineering

Assessment of the next generation hydrogels for 3D tissue engineering applications  
*Brooke Farrugia, Megan Lord*

Biomimetic sugar polymers for wound healing  
*Brooke Farrugia, Megan Lord*

Curing Diabetes: Fabrication and characterisation of hydrogel microspheres  
*Penny Martens, Laura Poole-Warren*

Design of new polymers for use in Tissue Engineering  
*Penny Martens, Josef Goding*

Engineering biomaterial interfaces for platelet storage  
*Megan Lord, Brooke Farrugia*

Engineering blood vessels using novel biomaterials  
*Jelena Rnjak-Kovacina, Megan Lord*

Production of bioactives for vascular tissue engineering  
*Megan Lord, Jelena Rnjak-Kovacina*

Therapeutic bioactive nanoparticles  
*Megan Lord, John Whitelock*

### Rehabilitation Engineering

Development of an interfacial stress sensor for prosthetic applications  
*Lauren Kark, Stephen Redmond*

### Implantable Bionics

Bionic Eye Image Processing System using an Android Mobile Telephone  
*Gregg J. Suaning, Marc Zapf*

BLINC - Bionic Lid Implant for Natural Closure  
*Professor Gregg J. Suaning, Nigel Lovell*

*Measuring from hearts, eyes and brains: Next generation optrode*  
*Nigel Lovell, Francois Ladouceur*

Single sensor depth-mapping camera for bionic eye vision processing  
*Gregg J. Suaning, Marc Zapf*

## School of Chemical Engineering

### May Lim

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### Energy

2 Birds, 1 Stone: Hydrogen Fuel Production and Carbon Dioxide Capture in a Single Step  
*May Lim, Jason Scott*

Algal Biofuel Project 1: Magnetic Harvesting With Natural Coagulant  
*May Lim, Rita Henderson*

Algal Biofuel Project 2: Understanding the Lipid Extraction Process  
*May Lim, Rita Henderson*

Algal Biofuel Project 3: Magnetic CaO Catalyst for Biofuel Production  
*May Lim, Martin Bucknall*

Atomic simulation of metal hydrides: bridging the gap between theory and experiment  
*Patrick A Burr, Francois Aguey-Zinsou*

Biocatalytic membrane contactor systems for CO<sub>2</sub> Conversion  
*Vicki Chen, Jingwei Hou*

Control the synthesis of polymer via light polymerization  
*Cyrille Boyer, Jason Xu*

Converting light into chemical energy  
*Cyrille Boyer, Jason Xu*

Emissions to Energy: Artificial Photosynthesis for converting CO<sub>2</sub> to fuels.  
*Rose Amal, Yun Hau Ng*

Enzymatic fuel cell with novel membrane electrodes  
*Vicki Chen, Jingwei Hou*

Experimental studies of control of vanadium batteries  
*Jie Bao, Maria Skyllas-Kazacos*

Integrating Hierarchical-Nanostructured Pseudocapacitor on Screen-Printed Solar Cells for Hybrid Ene  
*Yun Hau Ng, Alison Lennon*

Making hydrogen the fuel of the future  
*Francois Aguey-Zinsou, Qiwen lai*

No need for heat: Photon-promoted catalyst activation as an alternative to thermal  
*Jason Scott, Rose Amal*

One-dimensional Photoactive Nanostructures to harvest solar energy  
*Yun Hau Ng, Rose Amal*

Photothermal Carbon Dioxide Utilisation: Carbon-Neutral Synthesis of Methane  
*Rose Amal, Jason Scott*

Three Dimensionally Ordered Macroporous Spinel: Active Catalyst for CO<sub>2</sub> Reduction  
*Rose Amal, Hamid Arandiyani*

Turning Water into Chemical Fuels under Sunlight  
*Yun Hau Ng, Rose Amal*

### Food and Health

2 Stones, 1 Bird: Combining Conventional Therapy with Magnetic Hyperthermia in Cancer Treatment  
*May Lim, David Chang*

2-Photon Upconversion: Using Light for Highly Precise Drug Release  
*May Lim, Cyrille Boyer*

Delivery of Nitric Oxide for the prevention and the treatment of biofilm  
*Cyrille Boyer, Edgar Wang*

Importance of Nanoparticle Shapes for the delivery of therapeutic agents  
*Cyrille Boyer, Edgar Wang*

Novel membrane-enzyme hydrolysis systems to reduce allergenicity of milk proteins  
*Vicki Chen, Alice Lee*

Plasmonic nanoparticle based rapid test for allergen detection in food products  
*Alice Lee, George Lee*

### Molecular Engineering

Control the synthesis of polymer via photosynthesis: toward to mimic the Nature  
*Cyrille Boyer, Edgar Wang*

Novel Ultrathin Metal Organic Framework Membranes  
*Vicki Chen, Jingwei Hou*

Polymer nanoparticle synthesis using CO<sub>2</sub> – a versatile environmentally friendly approach  
*Per Zetterlund, Frank Lucien*

Sheared Aligned Graphene Oxide Membranes for Gas Separation  
*Vicki Chen, Jingwei Hou*

Synthesis of graphene/polymer nanocomposites  
*Per Zetterlund, Florent Jasinski*

### Process and Products

Remember to tap off to get the correct data?  
*Stuart Prescott, Patrick Spicer*

Simulation Studies on Distributed Model Predictive Control of Distributed Renewable Energy Storage  
*Jie Bao, Xinan Zhang*

### Water and Environment

Water recovery from flue gas: Preventing power plants from becoming water guzzlers  
*Vicki Chen, Hongyu Li*

## School of Civil and Environmental Engineering

### Wei Gao

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Analysis and Design of Light-Weight Sandwich Panels  
*Ehab Hamed, Chongmin Song*

Development and application of a coastal imaging tool for quantifying beach user patterns and trends  
*Mitchell Harley, Mr. Ben Modra*

Development and application of nanoparticle-based technologies for water and wastewater treatment  
*David Waite, Chris Miller, Shikha Garg*

Development of innovative cement binders with low carbon footprint  
*David Waite, A Casel; C. Arns; S.J. Foster*

Development of Reactive Barriers for Managing Radioactive Groundwater Contaminant  
*David Waite, Richard Collins, Andrew Kinsela*

Development of robust, low maintenance approaches to treatment of brackish contaminated groundwaters  
*David Waite, Peter Kovalsky; Di He*

Dynamic Traffic Assignment Calibration for Sydney traffic model  
*Simona MIHAITA, Chen Cai*

Factors contributing to the Growth & Toxicity of Freshwater Algae in Sydney Water Supply Catchments  
*David Waite, Mark Bligh, Brett Neilan*

Granular/biological activated carbon for algal and taste and odour removal  
*Arash Zamyadi, Richard Stuetz, Rita Henderson*

How to spot the flu on the bus: efficient outbreak detection methods in urban transport systems.  
*Lauren Gardner, Andras Bota*

Integrating Supply Information with Construction Planning  
*Mojtaba Maghrebi, Travis Waller*

LIDAR measurements of free-surface characteristics in hydraulic jumps  
*Stefan Felder, Laura Montano*

Light and Free-Radical Mediated Transformations of Iron and Copper in Oxidic Natural Waters  
*Professor David Waite, Ninh Pham, Chris Miller, Shikha Garg*

Logistics in humanitarian emergency operations  
*Hanna Grzybowska, Lauren Gardner*

Modelling a ride-share problem in microsimulation environment  
*Hanna Grzybowska, S. Travis Waller*

Modelling vehicle behaviour at an un-signalised intersection  
*Hanna Grzybowska, S. Travis Waller*

Optimising the flow of pedestrians in the context of a centrally-controlled traffic network  
*Lauren Gardner, Emily Moylan*

Product portfolio optimisation problem for vending operations  
*Hanna Grzybowska, David Rey*

Response characteristics of structures with uncertain parameters  
*Wei Gao, Di Wu*

Scenario Orchestration for Multi-participant Driving Simulator Validation  
*Zhitao Xiong, Vinayak V Dixit*

The impact of technology on pedestrian safety  
*S. Travis Waller, Kasun Wijayarathna*

The impact of utilized accessibility and travel time reliability on housing prices  
*Taha Hossein Rashidi, Emily Moylan*

Understanding the mobility of people through social media data  
*Taha Hossein Rashidi, Mojtaba Maghrebi*

Using network science to evaluate research interest in co-authorship and co-citation networks.  
*Taha Rashidi, Andras Bota*

Waste to Plate: A supply chain logistics problem  
*Vinayak Dixit*

Workforce Scheduling and Routing Problem  
*Hanna Grzybowska, S. Travis Waller*

## School of Computer Science and Engineering

**Salil Kanhere**  
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### Algorithms

Data analysis for understanding driver behaviour in Connected Vehicles  
*Simona Mihaita, Chen Cai*

Machine Learning Methods for Social Media Data Analytics  
*Chen Cai, Hoang Nguyen*

Multi-agent Resource Allocation Algorithms  
*Haris Aziz, Toby Walsh*

### Artificial Intelligence

Analysing and Classification of Time-Series X-Ray Crystallography Image Sequences  
*Arcot Sowmya, Mike Bain*

Automatic diabetic retinopathy detection  
*Arcot Sowmya, Anastasia Levenkova*

Big data analysis for understanding customer behaviour  
*Bang Zhang, Fang Chen*

Computer Assisted Analysis of Bone Age Studies  
*Zelin Li, Fang Chen*

Deep Learning for Brain MR Images  
*Arcot Sowmya, Upul Senanayake*

Deep learning for scene understanding  
*Zelin Li, Fang Chen*

Detection of People Carrying Objects  
*Arcot Sowmya, Yingying Liu*

Feasibility Study of Deep Learning Algorithms on Mobile Devices  
*Salil Kanhere, Arcot Sowmya*

General Game Playing  
*Michael Thielscher, Abdallah Saffidine*

General Problem-Solving Robot  
*Michael Thielscher, David Rajaratnam*

Pedantic Analytics  
*Guillaume Jourjon and Thierry Rakotoarivelo, Julien Epps*

Predicting Rare Events / Learning from Imbalanced Data  
*Arcot Sowmya, Ben Goldsmith*

Probabilistic Methods for Genocide/Atrocity Forecasting  
*Arcot Sowmya, Ben Goldsmith*

Sensor Validation for Structural Health Monitoring  
*Khoa Nguyen, Fang Chen*

Stable Marriages and Kidney Exchanges: Matching with Preferences and Constraints  
*Nicholas Mattei, Toby Walsh*

Understanding people from a robot's perspective  
*Michael Gratton, Maurice Pagnucco*

### Embedded, Real Time & Operating Systems

Art Installation on eChronos  
*Ihor Kuz, Peter Chubb*

Filter Banks for Local Signal Approximations  
*AIProf. Aleksandar Ignjatovic, Dr. Chamith Abewardana Wijenayake*

ROS native on seL4  
*Gernot Heiser, Siwei Zhuang*

Secure systems: Can you hack an unhackable system?  
*Ihor Kuz, Kevin Elphinstone*

Sloth vs eChronos  
*Gernot Heiser, Anna Lyons*

Standard C libraries - which one?

### Formal Methods

Automatic Translation of Routing Protocol Specifications  
*Peter Hoefner, Rob van Glabbeek*

Formal Verification of multi-threaded embedded application software  
*June Andronick, Corey Lewis*

Formalising and analysing blockchain protocols  
*Rob van Glabbeek, Peter Hoefner*

Formalising Properties for the Analysis of Bitcoin-like Protocols  
*Peter Hoefner, Rob van Glabbeek*

Implement and Verify a CakeML Compiler Optimisation  
*Ramana Kumar, Gerwin Klein*

Improving automation in concurrent software verification  
*June Andronick, Corey Lewis*

Machine learning for proof script generation.  
*Gerwin Klein, Yutaka Nagashima*

Model Checking of Network Routing Protocols  
*Peter Hoefner, Rob van Glabbeek*

Modelling Routing Protocols  
*Rob van Glabbeek, Peter Hoefner*

Proof Engineering on CakeML proofs  
*Ramana Kumar, Gerwin Klein*

Verification of native C functions in Cogent  
*Gerwin Klein, Toby Murray*

### Human Computer Interaction

Benchmarking physiological sensors for cybersecurity analysis  
*Ronnie Taib, Fang Chen*

Uncertainty visualization and interpretation in data analytics  
*Jianlong Zhou, Fang Chen*

Visual analytics of time-spatial data  
*Jianlong Zhou, Fang Chen*

### Multimedia & Visual Communication

3D Visualisation of Perfusion Patterns in Prostate  
*Arcot Sowmya, Gihan samarasinghe*

Mapping water distribution assets using GeoServer  
*Ronnie Taib, Fang Chen*

Medical Image Visualization  
*Arcot Sowmya, Gihan Samarasinghe*

### Networks, Sensor Networks, etc

A Novel Approach to Privacy Preservation in the Internet of Things using Blockchains  
*Salil Kanhere, Ali Dorri*

Batteryless secret key generation for wearable devices  
*Wen Hu, Weitao Xu*

Detecting Driver Distraction with WiFi  
*Wen Hu, Mojtaba Maghrebi*

Device-free Indoor Occupant Identification and Activity Recognition with WiFi  
*Wen Hu, Abdelwahed (Abdo) KHAMIS*

Mobile 3D mapping with Google Tango  
*Wen Hu, Yongtuo Zhang*

Security and Privacy Risks in Household Internet of Thing Devices  
*Salil Kanhere, Ali Dorri*

What does your network traffic reveal about you?  
*Salil Kanhere, Arash Shaghaghi*

### Optimization Techniques

Energy Efficiency in A Super Computer  
*(Daniel) Wei Sun, Liming Zhu*

### Programming Languages and Compilers

Preventing control flow attack in C++ using points-to analysis  
*Yulei Sui, Jingling Xue*

Using Linguistic Techniques to Automatically Analyse Content of Social Media to Extract Trip Purpos  
*Mojtaba Maghrebi, Taha Rashidi*

### Software Engineering

Dependable Blockchain Crowd-Funding Application  
*Ingo Weber, Helen Paik*

Exploring the risks of software monoculture  
*Ralph Holz, Ingo Weber*

Information flow analysis for detecting vulnerabilities in mobile applications  
*Yulei Sui, Jingling Xue*

Modeling life-cycle of Android applications using static program analysis  
*Yulei Sui, Jingling Xue*

Performance Analysis of Blockchain-based Systems  
*Shery (Xiwei) Xu, Mark Staples*

Pig+: Pig Enhanced by Provenance  
*Daniel Sun, Liming Zhu*

Reputation Mechanism on Blockchain-based Decentralised Systems  
*Shery (Xiwei) Xu, Surya Nepal*

Software development for an automated financial advice system (Robo-advisor)  
*Fethi Rabhi, Ali Behnaz*

### Theoretical Computer Science

Computational Complexity of Imperfect Information Games  
*Serge Gaspers, Abdallah Saffidine*

Expressiveness of Distributed Systems  
*Rob van Glabbeek, Peter Hoefner*

### Web Services, E-Commerce, and other Web Technologies

Cryptographically Enforced Privacy Preserving Technique for Cloud  
*Liming Zhu, Jongkil Kim*

Discovering Vandalizers in Social Media Streams  
*Lina Yao, Boualem Benatallah*

Enabling Autonomous Internet of Things Management using Blockchain  
*Lina Yao, Xiwei(Sherry) Xu*

Extracting Linked Events from Internet of Thing Systems for Human Activity Prediction  
*Lina Yao, Boualem Benatallah*

## School of Electrical Engineering and Telecommunications

**Aron Michael**  
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### Data and Mobile Networks

Content Caching in 5G Heterogeneous Networks  
*Kanchana Thilakarathna, Aruna Seneviratne*

Elastic Cloud Connections using Software Defined Networking  
*Vijay Sivaraman, Craig Russell*

Enhancing GPS Robustness via Vehicle-to-vehicle Communication  
*Joon Wayn Cheong, Andrew Dempster*

Evaluating the performance of Short-Range communication protocols in IoT  
*Aruna Seneviratne, Tham Nguyen*

Extracting meaningful information from a real-life large-scale sensor network  
*Thierry Rakotoarivelo, Julien Epps*

Fine-grained Group Activity Detection using Wearable Devices  
*Kanchana Thilakarathna, Aruna Seneviratne*

Implement multiple access for 5G on software defined radio platform  
*Jinhong Yuan, Raja Pillai*

Low-Power-Wide-Area-Network for Internet of Things  
*Kanchana Thilakarathna, Aruna Seneviratne*

Method for Providing Secure and Private Fine-grained Access to Outsourced Data  
*Aruna Seneviratne, Mosarrat Jahan*

The Application of Game Theory in Distributed Wireless 5G Networks and Networks for Disaster Respons  
*David Smith, Julien Epps*

Wearables Technology: Optimisation of Communications across Multiple Wireless Body Area Networks  
*David Smith, Julien Epps*

Web for Wearable Devices  
*Suranga Seneviratne, Aruna Seneviratne*

Zero-Copy DNS Server  
*Guillaume Jourjon and Vincent Gramoli, Julien Epps*

### Multimedia Signal Processing

Deep learning based high throughput image characterisation  
*Dadong Wang, Julien Epps*

Integrated 3D Video Coding  
*David Taubman, Reji Mathew*

Machine learning in Speech Processing  
*Vidhyasaharan Sethu, Julien Epps*

Throughput and Speed Enhancement of Wideband 2-D Digital Beamforming Filters  
*Chamith Wijenayake, TBA*

### Network Privacy, Security and Quantum Telecommunications

Breathing as Gestures  
*Suranga Seneviratne, Aruna Seneviratne*

Evaluating Security for the Internet-of-Things (IoT)  
*Vijay Sivaraman, Hassan Habibi Gharakheili*

Personal Data Valuation Scheme for Smart Devices  
*Aruna Seneviratne, Suranga Seneviratne*

Quad matrix switch and Tuneable RF Band-pass Filter  
*Rodica Ramer, W. Tainsh and K.Y. Chan*

### Quantum Computing and Microelectronics

A Quantum RAM  
*Jarryd Pla, Mykhailo Savtyskiy*

COMSOL simulation of scalable silicon quantum computing devices  
*Andrew Dzurak, Kok Wai Chan*

Cryogenic and microwave circuits for quantum computers  
*Andrea Morello, Vivien Schmitt*

Doherty RF amplifier  
*Rodica Ramer, TBA*

Silicon-based Quantum Computing  
*Andrew Dzurak, Henry Yang*

Smart algorithm for quantum bit state detection using MATLAB  
*Andrew Dzurak, Henry Yang*

### Satellite Systems

Advanced Signal Processing for GPS Anti-Spoofing  
*Joon Wayn Cheong, Andrew Dempster*

Advanced Signal Processing for GPS receivers  
*Joon Wayn Cheong, Andrew Dempster*

Beidou Correlator Design for Namuru/Kea FPGA Based GNSS Receiver  
*Eamonn Glennon, Andrew Dempster*

FPGA Search Acceleration Hardware for High Sensitivity and Space GNSS Applications  
*Eamonn Glennon, Andrew Dempster*

GPS Receivers for Sounding Rockets  
*Eamonn Glennon, Andrew Dempster*

Modelling and Digital Compensation of the Satellite Transponder Non-linearities  
*Ediz Cetin, Andrew Dempster*

Self-Checking, SEU-resilient Voter Design for Space-based FPGA systems  
*Ediz Cetin, Oliver Diessel*

Space Based GPS Reflectometry Experiment with QB50  
*Eamonn Glennon, Joon Wayn Cheong*

Space Based Tracking of Aircraft on CubeSats  
*Ediz Cetin, Andrew Dempster*

### Smart Grid and Energy Systems

A Novel Control Strategy for Demand Response in Smart Grids using Signal Processing Techniques  
*Jayashri Ravishankar, Anam Malik*

Augmenting HVDC systems for renewable electrical grid operation  
*John Fletcher*

Development and HIL testing of protection and control functions for a hybrid dc-breaker  
*Georgios Konstantinou, Mr. Harith Wickramasinghe*

Energy harvesting and scavenging using dielectric elastomers  
*John Fletcher, TBC*



Online monitoring system for SWER feeders and microgrids  
*Toan Phung Trevor Blackburn*

## School of Mechanical and Manufacturing Engineering

**Victoria Timchenko**  
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### Air and Ground Vehicles

Detecting Water Stress in Vineyards using Mobile Phone Cameras  
*Mark Whitty, Scarlett Liu*

Quiet Owl Wings  
*Con Doolan, Danielle Moreau*

Stopping Cross-infection: Lightweight Localisation Techniques for Patient Tracking in Hospitals  
*Mark Whitty, Samsung Lim*

Street View for a Vineyard: Efficient Database Management for Large Scale Image Processing  
*Mark Whitty, Scarlett Liu*

Using SWARMS of Vehicles to Explore Asteroids  
*John Page, John Olsen*

### Design and Analysis

Automated Manufacture of Advanced Composites - Modelling and Experimentation  
*Garth Pearce, Ebrahim Oromiehie*

Evaluation of the wear resistance of a new laminated composite material for arthroplasty application  
*Zhongxiao Peng, Juan Baena Vargas*

Gear wear diagnosis and prediction using wear debris analysis techniques  
*Zhongxiao Peng, Wade Smith*

The Application of Virtual Reality to Engineering  
*John Page, John Olsen*

The role of disc degeneration and sacral slope in the progression of vertebral slippage in human lum  
*Naomi Tsafnat, Ashish Diwan*

understanding martensitic transformations in zirconium  
*Patrick A Burr, Edward Obbard*

### Thermofluids

Experimental investigation of NOx reduction mechanism in an optical diesel engine  
*hawn Kook, Lingzhe Rao*

Heating of the skin tissues during WIRA irradiation  
*Victoria Timchenko, Rob Taylor*

Laser fluid dynamics measurement of in-vitro vascular flow  
*Tracie Barber, Anne Simmons*

Low noise aircraft technology  
*Danielle Moreau, Con Doolan*

Measurement of flow and flame interactions in an optical SIDI engine  
*Shawn Kook, Lewis Clark*

Modelling combustion in a low-emissions diesel engine  
*Evatt Hawkes, Josh Tang*

Modelling extinction and reignition in syngas flames  
*Evatt Hawkes, Josh Tang*

Stationary nanodroplets for single-cell analysis  
*Majid Ebrahimi Warkiani, Robert Nordon*

## School of Mining Engineering

**Seher Ata**  
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### Mining Geomechanics

Ground Water Flow near Cable Bolts in Roofs of Underground Mines  
*Wendy Timms, Serkan Saydam*

Influence of asperity properties on the shear strength of a rock joint  
*Joung Oh, Yingchun Li*

Suitability of lagging from recycled plastics and tires for use in mining and construction  
*Duncan Chalmers, Fidelis Suorineni*

### Mining Systems and Processing

Combining Virtual Reality with Augmented Reality for a mining environment  
*Rudrajit Mitra, Serkan Saydam*

Effect of particles on interfacial properties and inhibiting bubble coalescence  
*Seher Ata, Ghislain Bournival*

Effect of recycled water on the performance of surfactants  
*Seher Ata, Ghislain Bournival*

### Sustainable Mining Practices

Evaluating the accuracy of LiDAR scanning over variable targets for subsidence measurement  
*Simit Raval, Bikram Banerjee*

### Innovative Education and Training

Machine learning and virtual reality: Assisting the mind in discovering trends in big data  
*Fidelis Suorineni, James Tibbett*

## School of Petroleum Engineering

**Manman Hu**  
manman.hu@unsw.edu.au

Coal Transport Properties  
*Ryan Armstrong, Yulai Zhang*

Hydro-chemical induced permeability evolution in organic-rich shales  
*Hamid Roshan, Stuart Walsh*

Inclusion of microporosity in estimation of mixing in rocks  
*Dr Peyman Mostaghimi, Min Liu*

Mechanical response of shale at elevated temperature  
*Hamid Roshan, Manolis Veveakis*

Optimal Design and Planning for Laboratory Flooding Experiments  
*Furqan Hussain, Muhan Yu*

Rock Mechanical Property Measurement at High Temperature and High Pressure Conditions  
*Zhixi Chen, Sheik Rahman*

Unconventional Geomechanics: borehole stability  
*Manman Hu, Manolis Veveakis*

Unconventional Geomechanics: field application  
*Klaus Regenauer-Lieb, Thomas Poulet*

Unconventional Geomechanics: mathematical development for material instabilities  
*Sotiris Alevizos, Thomas Poulet*

Unconventional Geomechanics: Thermal Laboratory Experiments  
*Manolis Veveakis, Stuart Walsh*

Unconventional Geomechanics: Numerical Experiments  
*Thomas Poulet, Manolis Veveakis*

## School of Photovoltaic and Renewable Energy Engineering

**Shujuan Huang**  
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### 1st Generation Solar Cells

Belt firing furnace temperature profiling and optimisation  
*Matthew Edwards, Nitin Nampalli*

Development of Advanced Dielectrics for Surface and Bulk Passivation of Silicon Wafers and Solar Cell  
*Ziv Hameiri, Kyung Kim*

Development of Dielectric Layers for Advanced Hydrogenation  
*Bram Hoex, Brett Hallam*

Enhanced Hydrogenation Structures for Silicon Solar Cells  
*Brett Hallam, Malcolm Abbott*

Kinetic modelling and in-situ monitoring of carrier lifetimes in silicon wafers  
*Brett Hallam, Malcolm Abbott*

Novel cell interconnection techniques: electrical characterisation and evaluation  
*Matt Edwards, Nitin Nampalli*

Optical Optimisation of PV Modules  
*Matt Edwards, Nitin Nampalli*

Potential Induced Degradation (PID) testing and characterisation  
*Matthew Edwards, Nitin Nampalli*

Rapid Inline Hydrogenation for Silicon Solar Cells  
*Malcolm Abbott, Brett Hallam*

Temperature-Dependent Photoluminescence Measurements of Silicon Wafers and Silicon Solar Cells  
*Ziv Hameiri, Mattias Juhl*

### 2nd Generation Solar Cells (Thin Film)

Cd free CZTS solar cells  
*HONGTAO CUI, Xiaojing Hao*

Feasibility of Solar Paint  
*Martin Green, Anita Ho-Baillie*

Relationship Between Compositional Engineering And Stability Of Perovskite Solar Cells  
*Ashraf Uddin, Naveen Elumalai*

### Combustion and Biofuels

Lean premixed combustion of hydrogen  
*Evatt Hawkes, Josh Tang*