



AUSTRALIAN ACADEMY OF SCIENCE  
NATIONAL COMMITTEE FOR SPACE SCIENCE

## 13TH AUSTRALIAN SPACE SCIENCE CONFERENCE

September 30 - October 2, 2013



NATIONAL SPACE SOCIETY  
OF AUSTRALIA LTD



Australian Government  
Department of Innovation  
Industry, Science and Research

**Mars Society Australia**  
Mars Society Australia



**UNSW**  
AUSTRALIA



<b>Time</b>	<b>Monday</b>		<b>Tuesday</b>		<b>Wednesday</b>	
7:30	Registration		Registration		Registration	
8:00	Registration		Registration		Registration	
9:00	Opening / Nat Context <i>Physics Theatre</i>		Plenaries <i>Physics Theatre</i>		Plenaries <i>Physics Theatre</i>	
10:30	Break		Break		Break	
11:00	Plenary & Govt Units <i>Physics Theatre</i>		ASRP <i>Physics Theatre</i>	Planetary Science - MARS <i>Room G31</i>	Indigenous Sky Knowledge <i>Physics Theatre</i>	Planetary Science - Solar system <i>Room G32</i>
13:00	Lunch		Lunch		Lunch	
14:00	Space Physics I <i>Physics Theatre</i>	Space Engineering I <i>Room G31</i>	Earth Observation, GNSS <i>Physics Theatre</i>	Space Physics II <i>Room G31</i>	New Instruments, Techniques, Space Projects <i>Physics Theatre</i>	Space Physics III <i>Room G32</i>
16:00	Break		Break		Break	
16:30	Posters & Cocktail Reception <i>Level 2</i>		Space Industry <i>Physics Theatre</i>	Space Engineering II <i>Room G31</i>	Space Education & Humanities <i>Physics Theatre</i>	Planetary Science - Exoplanets <i>Room G32</i>
18:00			Close		Closing Remarks	
18:15	Close				Close	
18:30	Close				Close	

### 13<sup>th</sup> Australian Space Science Conference - Session Overview

## Venue Details



The conference will be held in the Old Main Building at the University of NSW (location K14) Kensington campus.

Stream 1 and Plenary sessions will be held in the Physics Lecture theatre (ground floor).

Stream 2 sessions will be held in Seminar room G31 on Monday and Tuesday (ground floor). On the Wednesday Stream 2 sessions are in room G32 (ground floor).

Teas and lunches will be served on level 2 near rooms 232/233. This area will also be used for poster displays.

Level 2 has disabled access via lifts to level 2.



### **Gala Dinner**

Tuesday October 1

6:45pm for a 7:00pm start

Dress: Smart casual

Location: Randwick Labour Club  
135 Alison Road, Randwick

## Location of conference facilities - Old Main Building at K14 - University of NSW



**Monday - Stream 1 (*Physics Theatre*)**

<b>Time</b>	<b>Speakers Name</b>	<b>Title</b>
<b>7:30-9:00</b>	Registration	
9:00-9:20	I. Cairns, W. Short	Welcome to ASSC / opening
9:20-9:45	Michael Nelson	<b>National Context</b> Space Policy and Space Science
9:45-10:10	Russell Boyce	NCSRS report and objectives
10:10-10:30	Dave Neudegg	IPS Radio and Space Services and space weather in cycle 24
10:30-11:00	<b>Tea</b>	<b>National Context</b>
11:00-11:20	Tim Payne	DSTO Space Program
11:20-11:40	Lewis Ball	CSIRO Astronomy and Space Science
11:40-12:00	Jeff Kingwell	Geoscience Australia activities in space science
12:00-12:30	Andrew Dempster	<b>Plenary Session I</b> Past and present research activities at ACSER
12:30-13:00	David Willson	Mars Exploration and Sample Return using Dragon: A New low cost paradigm for Mars science missions
<b>13:00-14:00</b>	<b>Lunch</b>	

14:00-14:15	Fred Menk	<b>Space Physics I</b> Pc2 Electromagnetic Ion Cyclotron Wave Source Regions in the Outer Magnetosphere
14:15-14:30	Brian Fraser	New Understanding of Inner Magnetosphere Physics: Initial Van Allen Probe Results.
14:30-14:45	Julie Currie	ULF Waves and Earthquake Precursors
14:45-15:00	Leila Norouzi Sedeh	Properties of ULF waves observed in TIGER radar
15:00-15:15	Trevor Harris	EXOTIC: A small experiment on polarisation effects of oblique HF radiowaves (separating O/X modes on oblique soundings)
15:15-15:30	Jayanta K. Behera	Substorm associated dayside CNA and simultaneous Pc5 pulsations in geomagnetic field variations
15:30-15:45	Dion Tiu	New model for the ion reflection process as quasiperpendicular collisionless shocks
15:45-16:00	Brett Layden	Exact Evaluation of the Rates of Electrostatic Decay and Scattering off Thermal Ions for an Unmagnetized Maxwellian Plasma
<b>16:00-16:30</b>	<b>Tea</b>	
16:30-18:30	Posters & Cocktails Reception	

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**Monday - Stream 2 (Seminar Room G31)**

<b>Time</b>	<b>Speakers Name</b>	<b>Title</b>
14:00-14:15	William Reid	<b>Space Engineering I</b> A Highly Mobile Wheel-on-Leg Planetary Rover for use in a Mars Analogue Environment
14:15-14:30	Anthony Tompkins	Development of a Low-Cost Vision-Based Localisation System for the Experimental Mars Rover
14:30-14:45	Steven Potiris	A Vision-based Autonomous Docking System of the Experimental Mars Rover
14:45-15:00	Trevor Kwan	Position Determination of Satellites in Formation Flying
15:00-15:15	Monica Chi	Swarm-Based Satellite Constellation Control
15:15-15:30	Yang Yang	Inter-satellite Link Augmented GPS Navigation System for Autonomous Satellites Formation Flying
15:30-15:45	Kyll Schomberg	Computational analysis of pintle variation in an expansion-deflection nozzle
15:45-16:00	Robert Moore	Economical Liquid Rocket Engine Production Using Thermal Spray Techniques

**Tuesday – Stream 1 (*Physics Theatre*)**

<b>Time</b>	<b>Speakers Name</b>	<b>Title</b>
<b>8:00-9:00</b>	Registration	
		<b>Plenary Session II</b>
9:00-9:30	Steven Tingay	The Murchison Widefield Array, Precursor for the Square Kilometre Array
9:30-10:00	Chris Rizos	GNSS Trends: Where are we now and where are we going?
10:00-10:30	Colin Waters	Probing near-Earth Space using ULF signals
<b>10:30-11:00</b>	<b>Tea</b>	
		<b>ASRP</b>
11:00-11:15	Kerrie Dougherty	Pathways to Space: ASRP Project Review
11:15-11:30	Bob Buxton	Place and Space: Perspectives on Earth Observation
11:30-11:45	John Le Marshall	The Platform Technology ASRP Project - Completion and Future Directions
11:45-12:00	Andrew Dempster	The Garada "SAR Formation Flying" project
12:00-12:15	Roland Fleddermann	Laser Ranging Instrument for the GRACE Follow-on mission
12:15-12:30	Barnaby Osborne	A Comprehensive Tertiary Education Program in Satellite Systems Engineering
12:30-12:45	Russell Boyce	Outcomes of the SCRAMSPACE Scramjet-based Access-to-Space Systems project
12:45-13:00	Michael Davis	Southern Hemisphere Summer Space Program
13:00-13:10	Brett Biddington	Australia's bid to host the International Astronautical Congress (IAC) in 2017



**13:10-14:00**

**Lunch**

14:00-14:30

John Le Marshall

14:30-14:45

Champlain Kenyi

14:45-15:00

Daniel Cotton

15:00-15:15

James Gilmore

15:15-15:30

Liam Liyuan Li

15:30-15:45

Tim Youtian Liu

**16:00-16:30**

**Tea**

16:30-16:50

Michael Davis

16:50-17:05

Brett Biddington

17:05-17:20

Rod Drury

17:20-17:35

Robert Brand

17:35-17:50

John Kennewell

17:50-18:05

Eren Gorur

**Earth Observation and GNSS**

An Analysis Of The Impact Of Earth Observations From Space On Australian And Global Numerical Weather Prediction

Retrieval of greenhouse gas concentrations from observations with a ground-based spectrometer in the near-infrared

Spectroscopic Fitting of the Terrestrial Atmosphere for Improved Planetary Atmosphere Observations

Measurement Uncertainty in Satellite Observations of Precipitation and Column Water Vapor

Satellite Vibrations and Restoration of High Resolution Pushbroom Images

Phase Unwrapping for Interferometric Synthetic Aperture Radar Technique

**Space Industry**

SIAA report and objectives

Role of Australian SMEs in the global space economy

Lockheed Martin and space industry in Australia

Triple Play in the Space Sector

Satellite Overpass Statistics

Australian Space Policy: A Student Perspective

**Tuesday - Stream 2 (Seminar Room G31)**

<i>Time</i>	<i>Speaker's Name</i>	<b>Title</b>
		<b>Planetary Science – Mars / MSA</b>
11:00-11:20	Steven Hobbs	A Comparison Of Arid, Temperate And Sub-Humid Terrestrial Gullies With Gullies On Mars – Implications For Martian Gully Erosion
11:20-11:40	Jonathan Clarke	Searching for life on early Mars: lessons from the Pilbara
11:40-12:00	Emily Bathgate	Raman characterisation of the products of alteration of volcanic rock minerals: preliminary results and implications for Martian studies
12:00-12:20	Shaun Moss	Blue Dragon: A Humans-to-Mars Mission Architecture
12:20-12:40	David Willson	Off-World field science performance: Results from the Pilbara space suit trials
12:40-13:00	Haritina Mogosanu	Using analogue Mars expeditions to create school resources for New Zealand’s “Planet Earth and Beyond” Curriculum
<b>13:00-14:00</b>	<b>Lunch</b>	
		<b>Space Physics II</b>
14:00-14:15	Murray Sciffer	Phase distortions of space to ground electromagnetic signals due to ULF waves
14:15-14:30	Gareth Sciffer	Modelling ULF Quarter-wave modes
14:30-14:45	Lewis Freeland	A Search for Signatures of Discrete Cosmic Radio Sources Using an Imaging Riometer at Davis, Antarctica

14:45-15:00	Joachim Schmidt	Type II solar radio bursts predicted by 3D MHD CME and kinetic radio emission simulations
15:00-15:15	Shyeh Tjing Loi	Production of fine structures in type III solar radio bursts due to turbulent density profiles
15:15-15:30	Iver Cairns	MWA and Spacecraft Observations of Type III Solar Radio Bursts, X-ray Bursts, and Plasma Flows
15:30-15:45	Stuart Gilchrist	Nonlinear Force-free Modeling of the Coronal Magnetic Field in Spherical Geometry
15:45-16:00	James Harding	New Density Model for the Solar Corona and Constraints on the Corona's Origin and Outflow
<b>16:00-16:30</b>	<b>Tea</b>	
		<b>Space Engineering II</b>
16:30-16:45	David Lingard	COWPATT: The Value of an Integrated Modelling Approach to Designing Cubesats and their Missions
16:45-17:00	Li Qiao	Attitude Determination and Control System (ADCS) of UNSW QB50 project "UNSW EC0"
17:00-17:15	Joseph Stefano	QB50 Power Management Optimization
17:15-17:30	Eamonn Glennon	CubeSat-based GPS Reflectometry using the Namuru V3.2 GPS Receiver
17:30-17:45	Mazher Choudhury	Test Results of the Namuru Dual-GNSS Space-borne Receiver
17:45-18:00	Sai Dheeraj Nadella	Computational Requirements in Interfacing Attitude Determination And Control System, onto the On Board Data Handling System in a Nano-satellite
19:00-22:00	<b>Gala Dinner</b>	<b>Randwick Labor Club</b>

### Wednesday – Stream 1 (*Physics Theatre*)

Time	Speakers Name	Title
<b>8:00-9:00</b>	Registration	
		<b>Plenary Session III</b>
9:00-9:30	John Goldsmith	The "Ilgarijiri- Things Belonging to the Sky" project: Collaboration between Aboriginal communities and radio astronomy in Australia.
9:30-10:00	Craig O'Neill	The tectonics of exoplanets
10:00-10:30	David Williams	Space Research capability in Australia. Are there lessons from the UK and the wider Europe?
<b>10:30-11:00</b>	<b>Tea</b>	
		<b>Indigenous Sky Knowledge</b>
11:00-11:15	Hugh Cairns	An Ancient Aboriginal Astronomy from the Northern Territory
11:15-11:30	Trevor Leaman	Ooldea Nights: Daisy Bates and the Aboriginal Sky Knowledge of the Great Victoria Desert, South Australia
11:30-11:45	Robert Fuller	The Sky Knowledge of the Kamilaroi People and Their Neighbours
11:45-12:00	David Pross	Sky Knowledge and Rock Art in the Sydney Basin
12:00-12:15	Duane Hamacher	Are Supernovae Recorded in the Astronomical Traditions of Aboriginal Australians?
12:15-12:30	Geoff Wyatt	Star wheel and signals: Sydney Observatory's Shared Sky education program
12:30-12:45	Alice Gorman	Beyond the Morning Star: the Voyager spacecraft and Australian Aboriginal culture
12:45-13:00	Ragbir Bhathal	Perspectives on Aboriginal Sky Knowledge

**13:00-14:00**

**Lunch**

14:00-14:15

Naomi Altman

14:15-14:30

Anthony Monger

14:30-14:45

Tim Broadbent

14:45-15:00

Iver Cairns

15:00-15:15

Thien Nguyen

15:15-15:30

Paul Stewart

15:30-15:45

Anthony Cheetham

15:45-16:00

Alexey Kondyurin

**16:00-16:30**

**Tea**

16:30-16:55

Jonathan Oxe

16:55-17:10

Kerrie Dougherty

17:10-17:23

Ali Haydar  
Goktogan

17:23-17:35

Ali Haydar  
Goktogan

17:35-17:50

Harrison Steel

**New Instruments, Techniques, Space Projects**

Expanding Australia's contribution to the ACES and future space missions  
Frequency Allocation for Satellite Space Stations using Amateur Radio Bands

The DragEN tether deployer experiments for the NASA Flight Opportunities Program

Status of the University of Sydney's i-INSPIRE spacecraft project

Finishing BLUEsat

High Resolution Imaging of Evolved Stars with Cassini Stellar Occultations

Optical testbed demonstration of Fizeau Interferometric Cophasing of Segmented Mirrors

Composite materials cured in stratosphere during stratospheric balloon flight

**Space Education & Humanities**

ArduSat: Bringing Hands-On Space Technology Into The Classroom

Before Woomera: Australia's Early Rocketeers

Virtual Mars Yard Simulation System for Internet-Based STEM Education

An Internet-based Collaborative Teleoperation System for the Mars Lab and Distance STEM Education

NASA's Spaceward Bound Program: Expeditions in Australia and New Zealand

17:55-18:05

**Closing Remarks**

**Wednesday - Stream 2 (Seminar Room G32)**

<b>Time</b>	<b>Speakers Name</b>	<b>Title</b>
		<b>Planetary Science – Solar system</b>
11:00-11:15	Jeremy Bailey	30 Years of Studying Venus with the Anglo-Australian Telescope
11:15-11:30	Elyse Schinella	Venusian Admittance and Correlation: Clues to Topographic Compensation Mechanisms and Mantle Dynamics
11:30-11:45	Sarah Chamberlain	Water Vapour near the Venus Surface
11:45-12:00	Jonathan Horner	The role of Jupiter in driving periodic climate change
12:00-12:15	Yi He, Chao Zhang	Titan Stream Mapping - Morphometric analysis of channel on Titan
12:15-12:30	Helen Maynard-Casely	Icy moons in the laboratory, re-creating the outer solar system at ANSTO
12:30-12:45	John Kennewell	The Desert Fireball Network And Orbital Space Debris Re-entries
12:45-13:00		
<b>13:00-14:00</b>	<b>Lunch</b>	
		<b>Space Physics III</b>
14:00-14:15	Anne Unewisse	A New Relocatable Airglow Imager
14:15-14:30	Lenard Pederick	Semi-empirical Model for Ionospheric Absorption based on the NRLMSISE-00 atmospheric model (SiMIAN)
14:30-14:45	Manuel Cervera	Generation of TIDs by Atmospheric Gravity Waves and their effect on VI ionograms

14:45-15:00	Zahra Bouya	Regional climatological model of TEC over Australia
15:00-15:15	Intan Idrus	Observation of Large-scale Traveling Ionospheric Disturbance in Peninsular Malaysia using GPS receivers
15:15-15:30	Andrew Layden	Langmuir electrostatic decay in magnetized plasmas
15:30-15:45	Fiona Schleyer	Linear mode conversion of upper hybrid waves to radiation: Averaged energy conversion efficiencies, polarization, and applications to Earth's continuum radiation.
15:45-16:00	Mike Wheatland	Revisiting the event statistics method for solar flare prediction
<b>16:00-16:30</b>	<b>Tea</b>	
		<b>Planetary Science - Exoplanets</b>
16:30-16:45	Jonathan Horner	Wobbling Ancient Binaries - Here Be Planets?
16:45-17:00	Kimberly Bott	Modelling a Hot Jupiter Atmosphere with VSTAR
17:00-17:15	Lucyna Kedziora-Chudczer	Inflated 'hot' Jupiters and their atmospheres
17:15-17:30	Brett Addison	The recently discovered exoplanet WASP-79b in a Nearly polar orbit
17:30-17:45	James Gilmore	Exo-Earth Habitability and Radiative Properties in Energy Balance Models

## Posters

Posters are listed in alphabetical order of first author

<b>Name of Presenter</b>	<b>Names of all authors</b>	<b>Title</b>
Shaila Akhter	Shaila Akhter, Maria Cunningham, Paul Jones	Clustering of dense molecular gas in the Milky Way Galaxy
Jeremy Bailey	Jeremy Bailey	Greenhouse Gas Measurement using Fibre-Optic Spectrometers
Mazher Choudhury	Mazher Choudhury, Eamonn Glennon, Andrew Dempster	Analysing Navigation Solutions of the Namuru V3.2 GPS Receiver for Spaceborne Applications
Suelynn Choy	Suelynn Choy	Precipitable Water Vapour Estimation using Observations from the Australian Regional GNSS Network for Climate Monitoring
Samuel Francis	Samuel P. Francis, Kirk McKenzie, Timothy T-Y. Lam, Andrew J. Sutton and Daniel A. Shaddock	Weak-Light Phase Locking for Space-Based Interferometry
Ali Haydar Goktogan	Ali Haydar Goktogan, Salah Sukkarieh	Sydney Lunabotics: A Project Based Teaching and Learning in Space Robotics
David Herne	David Herne, John Kennewell, Mervyn Lynch	Ionospheric Phenomena and Low-frequency Radio Astronomy
Lea Jouvin	Lea Jouvin, Sarah Maddison, Jonathan Horner	Dynamical stability of terrestrial planets in the habitable zone of HD204313



Lucyna Kedziora-Chudczer	Lucyna Kedziora-Chudczer, Jeremy Bailey, Jonti Horner, Daniel Cotton	The D/H ratio of giant planets as a diagnostic of planet forming conditions
Alexey Kondyurin	Alexey Kondyurin, Liudmila Komar, Alexander Svistkov	Modelling of the composite materials cured under free space conditions
Bo Li	Bo Li, Iver Cairns	Type III Bursts Produced by Power-law Distributed Electrons Injected into Thermal Corona
Vasily Lobzin	Vasily Lobzin	Automatic recognition of type III solar radio bursts in STEREO/WAVES data
Frank Mills	Frank Mills	Modelling and observations of mesospheric sulfur chemistry on Venus
Dave Neudegg	Dave Neudegg	Antarctic polar cap ionosphere and effects of solar EUV, magnetosphere-ionosphere coupling and thermospheric transport
Jeremy Soh	Jeremy Soh, Xiaofeng Wu	A modular FPGA-based Kalman filter for nanosatellite attitude determination
Samira Tasnim	Samira Tasnim, Iver Cairns	Generalized theory for the solar wind
Marek Zbik	Marek Zbik, David Williams	Discovery of nano in size particles within glassy bubbles in lunar soil, likely source of the ultra-fine lunar regolith fraction