



SPATIAL SCIENCES NEWS BYTES

Date: August 2013

Curtin marks a century of excellence in spatial sciences

The Spatial Sciences' Anniversary Celebration on 24 May was an excellent opportunity for over 150 Alumni and industry members to come together and celebrate Curtin University's and the Western Australian School of Mines' triple anniversary milestones: 100 years of mine surveying, 50 years of surveying and 25 years of GIScience.

Key speeches by Professor Bert Veenendaal, Head of Department of Spatial Sciences, Professor Lyn Beazley, Western Australia's Chief Scientist, and Mr Ian Hyde, Acting Chief Executive of Landgate, along with three Alumni members, Gerry Nolan, Boe Helms and Siaolin Kek, set the tone for the evening.

One of the highlights of the evening was a special presentation to the oldest living graduate of the Western Australian School of Mines, Mr Paul Royle, almost a centurion himself at age 99, who graduated with a mine surveying degree in 1947. His wonderful recollections of life before and after receiving his degree proved to be a fascinating story in itself.

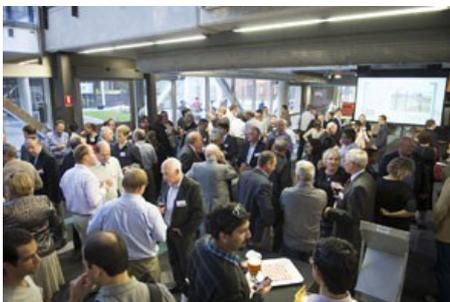


Mr Paul Royle with Prof Bert Veenendaal and Mr Bill Beament, President, WASM Graduates Association

Professor Veenendaal said. "It was great to see over 150 graduates, industry partners and past and current staff members commemorate the milestones, and hear where our alumni have headed in their careers.

"Whether a career in natural resources, mining, energy, tourism, agriculture, climate change or even health – it's impressive how spatial sciences has pervaded these disciplines, opening up marvellous opportunities and pathways."

Professor Veenendaal said the future of the spatial sciences industry was bright, with technological developments such as; laser scanning, 3D modelling, high accuracy positioning, and intelligent systems to model the world in real-time, just some of the examples today's students will be working on in tomorrow's careers.



Part of the crowd at the anniversary celebration

Curtin University and Landgate celebrate new alliance

Curtin University and Landgate marked a renewing of their Alliance by holding an official Alliance Agreement signing ceremony on Friday 2 August in the Spatial Sciences Landgate

Studios at Curtin University. During the speeches both Professor Bert Veenendaal, Head of Department, Spatial Sciences, and Mr Ian Hyde, Acting Chief Executive of Landgate, commented on the effective synergy in the partnership between Landgate and Curtin that has helped to make WA one of the global leaders in spatial sciences.



Curtin University's Pro Vice Chancellor, Professor Andris Stelbovics, and Landgate's Mr Ian Hyde sign the MOU Alliance Agreement while Ms Mary Manov from Landgate and Professor Bert Veenendaal witness the signing.

Curtin research the first in Australia to combine satellite technologies

Spatial scientist researchers Professor Peter Teunissen and Dr Dennis Odijk have completed the first research in Australia to integrate the well-established GPS technology with an emerging satellite system, Galileo.

The research is the first in Australia to show how two systems can be combined, a capability that is becoming essential as a growing number of next-generation Global Navigation Satellite Systems (GNSSs) emerge from several countries around the world.

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Professor Teunissen says that new satellite positioning systems are in development across Europe as well as in China, Russia, Japan and India. To date, the American global positioning system (GPS) has been the best known and the only one currently fully operational.

“By 2016, more than 100 GNSS satellites will be in operation, with the result being a broader and more diverse system of satellites,” Professor Teunissen said.



“The emergence of these new GNSSs, together with the linking of different systems, has enormous potential for improving the accuracy, integrity and efficiency of positioning worldwide.

“The availability of many more satellites and signals creates exciting opportunities to extend current GPS applications and to facilitate market growth.”

The new systems bring extended operational range and improved integrity, resulting in benefits to a host of industries, including mining and agriculture.

“With new satellite technologies, integrating multiple systems is going to be important and will have a dramatic effect on the accuracy of data that can be obtained,” Professor Teunissen said. “The integration of multiple systems will enable much more reliable data, particularly where signals from one system may be blocked, such as in open-pit mines or by skyscrapers.” Professor Teunissen’s research combined real-time data collected using high-grade multi-GNSS receivers from

different manufacturers for baseline studies in both Australia and the US.

Galileo is being developed by the European Union and is a complete new multi-frequency GNSS. It is currently in orbit validation phase and is expected to have 30-satellites that are fully operational by 2018. It was selected for integration with the GPS technology as it is expected to be one of the most widely used systems, and because it operates on the same frequency as the GPS system.

The research was funded by the Australian Space Research Program. Results are published in both the *Journal of Spatial Sciences* and *GPS Solutions* with co-author Dr Dennis Odijk, also from Curtin.

Professor Teunissen is the recipient of an Australian Research Council Federation Fellowship. He is Professor of Geodesy and Navigation and Head of Curtin’s GNSS Research Centre.

Researchers identify 280 new craters on the Moon

Curtin University researchers have identified what could be an additional 280 craters on the Moon, using a combination of gravity and terrain modelling.

Professor Will Featherstone, Dr Christian Hirt and Associate Professor Michael Kuhn of Curtin’s Institute for Geoscience Research received Australian Research Council grants to use satellite-collected gravity and elevation data to develop an ultra-high resolution gravity map of Earth.

Curiosity taking over, the team then applied these techniques to the Moon, identifying 280 lunar craters never mapped before, 66 of those categorised as distinctly visible from both a gravity and topographic perspective.

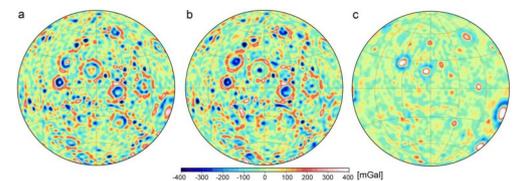
Professor Featherstone said that identifying such a large number of lunar craters was a result of using computer

modelling of the lunar gravity and topography data, where regional features were removed to reveal more detailed basins that would otherwise be obscured using other techniques.

“Our curiosity-driven work initially focussed on the identification of two basins on the lunar far side, but was extended during the peer-review process of scientific papers so as to cover the whole Moon,” Professor Featherstone said.

“The dark side of the Moon is particularly challenging because Moon-orbiting satellites cannot be tracked from Earth when they are over the far side.”

Professor Featherstone said the team was optimistic about further discoveries after applying their techniques to the new gravity data collected by NASA’s GRAIL mission, which ceased when the two satellites – named Ebb and Flow – were deliberately crashed on the Moon on 17 December 2012.



When applied over the entire lunar surface, band-limited Bouguer gravity reveals the locations of 280 candidate basins that have not been identified when using full-spectrum gravity or topography alone.

Beyond the Moon and Earth, the team has also developed an ultra-high resolution gravity map of Mars.

This research on the 280 new lunar craters is published in the *Journal of Geophysical Research – Planets*.

Government grant to support 3D imaging of HMAS Sydney II and HSK Kormoran wrecks

The Australian Commonwealth Government recently announced the award of a \$483k Your Community Heritage grant to support the use of high resolution 3D imaging technologies to survey the wrecks of the HMAS Sydney II and the HSK Kormoran. The project

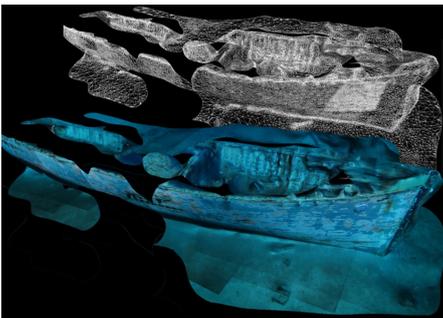
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will allow the site to be properly protected, conserved and interpreted for future generations.

At Curtin, the project is led by Andrew Hutchison from Design, Andrew Woods from CMST, and Petra Helmholtz from Spatial Sciences.

“For the past two years we have been conducting research on the image and video dataset that was collected from the wreck sites when they were discovered in 2008 – both to understand the site and to test new 3D imaging technologies for a future return to the wrecks,” explained Woods.



Above: a 3D reconstruction of one of the ship's boats of the HMAS Sydney II with wireframe representation in the background. Below: The position of the wreck sites.



“The small selection of 3D images and 3D models we have extracted so far are stunning and illustrate the great potential for improving the understanding and interpretation of deep-water wrecks.”

The project is a collaboration between Curtin University, WA Museum, DOF Subsea, Australian National Maritime Museum, iVEC@UWA, and several other project partners. The first research paper from the project was recently presented in Germany: <http://tinyurl.com/3d-structures>.

Global Change Research grant success

Associate Professor Michael Kuhn has been rewarded for his collaborative research in the area of global change by receiving a portion of the Euro 1.6M awarded to his group. The amount received will provide funding for a PhD student to work with A/Professor Kuhn on the project “Bangladesh Delta: assessment of the causes of sea-level rise hazards and integrated development of predictive modeling towards mitigation and adaptation”.

The funding was provided by the Belmont Forum, a sub-group of IGFA (International Group of Funding Agencies for Global Change Research).

Small scale faults lead to golden finds in WA mines

Recent research into analysing geology and remotely sensed data has benefitted from analysis based on geographic information systems. The research student: Leo Liu, a recipient of a Curtin Postgraduate Scholarship is co-supervised by Professor Zheng-Xiang Li of the Department of Applied Geology, Dr Carsten Laukamp of the CSIRO in Kensington, and Professor Geoff West of the Department of Spatial Sciences.

GIS is becoming increasingly important as a tool for geologists when analysing and searching for new gold

and other ore deposits. The work has identified the importance of small faults in the hosting of gold deposits. The research concentrated on the Eastern Goldfield in WA, which is one of the world's most important gold-producing regions. The St Ives Goldfields was a particular target of investigation as it is a region most intensively studied by geologists and geochemists, and has a comprehensive set of data available for spatial analysis.



The St Ives process plant in Western Australia. Image courtesy of Gold Fields.

Spatial analysis, through independent statistical analysis of the relationships between gold mineralisation and a number of potential controlling factors, confirmed that a particular type of smaller faults, i.e. those formed toward the later stage of the major tectonothermal event in the Yilgarn Craton with a dilational nature, is one of the major factors that determined the final resting places of the gold.

Another important factor is granite intrusions that drive fluids circulation, and possibly provided favourable chemistry and some of the deposited metals. Interestingly, the granite intrusions also occurred later in the sequence of events. The method developed here, which produces predictive mineral maps based on spatial analysis results, can be tuned to suit other metal deposits as well. The method/approach can be applied to much of the Eastern Goldfields. It can also be trained for other mineral provinces where some early exploration data and results are available.

An interview with some of the researchers can be found at:

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<http://www.mining-technology.com/features/feature-small-scale-faults-golden-finds-mines-western-australia/>

Teaching awards to staff members

Congratulations to two of the Department's staff members, Dr Ahmed El-Mowafy and Dr Cecilia Xia for being awarded esteemed teaching awards.

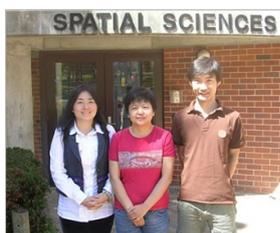
Ahmed was awarded the 2013 *Citation for Outstanding Contributions to Student Learning* from the Australian Government's Office for Teaching and Learning.



Dr Ahmed El-Mowafy

Cecilia was successful in being awarded a Teaching Excellence Award 2012 during the Faculty of Science and Engineering's round of Excellence in Teaching awards.

Well done to both Ahmed and Cecilia on these excellent achievements.



Dr Cecilia Xia (centre) with two of her research students

Treasure hunting on the Bentley campus

Have you heard of geocaching? Geocaching is modern treasure hunting –just like treasure hunts from classic pirate movies but transformed into the 21st century. The treasure hunters are now called geocachers and they look for hidden treasures

around the world in locations provided by the World Wide Web.

In this modern treasure hunting, instead of maps and compasses, GPS devices such as mobile phones are used to find the initial location of a geocache.

After the initial location is found using the GPS, it is then necessary to solve and follow interesting hints or details about the location or a specific topic to find the hidden treasure. Hidden treasures are often stored in small 35mm photo canisters, but also in boxes of the size of small food containers, but generally no larger than this. Often the treasures contain small goods which can be exchanged with other goods by the geocacher who found the treasure.

Petra Helmholz from the Department of Spatial Sciences says "It is a completely new way to explore cities during your vacations or just the area you live in." She has already discovered overseas geocaches and was introduced to the geocaching world by a friend. "This friend has found more than 300 geocaches." she says.

In early July a geocache was hidden at Curtin University's Bentley Campus. The name is "Spatial@Curtin" but we don't want to spoil your fun. If you want to find additional information about the geocache location go to the geocaching webpage at www.geocaching.com and look for our cache.

"We can say that by hunting our treasure you will learn much about spatial sciences." Petra says.

Bert Veenendaal, Head of the Department of Spatial Sciences at Curtin University, adds, "It is a great opportunity to provide more detailed knowledge to people about positioning services like GPS, which are part of our discipline. As they learn more about the devices they use, they gain a greater appreciation

of the relevance and importance of location-based technology and about spatial sciences more generally."

The geocache at Curtin is a so-called "multi-cache". This means that the cache is not only placed at a single location but at multiple locations around campus. This may direct a geocacher to locations on the campus not yet explored.

Andy Sharp from Curtin Properties points out another opportunity, "The geocache makes a visit to the campus interesting for people who are not studying or working at Curtin. It gives us the possibility to welcome more visitors, visitors who not only enjoy the campus but also contribute to campus culture and life".

So, why wait? Go to www.geocaching.com, find our geocache "Spatial@Curtin" and explore and enjoy our campus..



Geocache Apps can be easily downloaded by iPhones and Androids

Anniversary seminar series

As part of the Department's 2013 anniversary year celebrations an Anniversary Seminar Series has been organised by the Department in conjunction with industry and government partners. The aim of the series is to showcase the major research areas within the spatial sciences, including GNSS, geodesy, GIScience, remote sensing, photogrammetry and laser scanning.

To date, David Purnell (Whelans) presented "Spatial Science is dynamic", while Ken Alexander (formerly from Landgate) presented "You, Me and Spatial".

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The upcoming presentation on 28 August will be by Malcolm Jones (Geodesy Jones): “A surveyor who is lost is called an explorer”.



Subsequent confirmed presentations will be by Jason Birch (Adam Technology) on 23 October and Professor Dr.-Ing Peter Reinartz (German Aerospace Center, DLR): “Spaceborne 3D and airborne real-time monitoring” on 27 November. The seminar series is held at Curtin University.

Full details on the seminar series can be viewed at <http://spatial.curtin.edu.au/anniversary.cfm> or on the SSSIWA website at <http://www.sssi.org.au/Events/Curtin-Spatial-Sciences-Anniversary-Seminar-Series/eid/869.html>

Student prize winners 2013

Following is the list of student prize-winners from the Department of Spatial Sciences for 2013. The Department would like to congratulate all the students who were awarded prizes for their hard work and dedication to their studies.

The Department is very grateful to the many industry partners and donors who support the teaching programs in this way.

AAM Pty Ltd. Prize - awarded for outstanding work to the student community. **Daniel Win**

C R Kennedy & Co Pty Ltd Surveying Prize - awarded to the best first year student in the Bachelor of Surveying program. **Patrick Misan**

Spatial Information and Cartography Commission Award for Excellence Surveying and Spatial Sciences Institute (WA Region) awarded to the best first year student in the Bachelor of Science (Geographic Information Science) program. **Stuart McEvoy**

RICS (WA Division) - awarded to the best second year student in the Bachelor of Surveying program. **Christopher Vanderplas**

C W A Lewis Memorial Award – donated by the Surveying and Spatial Sciences Institute (WA Region), Spatial Information and Cartography Commission - awarded to the best second year student in the Bachelor of Science (Geographic Information Science) program. **Hassan Akram**

The Whelans Surveying Student Award - awarded to the best third year student in the Bachelor of Surveying program. **Gabriela Olekszyk**

Adam Technology Pty Ltd Prize - awarded to the best student in the area of photogrammetry. **Christopher Vanderplas**

C R Kennedy & Co Pty Ltd Mine and Engineering Surveying Prize - awarded to the best student obtaining the highest aggregated mark in mathematics in the Mine and Engineering Surveying program. **Yi Sun**

Associated Instrumentation Pty Ltd Prize - awarded to the best student in the subjects of geodesy and global positioning systems. **Jake Buswell**

Whelans Spatial Information Services Prize - awarded to the

best student in the field of cartography and mapping. **Christopher Vanderplas**

The John Cavill Memorial Prize - donated by the Surveying and Spatial Sciences Institute (WA Region) Land Surveying Commission - awarded to the best graduating student in the area of applied field surveying. **Michael Birch**

The John Forrest Prize - donated by the Surveying and Spatial Sciences Institute (WA Region) Land Surveying Commission - awarded to the dux of the Bachelor of Surveying program. **Jake Buswell**

The Lawry White Medallion - awarded to the dux of the Bachelor of Surveying program. **Kin Fong U**

The N S Bartlett Memorial Award – donated by the Surveying and Spatial Sciences Institute (WA Region) Spatial Information and Cartography Commission - awarded to the dux of the Bachelor of Science (Geographic Information Science) program. **Elizabeth Mair**

The John Balodis Medallion - donated by Alan & Louise Flavelle - awarded to the dux of the Bachelor of Science (Geographic Information Science) program. **Amy Chong**

Engineering and Mine Surveying Commission Prize - donated by the Surveying and Spatial Science Institute (WA Region) — awarded to the dux of the Bachelor of Science (Mine and Engineering Surveying) program. **Matthew Jones**

The Department of Spatial Sciences Prize - awarded to the best student in the Graduate Certificate in Geographic Information Science program. **Craig Milne**

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NGIS Award for Excellence – awarded to the best student in the Graduate Diploma in Geographic Information Science program.
Patrick Maslen

Head of Department Student Citation Award - awarded to a student who has made a significant difference or undertaken considerable outstanding work for the Spatial Student community. **Jay Sidhu**

The D B Johnston Award for Excellence, donated by Surveying and Spatial Sciences Institute (WA Region) - Spatial Information and Cartography Commission - awarded to the best overall postgraduate student. **Dr Marco Marinelli**

The Department of Spatial Sciences Prize - awarded to the best student in the Master of Science (Geospatial Science) program. **Weng Kit Ng**

The Ron Holland Memorial Prize, donated by Spatial Industries Business Association (SIBA) (Western Australia Division) – awarded to the best student in the Cadastral Option.
Jake Buswell

Fugro Survey Pty Ltd Mine Surveying Prize - awarded to the mining surveying student who obtains the highest aggregated mark in the subjects of plane and construction surveying, and survey computations.
Carl Faulkner

The Tony Pivac Prize - donated by the Surveying and Spatial Sciences Institute (WA Region) Engineering and Mine Surveying Commission – awarded to the best student in the subjects of engineering surveying and mine surveying. **Mitchell Woods**

Digital Mapping Solutions Prize – awarded to the student submitting the best final year project or honours dissertation in the Bachelor of Science (Geographic Information Science) program. **Elliot Dwyer**

INTERGRAPH Prize - awarded to the student submitting the best final year project or honours dissertation in the field of remote sensing. **Elliot Dwyer**

The Christopher Worth Memorial Prize - awarded to the student submitting the best spatial sciences project in the fields of geological, geophysical or environmental earth sciences. **Richard Van Dongren**

Haefeli-Lysnar Pty Ltd Surveying Prize - awarded to the student submitting the best final year project or honours dissertation in the Bachelor of Surveying program.
Alex Bretton

Haefeli-Lysnar Pty Ltd Mine and Engineering Surveying Prize - awarded to the student submitting the best final year project in the Mine and

Engineering Surveying program.
Matthew Jones

ESRI Australia Prize – awarded to the best graduating student in the field of geographic information science and programming. **Amy Chong**

2013 Scholarships

The McMullen Nolan Group Pty Ltd Surveying Bursary 2013 - awarded to outstanding full time third year students in the Bachelor of Surveying program who have a special interest in an area of digital mapping or cadastral surveying. **Todd Lyon, Christopher Vanderplas, Phillip Jones, Ashleigh Plaiche**

Landgate Student Bursary 2013 – The Landgate Bursary is awarded to provide an innovative student the opportunity to combine study with practical work experience related to the spatial sciences discipline.
Sean Gilmore

GIScience Honours Scholarship - donated by the Department of Spatial Sciences - awarded to a student on the basis of academic merit in their undergraduate program and who has just commenced the GIScience Honours program. **Elizabeth Mair and Rhianna Maconachie**



The 2013 student prize recipients

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Surveying Honours Scholarship

- donated by the White Family - awarded to a student on the basis of academic merit in their undergraduate program and who has just commenced the Surveying Honours program. [Stuart Gralton](#)

The Land Surveys Honours Scholarship 2013

– The Land Surveys Honours Scholarship is to assist students in gaining experience in their given field and to provide students with an opportunity to conduct joint research with industry. [Stuart Gralton](#)

New technical and office staff

The Department would like to warmly welcome our new technical and office staff for 2013. Our new members include Mr Carl Lares, Mrs Lee Loughnan and Mrs Deb McCulloch.

We would also like to take the opportunity to thank John Walker for all his years of service as the Department's Technical Officer. John has decided to retire from the position but may continue next year in a sessional teaching role. We also wish Caroline Rockliff, the Department's Personal Assistant, all the best for her secondment to the Faculty's travel area, during Semester 2, 2013.

Mr Carl Lares, who previously worked at Associated Instrumentation for many years and comes with a wealth of experience in the servicing of surveying equipment, commenced in July as the Department's Technical Officer.



Mr Carl Lares

Mrs Lee Loughnan has taken on Caroline's Personal Assistant role part-time during second semester. Lee has most recently worked in the Science and Engineering Faculty Office as the Acting Committee Services Officer.



Mrs Lee Loughnan

Mr Deb McCulloch has also joined the office staff on a part-time basis. Deb has most recently worked as a personal assistant/administration officer in the construction and oil and gas industries.



Mrs Deb McCulloch

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