



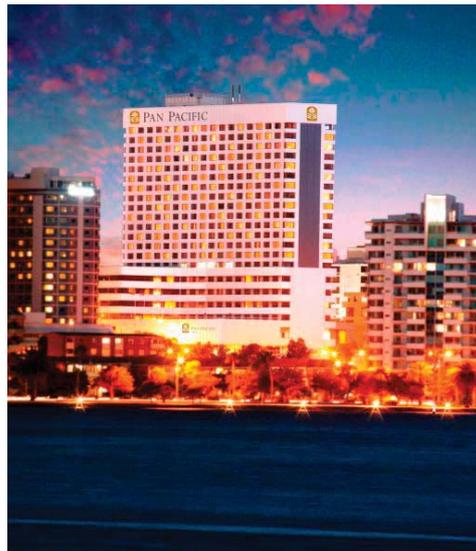
Woodgate Wisdom

Our annual conference this month is a great opportunity for you to network with our colleagues from across the spectrum of industry, government and the research sectors. I would encourage you to really value this interaction because it will be a source of great inspiration for your current and future research. Take every opportunity to speak to people. Spend an equal amount of time telling them, with passion, about your research as you will to listening to them about their thoughts on your work, their needs and interests. You are one of our 37 current PhD's and I know that our many partners from our 100 partnering organisations highly value your research and you as individuals. Enjoy the conference!

The Collier Corner

As a student and in your professional life, conferences will play a vitally important role. Technical sessions allow you to quickly absorb what is happening at the coal face; the exhibition affords the opportunity to see the latest developments in hardware and software; the intermingling of experts from all over the world allows you to meet new people, ask questions, explore career opportunities and rub shoulders with genuine leaders. Over the years I have seen some students blossom in a conference setting while others find the whole experience terrifying. If you are of a timid disposition, take comfort, the CRCSI conference brings together a friendly and close knit community with a deep interest in our (your) research. Participants genuinely care about what you are doing - talk to them. Make sure you take advantage of the rich program of activities from the student day, to the posters and technical sessions, to the dinner and networking opportunities, and of course those invaluable moments when you can, just to sit down and discuss your research over a coffee.

See you there – make sure to say hello.



Get ready for the CRCSI Conference in Perth

Tristan Reed, P3.01

It's coming up to November and that means it's time for the CRCSI annual conference – which this year is in Perth, my home town! Hopefully most of you reading this will be 'going west', and between all the official engagements I do hope you get to see all that there is to offer in Perth!

Perth's beaches are some of the best that you will ever see. About a 15 minute drive west of the city, you will find amazing beaches all the way from Fremantle to Hillarys. If you want to stay closer to the city, there is the Bell Tower right on the edge of the CBD and the Perth Zoo a ferry ride over from it. For those more inclined to eat, the Leederville and Victoria Park café strips (between Curtin University and the city) are a few minutes by public transport or car.

If this sounds amazing to you, studying in Perth at Curtin University is great. The campus is full of great people, great weather and amazing facilities. Near to the city, it means it isn't too out of the way when you want to get out on a Friday night! Plus, there are tonnes of shops and restaurants literally over the road at the Waterford shops.

Thanks to the CRC's help with a scholarship, I've been able to make the most of Perth, as well as meet people in

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Perth's very large geospatial industry (thanks to both the prevalence of mining and government interest).

Plus, with the fact there's around a dozen CRCSI PhD students studying throughout various programs at Curtin Uni, it's really easy to work together to solve problems quicker – I've already saved some time as another student had already made a tool I needed for my research. Being able to ask like-minded people for their opinion on these sorts of matters is also helpful.

In the few months I have been working on my PhD, I've already met a few people each from some of our 43pl partners (Amristar, NGIS, OmniLink) as well as government (DEPI, Landgate, CSIRO). It has been great getting all these different insights into how people could use my research. I look forward to seeing everyone at the conference – a chance to meet a few more faces still!



The new-ish CRCSI students relaxing over a lunch at Curtin Uni

My Research News, Issues & Outcomes

Health

E-K Gulland, P4.41

I'm focusing on the usability of online geovisualisation systems, particularly in the field of health. Arguably the biggest obstacle to researchers using online tools is finding relevant data to explore and analyse.

Currently, online search tools check for text matches between a query term and dataset metadata, which can cause issues including:

- different people using the same term in different ways ('K12' represents school years in education, or a disease code in health);
- alternative terms not matching to anything ('bushfire' would miss metadata listing 'fire');
- generic terms returning too many results.

I aim to develop new search tools to test with end-users for effectiveness. Potential datasets from the area of interest can be organised under alternative themes and ordered by the strength of their association with the initial query.

Urban Planning

James McIntosh, P4.51

As part of my PhD by publication I co-authored six journal articles, and recently submitted my 'PhD by Publication Thesis' for examination. My thesis is titled "Framework to capture the value created by urban transit in car dependent cities." This brings together my research papers in the fields of the causes of car dependence, integrated land use and transit planning, willingness to pay for transit in Australian land markets, financial modelling the benefits from the investment in transit, and developing a framework to capture these benefits to defray the cost of the investment.

It has been an exciting and challenging 3 years, and the support from the CRCSI has enabled me to launch into a new career building on the expertise and knowledge developed during my PhD.

We asked 5 students from across the research program for their latest updates.



Feature Extraction

Ebadat Parmehr, P2.02

I have been working on the automated registration of multi-sensor data. Accurately, registered data is required for the integration of products for many applications, especially in feature extraction and building reconstruction.

My research has developed a fast, reliable and accurate method for automated registration. This method has explored statistical dependence between data. It investigates the joint probability density of data.

The proposed method has been applied for registration of satellite and aerial imagery data with different resolution to LiDAR data with densities of 0.5-35 pts/m². The experimental results obtained demonstrate that the alignment of optical imagery to 3D LiDAR point clouds via the improved intensity-based method can yield greater accuracy (sub-pixel) than that produced by conventional approaches. For instance, the internal accuracy of 0.12 and 0.82 pixels have been achieved for the proposed and conventional methods, respectively.

This new level of accuracy facilitates high quality integration of optical and ranging data and eliminates the expensive ground control collecting process. In addition, the proposed method is fully-automatic.

Positioning

Lei Wang, P1.01

I have proposed a new threshold determination method to solve the ambiguity validation problem in GNSS. The major limitation of the fixed failure rate (FF-) ambiguity validation approach is it is complex and time-demanding. In the new method, we simplified the approach with modeling and an approximation procedure, which makes the FF-approach feasible for real-time GNSS applications. The validation results indicate the proposed method can reduce the computation time to a negligible level without degrading performance. The latest results have been presented in ION GNSS+ 2014, and will be posted in the coming CRCSI annual meeting.

Spatial Marketplace

Premalatha Varadharajulu, P3.02

The research is currently developing ontologies for the automation of spatial transactions between a local authority and government agency. The approach applies Semantic Web and Artificial Intelligence technologies. Since approval of candidacy (July 2014), the research work has concentrated on a detailed literature review and testing the Semantic Web techniques including ontology development to the research problem.

Preliminary research shows that implementation is complicated. The research work is now concentrating on the implementation of ontologies in an interactive way. As such, a new prototype is being developed using protégé, which is a leading ontology development tool that has inbuilt reasoners for SPARQL & DL queries. Most of the work remaining involves developing ontologies in an interactive way to apply the policy-related knowledge base that underpins the spatial transaction management decision tool. These ontologies will be implemented in a GUI to facilitate a self-service environment for approving changes made by users for property, address and admin boundary changes.

43pl Column

43pl Ready to Influence

Tony Wheeler, Past Chair 43pl

With the CRCSI now entering its second half of the 8 year joint venture term under the current funding arrangements, the Board of 43pl has been passionate about ensuring some kind of sustainable operating structure for the CRCSI remains post 2018, when the current CRC Program funding is due to come to an end.

The CRCSI since it was originally established in 2003 quickly established itself as a focal point for the industry. It rapidly became the 'hub' where government, research and the business sectors all came together to collaborate on areas of common interest. By 2008 its tentacles had spread far and wide throughout the Australian spatial scene, and today it remains central to the leadership of the spatial industry in both Australia and New Zealand. The CRCSI broke down barriers that had existed for decades, where Government and Business discussed issues, competitors talked to each other and collaboration flourished. Many of the largest mergers and acquisitions that have occurred within the Australian spatial industry over the last 5-7 years began by relationships developing from CRCSI events and projects.

The 43pl Board reflected for some time on 43pl and its strengths over its 11 years of existence. During this time, the primary role of 43pl was to look after the unit trust, act as a communication channel to the various jurisdictions, and react to requests for a considered opinion from the CRCSI on occasions. The Board concluded that the time is right for 43pl to become more proactive, and have a stronger contribution to the CRCSI on the one hand; and look to increase the value offered to members, while not compromising the interests of the Government and Research sectors, or colleges, as they are known as within the CRCSI.

With this approach now endorsed formally by both the Boards of CRCSI and 43pl, a very timely and comprehensive thorough review of 43pl and its strategic direction is now well under way. While it is important to maximise the possible benefits for all between now and 2018, a plan is being developed for the period beyond 2018. While this plan will become one of the options for a sustainable future of the CRCSI, it is very important to progress this and seek input as widely as possible to arrive at the best possible outcome. We would welcome any feedback from CRCSI participants whether they be students, researchers, project team members or company representatives.

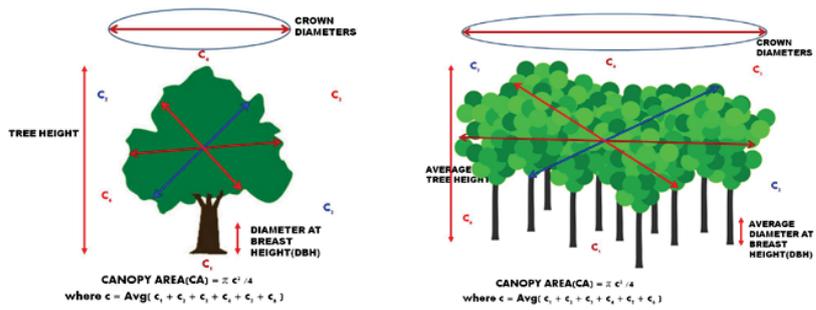


Figure A: Tree characteristics measurements

Getting in the Field – A tough, yet indispensable part of remote sensing projects

Niva Kiran Verma, P 4.12

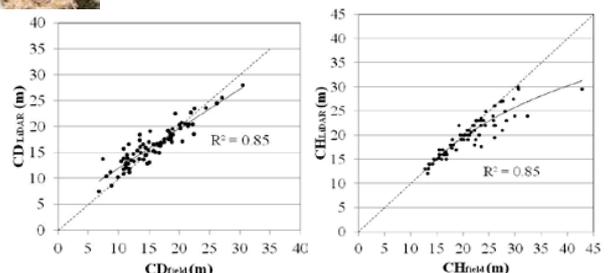
Field measurements help in providing precise data for developing and then validating the quality of research results. For my research, extensive field work was necessary to build an allometric model for DBH estimations in Eucalyptus species predominantly found in my pilot study. Here, a remote sensing based approach was undertaken where well distributed tree sample points were first chosen and marked on the multispectral Colour Infra Red Image with a spatial resolution of 15 cm, and then located in the field. The selected samples were converted to 5x5 pixels to account for positional error associated with high resolution imagery. The geometric centre of the 5x5 pixels were computed and fed to a differential GPS of 50 cm accuracy to locate corresponding tree sample points on ground. A total of 52 tree clusters and 180 individual trees were visited.

Once sampling trees were identified measuring instruments such as Diameter tapes, Range finders and Clinometers were used to measure tree parameters such as Diameter at Breast Height (DBH), Tree Height (TH) and Crown Diameter (CD) for both single trees as well as for trees in clusters. DBH was measured following the standard method, while for TH, both range finder and clinometers were used for cross verification. A difference of ±1.2 m was observed which was found satisfactory. An average of six diameters were taken to estimate crown projection area for both single trees and trees in clusters (Figure A).

The dimensions of five different Eucalyptus species were sampled, including:

- Apple Box (Eucalyptus bridgesiana)
- Stringy Bark (Eucalyptus caliginosa)
- Red Gum (Eucalyptus blakelyi)
- White Gum (Eucalyptus viminalis)
- Yellow Box (Eucalyptus melliodora)

The field measurements which are very accurate helped to derive the allometric model. The remote sensing based approach of field planning proved to be handy and well correlated to other measurement methods (Figure B). All in all we spent 90 days collecting field data; a tough yet indispensable part of any remote sensing campaign



Niva in the field

Figure B: Field and LiDAR measurements compared



Ben on the summit of Mt Barney in south-east Queensland

CRCSI Student Day 2014 Win a Prize in Perth

N. Quadros, Education M'ger.

You're required to do a little bit of homework for this year's student day at the conference. You need to think about ideas to commercialise, or enhance the utilisation of your research. Your group will need to present your program's ideas in front of a panel who will act as a potential funding body. The program with the most worthwhile opportunity will get a prize for each student.

You never know - this could be a great opportunity to establish the initial thoughts to put up a real project proposal for further CRCSI funding - especially if you're near graduation. Becoming a project lead would be a great chance to develop your research career.

Topics you will need to consider in your presentation will include a summary, benefits, trial deployments, technical readiness, technical limitations, dependencies, end users and future market, impediments to utilisation, research extensions, competitive threats and competitive advantages. You will need some preliminary thoughts so your program members can discuss and flesh out. See the student information pack for more details. GOOD LUCK! You'll need it. :D

Let's Meet Ben B. Fitzpatrick, Project 4.12

Hobbies -

I enjoy cycling, reading novels and hiking.

Favourite Book -

Picking a favourite book is far too hard. I recently finished 'We Are All Completely Beside Ourselves' by Karen Joy Fowler and that was a great read so I'll go with that one for a recommendation here.

Last Movie I Watched -

'The Empire Strikes Back Uncut', this one needs a little explanation. It's a shot by shot crowd sourced fan remake of the second film in the original Star Wars trilogy. Not the strongest entry in its genre that I've seen but still odd enough to be fun.

Place I'd Like to Visit -

The Daintree National Park. Since moving to Queensland for my PhD I've explored the south of the state a bit so I'd love to go North while I still have the chance.

Best Place in My City -

The Botanic Gardens or if I can stretch the question slightly the summit of Mt Coot-tha (it's essentially still in the broader metropolitan area of Brisbane and has a great view of the city and surroundings).

Latest Travel Story -

Earlier this year I attended IMS-APRM in Taipei, Taiwan. I'd never been to Taiwan before and found it really interesting. Perhaps one of the nicest memories I have from this trip is going for a walk from my hotel on the afternoon I arrived and quite by chance wandering into an enormous weekend flower market. I had never seen so many different types of orchids.

CRCSI Alumni Where Is... Zaffar Sadiq?

Zaffar was a CRCSI student from 2005-2008. During his PhD candidature he secured travel scholarships to present his work in Lisbon, Portugal and ITC Netherlands. Zaffar started his career in the corporate sector in Australia with Sinclair Knight Merz (Now Jacobs) in 2008. He quickly climbed the corporate ladder of Sinclair Knight Merz and was heading the Spatial Database Practice globally and led business development nationally and internationally. He joined GHD in November 2013 as a Principal Consultant.

Zaffar has lead several multi-million dollar projects for State and Federal governments in Australia. Zaffar has published research papers to support areas such as: spatial data infrastructure, data quality, groundwater management, water resources, rural administration; asset management; field data capture; public health management and disaster management. He is a member of several boards and technical committees in Australia and overseas. He is a recipient of the "Young Professional Award" by the Surveying Spatial Sciences Institute, Australia.

Zaffar has held a Senior Fellow appointment with the Department of Infrastructure, University of Melbourne since 2012 and was appointed as an Honorary Advisor for Industry Liaison for the CRCSI in early 2014. Currently, he supervises two CRCSI PhD students in Programme 3 and 4 in the capacity of Industry Supervisor. In doing so, Zaffar gives back to the CRCSI which provided him a platform to kick start his career in Australia when he emigrated from India in 2004 after working with Anna University for six years as Senior Research Fellow.



Zaffar on one of his worldly adventures