



THE NATIONAL LEADER FOR ADVANCED SOCIALLY RELEVANT, PROBLEM ORIENTED SOCIAL SCIENCE RESEARCH

# ISSR REVIEW

## DIRECTOR'S WELCOME

Happy New Year and welcome to the first edition of ISSR Review. The Institute for Social Science Research is one of The University of Queensland's newest research institutes.

During 2009 we reorganised the Institute's internal structure into seven Research Programs. We also welcomed Professor Lorraine Mazerolle to UQ where she leads the Policing and Security Research Program, and Professor Bill Martin who leads the Research Program in Education, Employment and Labour Markets.

With 100 staff, 12 professors, and researchers from criminology, psychology, sociology, demography, economics, statistics, geography, social policy, political science and physics, ISSR is one of the largest social science research institutes in Australia.

Nationally, ISSR works closely with the Australian Federal Police, the Federal Department of Families, Housing, Community Services and Indigenous Affairs and the Department of Immigration and Citizenship, among others. At the state level we work with a number of Queensland Government agencies and with several State Police Services.

One of ISSR's ambitions is to provide leadership for advanced social science and to contribute nationally to Australian social science and research training. To this end, we participate in several

major initiatives:

- We have hosted the ARC Research Network in Spatially Integrated Social Science since its inception. This research network of 18 universities and the Australian Bureau of Statistics leads the development of analytic spatial social science in Australia.
- We host the Queensland node of the Australian Social Science Data Archive, and are developing the Australian Qualitative Data Archive (AQuA). The archives allow Australian social scientists to have research datasets of national significance archived, preserved, documented and made available for reuse by other researchers.
- We host UQ's node of the ARC Centre of Excellence in Policing and Security (CEPS). CEPS is a national research centre involving Griffith, UQ, ANU and Charles Sturt Universities with partners from the Federal and State governments, and the police services. CEPS is undertaking the most ambitious program of research in policing and security ever conducted in Australia.
- We host the Queensland Research Centre of the Australian Housing and Urban Research Institute (AHURI) which conducts research on housing and urban issues.



- We host the annual ISSR PhD Winter School which features leading international instructors. Winter Schools instructors have come from the World Bank and Princeton, Roehampton, Manchester, Ohio State, Harvard and the University of Durham.
- We have one of the largest academic Survey Research Facilities in the country, with the capacity to design and undertake large scale national surveys by telephone, mail and online.

We hope that you enjoy the first issue of ISSR Review.

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# FEATURE STORY

## Combining Aboriginal knowledge and Western science to create building materials of the future

When Paul Memmott wrote his prize-winning book "Gunyah, Goondie + Wurley: The Aboriginal Architecture of Australia", he included a chapter titled "Spinifex Domes of the Western Desert". This chapter outlined the widespread customary use of spinifex as an insulative dome cladding as well as to produce a resin for hafting stone tools to timber handles. This in turn sparked the idea for an innovative research proposal, with a cross-disciplinary team of UQ researchers. The result was a five-year ARC Discovery Project titled 'Searching for biomimetic design prospects from an understanding of Spinifex grasses', which is in its second year and being carried out in collaboration with the Dugalunji Aboriginal Corporation at Camooweal in Western Queensland.

At this very moment in Year 2, there are a number of hobo instruments (environmental sensors) in several spinifex-clad domes at Camooweal, positioned to measure their thermal insulation performance, and which were built by an East Arrernte, an Indjiladji and an Alyawarr Elder respectively. Not far away is a set of 25, square spinifex plots where an Aboriginal postgraduate student (Malcolm Connolly) is conducting burning, harvesting and re-growth experiments. In the UQ Botany lab, an electron microscopist has been producing cross-sections of the resin secretion cells of *Triodia pungens* and blow-ups of spinifex fibres at magnification x 1,000. A team in the Australian Institute for Bio-Nano Engineering have been examining the glass transition, crystallization and melting phases of spinifex resin. Sujeewa de Silva is a Sri Lankan chemist who has come to Australia on an Endeavour Fellowship to contribute to the



Traditional Aboriginal shelter built at the Myuma Indigenous training camp near Camooweal, North-west Queensland by pre-vocational trainees. The shelter's spinifex cladding is being monitored for thermal performance

project and she is analyzing the chemical constituents of spinifex resin into 38 compounds. A group of architecture students have recently produced experimental samples of spinifex fibre-reinforced cement. Meanwhile in Camooweal, an Indjiladji stone knapper, Colin Saltmere is producing resin-hafted stone tools using different resin production techniques to understand the respective bond strengths of resin types.

One of the ultimate aims of this project is to see whether some possible sustainable use might be put to the 67 spinifex grasses that cover approximately a third of the Australian continent. There are various ways in which spinifex could be used as a low-tech building material in remote settlement contexts e.g. not only in its traditional format as an insulative material, but because certain species have very strong fibres, they can be used to reinforce earth-walls (adobe construction) as well as concrete. There are also potential high-tech uses that could be developed, e.g. as a commercial resin or glue. One of the project's challenges is whether a cottage industry could be catalysed for a set of remote

Aboriginal communities and outstations to sustainably farm their own spinifex, to be harvested either for local rural needs or for metropolitan commercial uses. To this extent, the research teams are investigating sustainable spinifex harvesting practices. Critical research questions include when is the best time of the year to harvest spinifex and what is the most sustainable harvesting techniques such that the ecology of the plant is not disrupted? How many years does it take to regrow to maturity? Thus, a second set of experimental plots has been established at Dajarra to the south of Mt Isa where a different species of spinifex grows to that at Camooweal. And a third large site is being sought where crop rotation can be combined with patch burning. In doing so, the research team has to acquaint themselves with available harvesting technologies and their capacities, varying from whipper-snippers to deluxe ride-on mowers, to wheat harvesters and hay bailers.



UQ Researcher Tim O'Rourke with Aboriginal trainees

# RESEARCH PROGRAM UPDATES

## Policing and Security

Scholars throughout the world have spent 80 years studying the neighborhood context of violence and intergroup tensions. However, never before has a group of researchers sought to test an integrated, ecological theory of inter-group conflict and then use these data to develop innovative approaches for responding to inter-group conflict in vulnerable communities. In the Vulnerable Communities program of research in the Policing and Security Research Program we will use survey methodologies to gather detailed, ecological measures of community vulnerability, resilience, social inclusion/exclusion and social capacity; explore ways that police can foster peace and harmony between groups in conflict; and test, under experimental randomized field trial conditions,

best-practice approaches to intervene in communities that may become breeding grounds for radicalisation, hate and conflict. Professor Lorraine Mazerolle leads a team of experimental criminologists, spatial statisticians and urban criminologists in the Vulnerable Communities Program of Work from the Centre of Excellence in Policing and Security (CEPS), UQ node.

With Partner Gary La Free, Professor Mazerolle and Dr Denning are working across CEPS nodes to develop the world's first Counter-Terrorism Database. The CEPS team along with CEPS Associate Investigator Andrew Smith and his software development company, Leximancer Inc, are developing the architecture of the Global CT i-Library (CTiL) using the leading innovative text mining software, Leximancer, to trawl the web

for CT documentation and use the multi-language facilities of Leximancer to create "holding" cells for data on CT measures initially in Indonesia, Thailand and the Phillipines. These will then be cross-checked to validate the data. Plans are also in train for building programming interfaces between CTiL and the world's two best open source collections of terrorist incidents, terrorist groups and the networks of those involved in terrorist incidents throughout the world. These developments will provide policy makers with the world's best evidence base to make sound, strategic decisions about the most effective way to intervene both domestically and off-shore to terrorist threats as well as transnational and organized crime problems facing our nation.

## Commercial Services

ISSR provides commercial services relating to research and professional development training. We provide expert advice and offer research services in statistical analysis; survey research design and data collection; scientific qualitative analysis using innovative Leximancer software developed by staff in the Institute; and policy analysis and evaluation. We also offer intensive, flexible training in applied and quantitative data analysis.

ISSR undertakes in-house survey research and is able to provide advice and assistance with survey design including questionnaire development, sampling design and procedures, and data collection.

We manage an in-house data collection service with the capacity to undertake large-scale representative sample surveys by



ISSR CATi Lab

telephone, personal interview, mail or use of online technologies.

Our researchers have expertise in the application and development of mathematical and statistical models and methodologies for the analysis of multilevel, longitudinal and spatially designed social survey data.

Expertise is also available for integrating spatial and survey data; developing statistical control charts and software for organisational assessment and evaluation;

methodological work on best-practice for social surveys; data preservation, documentation and preparation for archiving and re-use.

ISSR has advanced statistical computing facilities for data analysis and visualisation of complex datasets. The Statistical Modelling Facility is an integrated environment that uses specialist analytic software, including SAS, Stata, LISREL, WinBUGS, MLWin, SPSS, R, GIS and spatial analysis software, and digitised and geo-coded datasets that can be linked to survey data to add a spatial dimension to survey based analysis.

For more information on these services please contact Mr Andrew Ross, Commercial Operations Coordinator, on 334 69677 or email [andrew.ross@uq.edu.au](mailto:andrew.ross@uq.edu.au).

# STAFF PROFILES

Dr Kirsten Maclean is a human geographer working in the field of social and environmental justice. Kirsten is part of a team of four UQ researchers who received funding from the Australian Government's Marine and Tropical Science Research Facility (MTSRF) to investigate ways to conceptualise, monitor and report on regional social resilience to contemporary environmental, social, economic and political challenges in Far North Queensland. This work is important for regional scale managers whose mandate is to ensure both social and environmental systems are healthy and adaptive into the future. Partners include Terrain NRM Ltd (the regional NRM body for the Wet Tropics region), the Wet Tropics Management Authority, Traditional Owners from the Rainforest Aboriginal Advisory Committee, the Great Barrier Reef Marine Park Authority and Girringun Aboriginal Corporation.

Kirsten has two further projects. She works with the Kuku Nyungkal people from Shipton's Flat near Cooktown, Cape York. These projects focus on Kuku Nyungkal connection to their country and the related sustainable livelihood challenges faced by Elders and Youngers. Kirsten has just returned from Kuku Nyungkal country where she, was involved in the launch of a film co-produced with Kuku Nungkal and Joshua Darrah, Film maker at the UQ Boilerhouse. The Film, Nyungkal warra bama: Bubuingu Dungan-Dungay-Baja' (Kuku Nuyngkal People: Returning to Country), was funded by Q150 with support from MTSRF and UQ.

Kirsten's other project with the Kuku Nyungkal, Bana Dreaming, uses the innovative and interactive methodology of photovoice, to document Kuku Nyungkal values to fresh water. The photovoice methodology, hands over cameras



Kirsten with Uncle Frankie Yougie, Kuku Nyungkal Elder, during filming for Nyungkal warra bama, Shipton's Flat, June 2009

to research participants, who capture images evocative of challenges they face in working to manage their country. Bana Dreaming informs the Kuku Nyungkal strategic management of country; and provides a case study to redress the neglect of Aboriginal interests in Australian water governance policy and management.

Dr Andrew Smith's early research training was in Physics, with a Ph.D. from The University of Queensland in 1993. From 1993 to 2000 Dr Smith worked in the IT industry. In 2000 he undertook a research Masters degree in Information Science in order to develop a robust computational system for quantifying and visualising the conceptual information in large text collections.

Dr Smith employs techniques in information architecture and visualisation that derive from principals in Information Science. In order to extract concepts from natural language in an automated manner, principals from Corpus Linguistics have been integrated with algorithms from Computational Linguistics and Machine Learning. The resulting system is called Leximancer, and is offered commercially for use in text analysis and knowledge management.

In order to examine the semantic and relational networks generated by these techniques, Dr Smith has investigated and developed algorithms for scaling and measurement of Complex Networks. His current research focus is on finding large-scale structure within complex knowledge networks, with a view to enhancing learning, recall, temporal trend analysis, and ontological alignment. Much of this research has been undertaken in the context of the ARC Thinking Systems project based at UQ: Navigating through real and conceptual spaces.

Dr Smith is contributing to several initiatives within ISSR. These include: the development of a qualitative analysis service for rapid understanding of large collections of textual data; an on-line short course in text content analysis; establishment of an ISSR subscription Portal for undertaking Leximancer analysis; development



of an intelligent and semi-automated library for the collection, coding, and archiving of on-line content, initially for counter-terrorism interventions, but with a very general applicability.

Dr Smith is also involved in a NICTA project aimed at building a system to support analysis of interviews and meetings by providing linked video, audio, textual and conceptual modes of analysis. This project is called COMLEX.

# COLLABORATIVE RESEARCH

## RESEARCH WITH THE AUSTRALIAN FEDERAL POLICE

### Building Peace and Stability: Measuring Effectiveness of Peace and Capacity Building operations

The Australian Federal Police (AFP) has funded a 3.5 year project for ISSR to develop a framework by which to assess the many overseas civilian policing deployments now conducted by its International Deployment Group (IDG). The project team, managed by Dr Bryn Hughes and featuring the contributions of PhD candidates Charles Hunt and Jodie Curth, recently met with members of IDG as well as the performance analysis staff for the AFP overall, to present the project's framework developments to date. The productive interchange of ideas led to the intent to begin rolling out the work-in-progress framework alongside some of the IDG's key policing programs in the Pacific Island region, as well as others around the globe in order to operationalise and test its various elements. 2010 will prove an exciting time indeed for these activities, with the aim being a fully operational framework, robustly field tested within IDG policing missions, by year's end.

### Monitoring Workflow and Outcomes using Control Chart Methodology

Dr Michele Haynes (ISSR Head of Data Services, and Leader of the Research Program in Research Methodology) has worked with AFP since 2005 in developing control chart methodology and automated software to monitor workflow and outcomes within the AFP. Control charts are statistical and graphical techniques that have, in the past, been used to monitor industrial manufacturing processes. This research also forms part of a PhD



*IDG Project team*

undertaken by Angela Higginson and has resulted in control charts being routinely included in monthly performance reports to AFP management. Robyn Attewell, Coordinator Performance Analysis team AFP said "The methods have been incorporated into software that is run by members of the Performance Analysis team. The charts provide an efficient and effective method of conveying both short term and long term performance regarding case activity, drug seizures and economic crime. Monthly activity that is outside the norms expected from previous historical data is easily recognised in the charts. Additionally, the data can be assessed with appropriate statistical tests to detect shifting trends and instability". This work was referenced recently by Robyn in a presentation at the conference at ANU on 'Dealing with Uncertainties in Policing Serious Crime' sponsored by the Centre of Excellence in Policing and Security (CEPS).

Angela Higginson's research will provide investigators with a new way to analyse patterns of serious fraud against the Commonwealth.

Angela delivered some of her findings to the AFP during a seminar in August 2009. It is planned that her research will ultimately provide empirical evidence to support AFP investigations and lead to more successful prosecutions.

Fraud against the Commonwealth puts a huge financial burden on Australian society, and the research is being sponsored by the AFP because of its national significance.

"The research provides insight into trends of criminal activity in Australia that have not previously been identified in academic literature," Ms Higginson said.

Her work identified eight statistically distinct types of fraud which are characterised by the amount of money involved, age and gender of the offenders, whether they work alone or in a group, and the gender of any co-offenders.

The research focuses on developing a statistical framework to analyse patterns of serious fraud to identify factors which predict successful prosecutions. The framework will also allow investigators to monitor the occurrence of different types of fraud while examining the effects of AFP investigations on fraudulent activity.

# AWARDS AND PRIZES

**Dr Belinda Hewitt**, School of Social Science and ISSR graduate, Dr Hewitt was the winner of the 2007 Jean Martin Award at The Australian Sociological Association (TASA) conference held in Auckland in December 2007.

The award is given for the best PhD thesis in sociology awarded from an Australian tertiary institution. Excellence in scholarship and balanced treatment of sociological theory and research are the main criteria used by the judging panel.

Belinda's thesis was titled *Marriage Breakdown in Australia: social correlates, gender and initiator status*. According to the judging panel, Belinda's "thesis is a sophisticated quantitative analysis of the social determinants of marriage breakdown in Australia. The thesis uses the HILDA data (Household Income and Labour Dynamics in Australia) to explore specifically who initiates the end

of marriage. Belinda's work is solidly grounded in the literature on marriage and divorce but it also seriously considers the broader sociological literature on how marriage, relationships and intimacy are organised in the contemporary society.". Belinda's thesis was supervised by Professor Janeen Baxter (School of Social Science and ISSR) and Professor Mark Western (ISSR).



**Professor Janeen Baxter** (ARC Professorial Fellow) has been elected as a Fellow of the Academy of Social Sciences in Australia. The Academy is devoted to advancing knowledge and research in the social sciences and is one of the four Learned Academies in Australia. Election as an Academy Fellow is a significant honour that testifies to a person's leadership and standing in the field. Professor

Baxter is now the Institute's second Academy Fellow after Professor Bob Stimson.

**Professor Paul Memmott** has won a National Teaching Award in Teaching Excellence from the Australian Learning and Teaching Council for his teaching in indigenous education. Professor Memmott's work is not only helping to clear up historical records but is educating students to understand Indigenous built environments and housing needs." Professor Memmott was commended for having inspired an independent field of study into Aboriginal built environments. In 1998, he initiated Australia's first curriculum on Aboriginal people-environments in an architecture course. The centre he heads is a national and international point of reference for resources on Indigenous housing, architecture and a related set of socio-cultural problems.



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