Collaborating for Sustainability

The 4th Annual PhD Students’ Colloquium of the Zero Waste Research Centre for Sustainable Design and Behaviour (sd+b)

20 September 2013

Annual PhD Students’ Colloquium
and Distinguished Lecture
This compilation of abstracts and biographies records the proceedings of the 4th Annual PhD Students’ Colloquium held at the University of South Australia (UniSA) in Adelaide, on 20 September 2013. This booklet is a collection of abstracts of papers presented and research conducted by PhD students at UniSA, who are researching topics related to cities, climate change, sustainability and the built environment. The Colloquium offers a snapshot of the diversity of current research into the future of our urban environment and the diversity of research being undertaken in the sd+b Centre and the Barbara Hardy Institute.

Cover Image©: Seoul, Korea
I am delighted to welcome you to the University of South Australia for ‘Collaborating for Sustainability’, the 4th Annual PhD Students’ Colloquium and Distinguished Lecture co-organised by the Zero Waste SA Centre for Sustainable Design and Behaviour (sd+b) and the Barbara Hardy Institute.

In many ways the area of sustainable design and behaviour is emblematic of where I see UniSA’s research moving in the coming decade. Researchers in disciplines from across the university’s schools and divisions will work together, collaborating across disciplines on specific challenges. This is the contemporary approach to research that delivers to society, to industry and to government - indeed all end users. UniSA is currently looking at the position of and possibilities for collaborative scholarship across the university and with other institutions to see how we can enhance this sort of thematic work.

The sd+b Centre and the Barbara Hardy Institute, separately and together, conduct rigorous strategic research to help society move forward on problems that matter. They engage with the business community, governments and public sector organisations to investigate problems and develop solutions, training academics who can examine cutting-edge areas of sustainable urban futures. The PhD Students’ Colloquium is evidence of the diversity of research currently conducted at UniSA in the fields of sustainability, cities and climate change. Once again, I welcome you to this Colloquium and highlight its significance and importance. I would like to thank all those who have collaborated to create this event, particularly the researchers who are presenting their work today.

Prof. Richard Head, PhD

is the Deputy Vice Chancellor & Vice President Research & Innovation at UniSA. A pharmacologist with more than 40 years’ experience in research, prior to being appointed at UniSA, Professor Head was the director of CSIRO’s Preventative Health Flagship, where he was responsible for driving a national research program focussed on early detection and intervention in chronic diseases. Formerly he was Chief of CSIRO’s Division of Health Sciences and Nutrition and prior to that Chief of CSIRO’s Division of Human Nutrition. He served as Professor of Pharmacology and Toxicology at West Virginia University Medical Centre, and was a Research Fellow with the Department of Medicine at the University of Melbourne and a Postdoctoral Fellow at the Roche Institute of Molecular Biology.

The author of numerous publications, his research interests centre around understanding the protective action of dietary constituents in human health; some of his pivotal research findings have included illuminating the role played by exaggerated sympathetic innervation in hypertension disease, demonstrating impaired vascular contraction in diabetes, demonstrating the vascular protective role of long chain fatty acids, defining the pharmokinetics of isoflavones, and demonstrating the roles of butyrate in inducing program cell death in cancer cells.
Working across divisions, schools and disciplines
Welcome to the 4th Annual PhD Students’ Colloquium and Distinguished Lecture on Urban Futures

I am pleased to welcome you to the 4th Annual PhD Students’ Colloquium and Distinguished Lecture event of the Zero Waste SA Research Centre for Sustainable Design and Behaviour (sd+b) and the Barbara Hardy Institute, which deals with the topic ‘Collaboration for Sustainability’. This year’s Distinguished Lecture is jointly organised with the Barbara Hardy Institute and we are pleased that Professor Stuart White from UTS is able to speak to our students. The PhD Students’ Colloquium is always a wonderful networking opportunity for young researchers at UniSA, working in the areas of climate change, sustainable cities, consumption and other topics related to a low carbon built environment. Thus, these proceedings offer an intriguing snapshot of the diversity of HDR research currently underway, as well as giving early career researchers the opportunity to present and discuss their work. Today’s research is crucial: it distinguishes universities and is likely to influence the future of this university and the city, state and nation. Our Centre’s research is theme-based, project-based, stakeholder-focused, interdisciplinary and involving PhD students. The sd+b Centre explores a range of topics and solutions for better management of our finite resources in regard to urban development, including behavioural, technological and urban design options. It’s a platform for the exchange of knowledge and ideas in these areas, bringing together representatives from academia, industry, governments and local communities. As Director of the sd+b, I am immensely proud of the sizeable steps the Centre has taken in the last three years. The sd+b Centre has become an open platform for young researchers and we currently supervise a growing number of Doctoral and Masters students examining critical aspects of urbanisation.

Adelaide, September 2013
Sustainable cities: From Possible Futures to Preferred Futures

Abstract:
More than half the world’s population lives in cities. They are the source of most of the world’s greenhouse gas emissions, resource use and waste and yet also a major source of innovation and transformation. They are key to the future of our societies and the planet. This presentation will focus on the potential for cities to be the source of sustainability. What would need to happen? How would our decision-making systems need to change? How would our transport, energy, materials and water systems look?
Using examples from the work of the Institute for Sustainable Futures, this presentation will describe solutions that can take us from possible futures to preferred futures.

The Barbara Hardy Institute
The Barbara Hardy Institute brings together world-leading researchers to work in multidisciplinary teams on real-world issues. Our researchers are scientists, engineers and social scientists, working together with a focus on the sustainability of our society.
Formed in February 2011, the Institute, whose patron is the well-known and widely respected Dr Barbara Hardy, champions her vision for the ‘widespread adoption of sustainable principles and environmentally correct practices’ by utilising multidisciplinary research approaches that challenge conventional thinking.
The Institute ethos is to support its members in conducting relevant, globally significant, multidisciplinary research. We collaborate with partners internally, nationally and internationally, engaging stakeholders and building partnerships to attract investment and promote research. Currently, our team includes around 250 members, who share the same vision: doing great research into sustainability.

Prof. Stuart White, PhD, BSc (Hons)

is the Director of the Institute for Sustainable Futures at the University of Technology Sydney. With more than thirty years’ experience in sustainability research, Stuart’s work focuses on achieving sustainability outcomes for a range of government, industry and community clients in Australia and internationally. This includes both the design and evaluation of programs for improving resource use efficiency and an assessment of their impact.
Stuart has extensive experience in the urban infrastructure sector, including water, energy, waste and transport, specialising in futures methods, distributed infrastructure; resource management policy and planning; resource efficiency technical and financial assessment; economic modelling and sensitivity analysis of demand-side management options for urban sustainability; and the design and implementation of community-based programs for urban sustainability. From 2008 to 2011, he was the Cluster Leader for the CSIRO-funded Intelligent Grid collaboration.
In 2012, Stuart was awarded the Australian Museum Eureka Prize for Environmental Research. He is Deputy Chair of the IWA Specialist Group on Efficient Urban Water Management, and the Australian Alliance to Save Energy.
His recent work has included urban water supply demand planning, models for sustainable sanitation, strategies for decentralized energy and smart grids, including energy efficiency, peak demand management and distributed generation and the development of sustainability strategies for new commercial precinct developments.

Distinguished Lecture
The Zero Waste SA Research Centre (sd+b) is a partnership between the government agency Zero Waste SA and the University of South Australia, founded in 2009. It is a multi-disciplinary Research and Innovation Cluster and a university-recognised Research Centre, with interest and expertise in a wide range of environmental and sustainability issues. The Centre is developing international research expertise for intelligent, holistic solutions and improved decision making in environmental sustainability and complex human-nature interlinked systems. The Centre facilitates collaborative, evidence-based and cross-disciplinary research across UniSA’s Education, Arts and Social Sciences (EASS) and Information Technology, Engineering and the Environment (ITEE) divisions.

**Aims and Mission**

The Zero Waste SA Research Centre for Sustainable Design & Behaviour (sd+b) promotes UniSA’s commitment to educating professionals and citizens to the highest standards; to creating and disseminating knowledge; and to engaging with our communities to address the major issues of our time through multidisciplinary urban, environmental and social sciences research by:

- providing high calibre research and research training, and facilitating debate on questions of national and international importance to help create sustainable and just societies.
- providing a forum in which public policy makers, public and private sector organisations, and national and international experts can explore, anticipate, and evaluate complex social issues.
- building policy and collaborative research capacity and a research culture within which postgraduate students, early career researchers and more established researchers can thrive.
- addressing societal needs and critical technologies.

The centre has developed a series of high-impact research themes across divisions and disciplines.
Strategic Research Priorities

The sd+b Centre is one of the University’s leading research units for resource efficient architectural and urban design and has forged research alliances across different Divisions and Schools, and with government and industry partners. Our research interests include climate-responsive building design, resource and material efficient urban design, principles of integrated sustainable design, rapid urbanisation in the Asia-Pacific and the development of new curriculum materials. Our key research priorities are:

- Material flows, urban metabolism and value chains for resource efficiency and resilient urbanisation
- Waste avoidance and waste management, towards a truly sustainable society
- Sustainable design and human behaviour that addresses issues of modified consumption patterns, and social innovation in sustainable design
- The psychology of consumption, understanding and changing consumer behaviour, and mobilising these for attitudinal changes
- Resilient cities, energy and material-efficient architecture for an ageing population
- Social sustainability and its relation to urban ecology, technology and design issues
- Prefabricated, lightweight construction systems for disassembly, material efficiency and durability
- Measuring embodied energy, life cycle, consumption and ecological footprint
- Improved decision making; helping governments, municipalities and companies to improve their waste cycles, water and energy, and manufacturing processes
- Strategies to develop resilient ecosystems and communities.

Our Four Research Programs

- **Enabling Technologies**
  - Transformative Education & Research
  - Identity & Heritage
  - Urban Culture & Public Space
  - Behaviour Change
  - Health & Communities
  - Affordable Housing
  - Building & Envelope
  - URBAN GOVERNANCE: POLICIES AND LEGISLATION
- **Infrastructure**
  - Infrastructure Systems & Mobility
  - Water Management
  - Renewable Energy
  - Land Use & Food Security
  - Waste & Materials
  - Biodiversity & Urban Greenery
  - Compact Urban Form
- **Cities - Green Urbanism**
- **Communities**
**Program Schedule**

Theme: **Collaborating for Sustainability**  
Friday 20 September 2013, 13:40 – 18:45  
Bradley Forum, Level 5, Hawke Building, City West Campus

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**PART 2**  
**DISTINGUISHED LECTURE**

| 17:00  | Welcome, **Prof Steffen Lehmann** (sd+b) and **Prof Chris Daniels** (BHI) |
| 17:10  | Guest Speaker, **Prof Stuart White**, Director, Institute for Sustainable Futures, UTS<br>Sustainable cities: from possible futures to preferred futures |
| 17:55  | Q&A |
| 18:00-18:45 | **Drinks** |

END

This is a joint event between the **Zero Waste Research Centre for sd+b** and the **Barbara Hardy Institute**.
Performance assessment and strategy development of municipal solid waste management in Adelaide based on the zero waste index

Synopsis:
Adelaide, South Australia is one of the high-consuming cities of the world that has developed and implemented a zero waste strategy to achieve optimum resource recovery from waste. Many similar cities are adopting a zero waste strategy with a 100% rate of diversion of waste from landfill as a key goal. This study argues that achieving a 100% diversion rate will not be adequate and does not reflect the core concept of zero waste philosophy. In a previous study, the zero waste index was presented as an alternative waste management performance assessment tool for zero waste management systems. In this study, waste management performance in Adelaide during the years 2003 to 2010 is analysed using the proposed zero waste index tool and Adelaide’s performance in waste management in 2015 and 2020 is predicted. The study indicates that waste composting is increasing significantly in Adelaide and, by the year 2015, the amount of waste composted should be higher than the amount of waste going to landfill. For this reason biological waste treatment infrastructure, particularly in waste composting facilities, should be stimulated in Adelaide. In addition, the study identifies that, despite the zero waste strategy being in place, overall waste management performance in Adelaide may not reach the targeted zero waste goals, particularly in optimum resource recovery from waste. The projected results indicate that by 2020, if similar waste diversion rates continue, Adelaide should have reached a diversion rate of over 82% of municipal solid waste from landfill; and the zero waste index would then be 0.45 (increasing from its current 0.41 (with a 72% diversion rate). The study also involved an online survey of local waste experts in metropolitan Adelaide. By combining the waste performance and survey findings, the study identified the most important priority areas for future waste management strategies in Adelaide.

Keywords: waste management, performance assessment, zero waste strategy, zero waste index

Short Bio:
Atiq is a PhD Candidate at the Zero Waste SA Research Centre for Sustainable Design and Behaviour at the University of South Australia. In 2010, he was awarded the University President’s Scholarship (UPS) to pursue his PhD research. In 2009, he completed his master’s in Environmental Engineering and Sustainable Infrastructure from the Royal Institute of Technology (KTH), Stockholm, Sweden. His research interest includes waste management, planning, strategy and tool development.

Recent Publication:
**PhD Research**

**Name:** Li Meng  
**Email:** Li.Meng@mymail.unisa.edu.au  
**Principal Supervisor:** Prof. Michael Taylor  
**Associate Supervisors:** Prof. Steve Hamnett, Dr Nicholas Holyoak

*A travel behaviour study on transit-oriented development in Adelaide’s northern rail corridor by using discrete choice modelling and GIS modelling*

**Synopsis:**
As part of a recent ARC Linkage research project, this study analyses travel mode choice behaviour and house location choice behaviour in search of ways to increase public transport patronage and to reduce travel demand, using the Adelaide northern rail corridor as a case study area. A household survey was designed from the findings of observations at railway interchanges and local residents’ focus groups. The survey collected stated preference data (through hypothetical choices) to provide data for input into discrete choice models. Various choice models were then developed to highlight the heterogeneities between the choices of individuals and to help understand the reasons behind their behaviour and preferences. The significant variables were further explored in GIS models, revealing some interesting results for potential shifts in travel behaviour in the corridor.

Some important findings derived from the model results can assist policy makers develop sustainable transportation infrastructure provisions and provide suggestions for updating Adelaide’s 30-Year Plan. An example of the findings concerns factory workers in the car automotive industry who need transportation at around shift hours from home to work. However, the main road corridor development proposed in the 30-Year Plan lacks the ability to connect the origin and the destination. This study suggests providing higher frequency and shorter loop feeder buses linking homes to the train station and from the train station to work places in order to attract more people to use public transport.

**Keywords:** travel choice model, public transport, demand forecasting, GIS, behaviour change

**Short Bio:**
Li worked in the car automotive industry as a design and test engineer for 8 years, and then worked in production planning and logistics transportation both in Shanghai, China and in Adelaide for another 5 years. In 2009, she started as a research assistant in the Transport System Centre in UniSA and then commenced a full time PhD in transport system engineering for travel behaviour study on transit-oriented development. Li submitted her PhD thesis in early May 2013. She is currently working on a number of projects that are related to urban and transport planning in the School of Natural and Built Environments. She is a member of the Barbara Hardy Institute.

**Recent Publication:**
Meng L, Taylor MAP and Holyoak N (2012), 'Discrete Choice Modelling for Travel Mode and Residential Location Choices in an Adelaide Rail Corridor', *Proceedings of the 17th International Conference of the Hong Kong Society for Transportation Studies*, Hong Kong.
Communicating sustainability: the role of human values, narrative identity and social action

Synopsis:
Recent findings from Common Cause Research in the UK strongly argue that mainstream marketing tactics that systematically appeal to extrinsic human values of power, wealth, image and status can fundamentally undermine behaviour change for sustainability. To support this concern, my research agenda identifies three interdependent factors thought to be crucial for improving behaviour-change communication.

drawing from Mead’s seminal work on social symbolic interactionism and social identity, Ricoeur’s narrative hermeneutics and recent studies on values and frames by Common Cause Research, my work contends that communication for sustainability should elicit intrinsic values, self-efficacy and social collaboration in the public domain, instead of fear and on-going social competition. To demonstrate this, case studies have been made of behaviour-change initiatives such the ACF’s Songlines Project in Broome, WA, and the global phenomenon of the Transition Network, to explore alternative communications and community practices where lasting motivation for change occurs. Analysis of the emergent narratives and social phenomena from these contexts seeks to describe how self-authored communities build a collective identity of motivation and social resilience. As proposed by Ricoeur, human freedom is recovered by reclaiming the potential of being as act. This concept is central to the argument that motivation for sustainability is determined not by rationality or purchase choice but by the social and narrative practices that shape who we believe we are.

The implications of this suggest that ‘selling’ sustainability, as outlined by the UNEP for example, is strategically misguided and unlikely to engender the degree of change needed for sustainability long-term. Instead, this study aims to participate in a redirective practice of industrial and communication design, seeking an altogether more radical shift towards a participative social ecology.

Keywords: communication, narrative, identity, values, sustainability

Short Bio:
With a professional background in communication design and illustration, Chris has taught visual communication in institutions in the UK and Australia for fourteen years. He is currently a sessional lecturer in communication design theory and practice at the University of South Australia and also in the second year of his PhD at the Zero Waste SA Research Centre for Sustainable Design and Behaviour. Chris’s work concentrates on the psycho-social and eco-psychological dimensions of design for sustainability, central to which are the themes of narrative identity and social values which he believes are vital to communications aiming at motivating change long term.

Recent Publication:
Are our local governments ready to adapt to climate change?

Synopsis:
The impact of climate change on human settlements has been startling, demonstrated by climate events such as flash flood and cyclone in Queensland, Hurricane Katrina in Florida and Cyclone SIDR and AILA in Bangladesh. But the results of such climate change induced events are not confined to the immediate or primary effects. Hundreds of millions of people, mostly from those exposed coastal zones, face forced displacement and will need to migrate in search of alternative livelihoods as an indirect impact of climate change. Such climate-induced push factors lead to a chaotic overwhelming urbanization with attendant congestion and pollution choking urban growth as the tertiary level of impact of climate change. This tertiary level of climate impact is not only a challenge for developed nations but it is a challenge for low-elevated coastal countries as well. The question is how local governments and planning systems could address such flux of migration and urbanization result from primary impacts of climate change. Brisbane, Australia and Khulna, Bangladesh are both low-elevated cities and threatened by extreme climate events and forced displacement though they are from two different regions and have different local government systems. Using these two regions as examples, this study seeks to develop local level planning approaches, which seek to cope with the escalating scale of the problems. The interconnections between climate change, displacement and urban policy are explored.

Keywords: climate change, displacement, urbanization, urban planning, planning framework

Short Bio:
Reazul completed a PhD at the University of South Australia in the School of Natural and Built Environments in 2013. His thesis title is ‘Climate Migration and Urban Change: A Study of Adaptation in Bangladesh’. Reazul is currently working as a Research Assistant in the Zero Waste SA Research Centre for Sustainable Design and Behaviour (sd+b).

Recent Publication:
The Sustainable Design of Water's Edge Public Spaces - An architectural analysis of convergence and divergence between the East and the West

Synopsis:
Eastern and Western civilizations have had intersecting, complex and varied, inter-reliant relationships. This presentation intends to cover an analysis of Water's Edge Public Spaces (WEPS) in selected Eastern and Western cities, focusing especially on existing literature and future opportunities. In line with the different projected demographic profiles of the East and West, emerging public spaces in the West focus on ‘access’, ‘connecting’ and ‘networks’ (Thompson, 2002), while emerging public spaces in the East focus on ‘usage by a rising middle class’, or mass-use, and a growing demand for ‘comfort’ and ‘security’ (Dick & Rimmer, 1997). This work follows the completion of a pilot study (exploring three sites each in Sydney, Hong Kong and Singapore) (John, Lehmann and Sivam, 2013), the creation of sustainability indicators, and the use of trial models for the evaluation of Water's Edge Public Spaces in different environmental, social, economic and cultural contexts. The presentation will focus on commonalities and differences within selected Australian case studies, especially in the design of emerging water's edge public spaces, providing recommendations before impending field work. The six explored dimensions are: 1) mixed use functionality; 2) heritage preservation and adaptive re-use; 3) green urbanism principles; 4) technological connectivity, maintaining and establishing connections to urban networks; 5) avenues of incomplete urbanism; and 6) renewable energies in the public domain. This work focuses both on individual and collective interpretations of spaces, it then portrays the designers’ views as opposed to a users’ views of these selected spaces. The presentation will be interactive, requesting the audience to complete a similar sample survey, separating the views of designers and users.

Keywords: sustainable urban design, water's edge public spaces, space interpretation, convergence and divergence, urban renewal

Short Bio:
Mabel is a planner, architectural professional and GIS analyst/urban geographer. Mabel works for local government as a Senior Policy Planner, runs a small company (called MapPlan - Mapping and Planning Services) and lectures/tutors at the University of South Australia. Mabel is currently working on a PhD at sd+b Research Centre at the University of South Australia. Her interests include waterfront regeneration, the design of water's edges, maintaining environmental connections, protecting diversity and enhancing positive social synergies.

Recent Publication:
Impacts of the Urban Heat Island effect on the quality of vitality in public space

Synopsis:
Australia had three extreme heat waves in 1895, 1939 and 2004. We experienced another heat wave in the summer of 2013. A likely increase of 1.2°C in the surface temperature of Australia is going to be amplified by artificial heat storage in higher densities by 2030. This artificial heat storage is known as the Urban Heat Island (UHI) effect and can result in city centres being significantly hotter than the peri-urban surroundings (frequently more than 4.5°C). Urban Geometry, landscape, surface materials and anthropogenic waste heat have been cited as the main contributors to the UHI effect. Alongside cities’ substantial energy consumption and concomitant heat production, public life in most metropolitan areas suffers from the UHI effect during the summer, when natural cooling is not effective at pedestrian level.

Addressing the UHIs’ social impacts in public space, the current paper reports my findings about correlations between heat stress and the quality of vitality in public space. Three types of public space in Adelaide are being monitored in two climatic conditions (moderate and high temperatures). Data is collected via direct observation, satellite imagery and archival climate databases. Pedestrian flow and space occupation patterns are being discussed against UHI indicators to map the quality of vitality in public space in different microclimate conditions. Results show that, despite adaptive thermal behaviours, the quality of vitality in public spaces regresses positively with the human thermal comfort factors. The result of this investigation can facilitate my PhD thesis, discussing the impact of more vitality in public space on anthropogenic waste heat generation in Australian cities. The study is a part of a larger research project in collaboration with the CRC for Low Carbon Living.

Keywords: Urban Heat Island effect, activity patterns, urban microclimate, vitality, public space

Short Bio:
Ehsan worked as a professional architect on a number of landscape and urban design projects, after graduating with a Master of Architecture in 2002. He completed the Master of Sustainable Design at the University of South Australia in 2011, focusing on local influences of pedestrian-friendly urban design. His research interests cover quality, liveability and the sustainability of public space. Previously he worked as a Lecturer at Shiraz University in Iran, focusing on the history of architecture and urban design and the rehabilitation of existing urban precincts. Ehsan was the recipient of UniSA’s President Scholarship and School of Art, Architecture and Design Scholarship in 2012, and a National AAD Travel Grant in 2013 for his PhD at the sd+b Centre.

Recent Publication:
**PhD Research**

Name: Sheryn Pitman  
Email: sheryn.pitman@sa.gov.au; sheryn.pitman@mymail.unisa.edu.au  
Principal Supervisor: Prof Chris Daniels  
Co-Supervisor: n. n.

**Ecological literacy: how much do we need to know about nature – and who knows?**

**Synopsis:**
Critical to the health and survival of any human society is knowledge and understanding of the natural ecological systems that underpin life. This is ecological literacy, defined as the capacity to know and understand places as ecological systems including how they function and connect with other systems. Changed relationships between many human societies and the natural world have affected our capability to make well-informed decisions about how to live sustainably. With particular reference to ecological literacy in Australian society, we asked a fundamental question; how can ecological literacy be assessed? This presentation discusses the findings of an ecological literacy assessment and survey of over 1000 South Australian adults from industry, government, non-government, business and volunteer organisations. Eco-literacy scores varied significantly with a range of socio-demographic and psychographic factors. These findings provide a solid foundation on which to build efforts to further understand and develop ecological literacy within our citizenry and governing bodies.

**Keywords:** ecological and environmental literacy, ecological knowledge, sustainability, informed citizenship

**Short Bio:**
Sheryn manages the South Australian Green Infrastructure Project hosted by DEWNR through the Botanic Gardens of Adelaide. This work brings together diverse stakeholders to integrate the planning and design of green spaces and water systems that underpin the health and sustainability of our towns and cities. Sheryn has a multidisciplinary background in environmental and project management, education, research and writing and communication. With a Master’s Degree in Environmental Studies, she worked for seven years with Greening Australia engaging communities in landscape rehabilitation and habitat restoration. Prior to this she spent many years as a creative and technical writer including documentary film, television and radio, and five years as a secondary school teacher. Sheryn is working on a PhD in Environmental Management with a focus on Ecological Literacy and is a member of the Barbara Hardy Institute.

**Recent Publication:**
**PhD Research**

**Name:** Christian Reynolds  
**Email:** christianjreynolds@gmail.com  
**Principal Supervisor:** Professor John Boland  
**Co-Supervisor:** Dr Julia Piantadosi

*Sustainability collaboration via cloud based research*

**Synopsis:**
A Virtual Laboratory (VL) is a novel concept aimed at connecting researchers to research facilities, data repositories and computational tools on a national scale. The Industrial Ecology (IE) Lab is a VL that targets a well-described, significant research challenge: the compilation and use of a time series of Australian sub-national Multi-Regional Input-Output (MRIO) tables.

IO tables describe the economic flows of goods and services from one sector of an economy to another. Modern computing power has allowed the creation of international MRIO tables that trace circuitous supply routes through the complex economic systems of the globe. These MRIO tables have yielded information about global trade-offs between environmental and economic objectives, and thus guide policy decisions on global matters like allocating fair shares of the climate change burden.

Rather than tracing the flows of goods between international countries, the IE-VL has disaggregated the Australian economy into 2196 regions according to the Australian Bureau of Statistics’ Statistical Area Level 2 (SA2) classification, each with 1,284 individual sectors. The resulting ten year MRIO time series allows for economic, environmental and social analysis at a detail and breadth not before obtainable for Australia.

In this paper I discuss the construction and operational methodology of IE-VL, along with the challenges and opportunities associated with virtual cloud based research. I present examples of how the IE-VL supports the rapid expansion of national research efforts required to address the challenges of economic development occurring in the face of social and environmental constraints that are growing in number and in urgency.

**Keywords:** sustainability, cloud, online, input-output.

**Short Bio:**
Christian is a PhD candidate at the University of South Australia and a Visiting Scholar at the Integrated Sustainability Analysis Group, University of Sydney. In his PhD, Christian is examining the economic and environmental impacts of waste; specifically food waste. In 2009, Christian graduated from the University of Adelaide with a double degree in Economics and International Studies (Hons), reading part of this program of study at Newcastle University, UK. Christian is a WMAA Young Professionals NSW 2012 Scholarship recipient. He is a member of the Barbara Hardy Institute.

**Recent Publication:**
PhD Research

Name: Gabriele B Fitzgerald
Email: fitgb001@mymail.unisa.edu.au
Principal Supervisor: Prof. Steffen Lehmann
Co-Supervisor: Dr. Collette Snowden

Effects of greening community organisations

Synopsis:
Governments of high consuming nations are concerned to promote societal change towards more sustainable everyday practices in the home to address water and energy consumption, and the significant proportion of waste produced by householders. Studies on change-focused environmental discourse draw frequently on three approaches, the systemic, individualistic and social practice-based paradigm.

Placing individuals as citizens at the centre of information driven change strategies within the individualistic paradigm has not always proven effective, as drivers that form environmental behaviours of individuals are complex. Therefore, information campaigns must be critically placed within the overarching and distinct structures and social settings in which householders operate and socialise in their community and focus on environmental practices.

Case studies that focus on the role of greening community hubs in shaping the adoption of pro-environmental practices by their individual members or employees using a social practice-based intervention are presented. Two sports clubs, three community centres and four welfare organisations were chosen as the foci of this research which examines the influence of community organisations and applied practice-oriented strategies in these discrete social settings to see whether a collaborative mix of agents and stratagems is effective in promoting environmental practices and whether these practices would carry over to home and work.

The data is drawn from focus group discussions, contextual in-depth interviews and surveys, and published reports and policies. Findings reveal that individuals transfer acquired environmental practices from the communal setting to home and work.

Keywords: pro-environmental behaviour and practices, community environmental management, social entrepreneurship, community to work and home.

Short Bio:
Gabriele is a recipient of an Australian Postgraduate Award (2011) to undertake PhD research at the Zero Waste Research Centre for Sustainable Design and Behaviour.
She has also been the recipient of the Australian Endeavour Fellowship for Practicing Teachers (2011) and a scholarship to attend the 2012 Hargraves Institute Conference: Innovation, Leadership and Transformation.
She holds several academic degrees: Master of Business, Administrative Management (2008); BA (Hons) Behavioural Science (2001); Dip Psych Uni, Psychotherapy, Behavioural Psychology and Cultural Psychology (1993); MA Modern History, Modern German Literature and Politics (1987), BA Ed History and German (1985).

Recent Publication:
**PhD Research**

**Name:** Dr. Queena Kun QIAN  
**Email:** kun.qian@fulbrightmail.org  
**Principal Supervisor:** Prof. Steffen Lehmann  
**Co-Supervisor:** Prof. Edwin Chan (The Hong Kong Polytechnic University)

**How transaction costs affect real estate developers entering into the building energy efficiency (BEE) market**

**Synopsis:**
Buildings consume a major proportion of the electricity power in most cities, thus promoting building energy efficiency (BEE) will directly contribute to low carbon cities. Some studies suggest that the additional investment in BEE will be paid by higher selling prices or more savings in term of life cycle costing. Real estate developers are profit driven and working in a competitive environment. However, it appears that real estate developers are skeptical about entering the BEE market, which requires alternate theories to explain their behaviours. In this study, I attempt incorporating transaction cost economics (TCE) and game theoretical frameworks into the analysis. It suggests that the anticipated transaction costs entailed in the provision of BEE products due to such factors as bounded rationality, opportunism and contractual hazards, combined with the asymmetrical information in the BEE market have curtailed the developers’ interests. This study leads to some policy recommendations to induce developers to enter the BEE market by reducing the transaction costs. The findings highlight the importance of institutions in the BEE market to secure a level playing field. Governments play an important and unique role in providing regulations and incentives to reduce the unfair competition in the market. It will not only help developers to avoid unnecessary transaction costs, but also facilitates them in reducing the costs of BEE through competition. In this context, information publicity and education programs are a necessity to raise the awareness and consequences of credibility amongst the developers providing BEE.

**Keywords:** building energy efficiency; low carbon; game theory; transaction cost economics; information asymmetry

**Short Bio:**
Dr. Queena K. Qian has held an Endeavour Cheung Kong Post-doc Fellowship at the Zero Waste Research Centre for Sustainable Design and Behaviour (sd+b) at UniSA since Feb 2013. Queena received her PhD, entitled ‘Barriers to Promote Building Energy Efficiency- A Transaction Costs Perspective’, at the Hong Kong Polytechnic University in 2012, supervised by Prof. Edwin Chan. She was a Fulbright recipient (2010) at Lawrence Berkeley National Laboratory at UC Berkeley and at Washington University in St Louis, USA. During her time at the sd+b Centre, she is involved in the project ‘Framework for low carbon precinct design from a zero waste approach’.

**Recent Publication:**
**Developing a framework for waste informatics using a case study approach in Jakarta, Indonesia**

**Synopsis:**
Like many of the Asian mega-cities urbanisation in Jakarta has spilled over into the surrounding villages leading to uncontrolled development, housing shortages, and the expansion of squatter settlements. The infrastructure is buckling under the demand of rapid population growth. In turn, a dysfunctional waste management system is having significant negative impacts on the natural and built environments.

Governments can deploy a range of strategies to manage waste with varying success. The inability of formal waste management approaches to service the illegal and marginal settlements has created opportunities for a significant informal sector to exist on the discarded resources of the city. Research has shown that harnessing this source of human energy and expertise is crucial to reducing the waste footprint of developing cities and improving the lives of these citizens. However, underinvestment, poor organisation, unsafe conditions, and extreme poverty are currently barriers to utilising this potential grassroots activity.

Waste informatics is a new area of research that aims to utilise smart city technologies to measure waste and understand material flows around urban systems. In this project the researcher will explore barriers and opportunities for implementing IT solutions to harness existing social networks, making citizens an active part of data collection and distribution regarding the impacts of waste. It is hoped that by better understanding the work of the informal sector, government and private industry will be more motivated to consider this decentralised approach an important aspect of creating a zero waste city.

**Keywords:** informal waste sector, waste informatics, Jakarta, Indonesia

**Short Bio:**
John graduated in BSc Computer Science (hons) from Staffordshire University, England in 2004. Since moving to Adelaide, his work has included landscaping, construction, and horticulture. He has recently completed Masters research in Environmental Management at the University of South Australia. John is currently enrolled as a PhD candidate at the Zero Waste Research Centre for Sustainable Design and Behaviour, focusing on the role of community and technology in waste reduction. John is the recipient of a sd+b PhD scholarship (2012-15)

**Recent Publication:**
Devlin J (2013), ‘From Informal to Intentional: What can the Waste Pickers of Jakarta Learn from Intentional Communities such as Findhorn?’, ICSA Conference, June 2013, Findhorn, Scotland.
Name: He He
Email: hehe1982428@gmail.com
Principal Supervisor: Prof. Steffen Lehmann
Co-Supervisor: Dr. Rocco Zitto

Towards the integration of waste management in a shared platform for ETWW demand forecasting and scenario planning

Synopsis:
According to the report from United Nations Human Settlements Programme, urban development interweaves with climate change in many respects. These intersections lead to some risks and challenges. However, with the appearance of the risks there is also the opportunity for sustainable urban development of cities. Sustainable urban development can enhance the adaptability in all areas of a city, such as water systems, waste infrastructure, transport and so on. Helpful in planning low-carbon precincts would be a shared platform for integrated ETWW (energy, transport, waste and water) demand forecasting and scenario planning that will allow assessing overall carbon impacts of urban developments or redevelopments effectively and efficiently.

For the challenges and opportunities, there are some methods to achieve sustainable urban development, such as:

1. Establishing strategic targets: It is fundamental to set strategic targets for achieving the goal of the sustainable urban development. Targets are divided into three goals: the short goal, the intermediate goal, and the long-term goal. We intend to lessen the amount of carbon emissions for the short goal; be carbon-neutral for the intermediate goal; and achieve a low-carbon, sustainable urban development for the long-term goal.

2. Adopting a suitable model of development: Here we research the type of model for sustainable urban development. On the basis of the selected development model, it not only utilises the efficiency of market, but also compensates for negative effects generated by the development of a city at a lower cost.

3. Developing and establishing different evaluation standards: It is necessary to develop a series of evaluation standards in order to monitor and measure the progress and achievement of sustainable urban development. These evaluation standards guide the sustainable urban development of a city and display its significance in urban planning.

Keywords: Sustainable urban development, establishing standards, demand forecasting tool

Short Bio:
He He was awarded a Master’s degree in Material Science at Harbin Institute of Technology in China, in 2007. He worked at the Shanghai Research Institute of Building Sciences (Group) Co Ltd for six years, where he focused on the assessment of low carbon buildings and building materials. During this time, he was dealing with lifecycle and greenhouse gas emissions from building materials. His work is based on the assumption that the development of sustainable urban systems will help to resolve issues generated by climate change. Since September 2013 he is part of the research team working on the CRC for Low Carbon Living project ‘Integrated Energy, Transport, Waste and Water (ETWW) Demand Forecasting and Scenario Planning for Precincts’ at the sd+b Centre at UniSA.

Recent Publication:
Synopsis:
As a result of the dramatic urbanisation in the past hundred years world-wide, 50.5 per cent of the global population lived in cities in 2010 (WHO), while by 2050 it is predicted that seven out of ten people will be urban residents. Although, this urban expansion stems from the high efficiency of urban living, as cities are growing, new difficulties appear that significantly reduce both efficiency and liveability of metropolises. One of the negative outcomes of urbanisation is the discernible temperature difference between urban and rural areas, known as the Urban Heat Island (UHI) effect. Australia is particularly exposed to UHI effects due to its developed urbanisation; 89% of Australians lived in cities in 2011 (WHO). It is estimated that greenhouse gas emissions could raise the overall temperature in Australian cities by up to 1.2°C by 2030, 2.2°C by 2050 and 3.4°C or more by 2070 (CSIRO, 2007), a process that will be exacerbated by the UHI effect.
The detrimental impacts of heat waves on cities and their inhabitants have been widely researched in recent studies. The direct influence of the UHI effect on urban residents (e.g. health problems and higher mortality) has been explored in depth, whereas very little work has been done on the interaction between citizens’ lifestyles and heat waves, despite the fact that the long-term consequences of behaviour changes are immense. Since citizens are not only contributors to, but also victims of UHIs; they are caught in a vicious circle. As more energy and water is consumed even more artificial heat increase is generated. Therefore, humans’ role is a major part of this cycle.
My research aims to explore what sort of long term changes in people’s behaviour are derived from heat waves. How does this adverse transformation of lifestyle magnify the impact of UHIs? How could urban design, with additional attention to public space usage, intervene in this vicious circle? How could behavioural change help? The study will answer the questions raised through case studies in three Australian cities (Sydney, Melbourne and Adelaide) and aims to deliver recommendations about feasible and cost effective adaptation methods and tools respond to heat waves.

Keywords: Urban Heat Island impacts, resilient public space, climate change, behaviour change, cost-effective mitigation strategies

Short Bio:
Gertrud Hatvani-Kovacs graduated with an MSc degree in Architectural Engineering from the Budapest University of Technology in 2007. During her university studies she worked as a Student Demonstrator at the Department of Historical Architecture and Monuments where she carried out research on the topic of Hungarian Baroque architects. Since her graduation she has worked in engineering design and later in the project management of sustainable office building developments. As a LEED AP, she contributed to the design and execution of the first LEED Platinum building in Hungary. She is a chartered member of the Hungarian Chamber of Architects as a Building Energy Certifier and Architect Designer. Her research interests include sustainable cities and citizens’ evolution towards more resilient living. Gertrud commenced work on a PhD in sd+b Centre in September 2013.
Members of sd+b Centre, June 2013
Program Schedule

Theme: Collaborating for Sustainability
Friday 20 September 2013, 13:40 – 18:45
Bradley Forum, Level 5, Hawke Building, City West Campus

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| 13:40        | Introduction and Welcome, Prof Steffen Lehmann  
Collaborating for sustainability |
|              | Presentations by PhD Candidates (10 mins presentation and 5 mins Q&A)      |
| 13:50        | Atiq U. Zaman  
Performance assessment and strategy development for municipal waste management in Adelaide based on the zero waste index |
| 14:05        | Li Meng  
Travel choice behaviour for a better integrated transport and land use urban plan |
| 14:20        | Christopher Thornton  
Communicating sustainability: the role of narrative, identity and social action |
| 14:35        | Reazul Ahsan  
Are our local governments ready to adapt to climate change? |
| 14:50        | Mabel John  
The sustainable design of water's edge public spaces - an architectural analysis of convergence and divergence between the East and the West |
| 15:05        | Break: Tea & Coffee                                                        |
| 15:30        | Ehsan Sharifi  
Impacts of the Urban Heat Island effect on the quality of vitality in public space |
| 15:45        | Sheryn Pitman  
Ecological literacy: how much do we need to know about nature – and who knows? |
| 16:00        | Christian Reynolds  
Sustainability collaboration via cloud based research |
| 16:15        | Gabriele B. Fitzgerald  
Effects of greening community organisations |
| 16:30        | Summary and wrap up                                                        |

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<th>PART 2</th>
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| 17:10        | Guest Speaker, Prof Stuart White, Director, Institute for Sustainable Futures, UTS  
Sustainable cities: from possible futures to preferred futures |
| 17:55        | Q&A                                                                        |
| 18:00-18:45  | Drinks                                                                     |

END

This is a joint event between the Zero Waste Research Centre for sd+b and the Barbara Hardy Institute.