



Sustain09 Postgraduate Research Colloquium

Book of Abstracts

School of Natural and Built Environments

November 12-13, 2009

University of South Australia, City East Campus

Printed on paper that is 50% post-consumer waste

Welcome from the Head of School

Welcome to the second annual School of Natural and Built Environments Postgraduate Research Colloquium. Composed of 4 Disciplines (Civil and Water Engineering, Construction and Project Management, Geospatial and Environmental Management and Urban and Regional Planning) each with a specific focus on aspects of either natural or human constructed systems, the School supports 7 postgraduate research programs to cover its research themes. However, the postgraduate research within the School is not conducted by a set of isolated research groups. Our School realises that the great discoveries in the near future will be at the interface between one or several disciplines and in the area of environmental sustainability. Hence we are in a unique and timely position to develop more interactive research programs that cross traditional boundaries. NBE is embarking on a program to actively foster overlap between its Disciplines by encouraging multidisciplinary research around sustainability issues, and by promoting and encouraging interactions between researchers.

In addition to encouraging multidisciplinary research, this colloquium represents part of an active and ongoing program to raise the quality of postgraduate research by providing a significant and important opportunity to develop collaborations between and amongst our graduate students. Our PhD students and Masters (by research) students in 2009 contribute to a program where they produce a poster on their research in April and deliver a talk at their colloquium in November. This has many advantages for the students in addition to developing their writing, speaking and thinking skills. The students come together in a congenial atmosphere to see the research of others, receive input from academics and relevant industry leaders, and to observe and discuss the development of research projects with students at different stages of the process. PhD and Masters (by research) students are the “engine room” of the research program of any School because they produce the lion’s share of our cutting edge research. However, our postgraduate students also create the attitudes, ethos and research identity that defines the School because of the flair, enthusiasm and innovation they bring to our research program. Hence, our postgraduate students add a breadth and depth of “life experience” drawn from their varied backgrounds which influences not just their own research projects, but the nature and the style of our School research program. In a colloquium such as this, our students will hear and understand the approach of others, influence and flavour the subsequent discussions with their own interests and attitudes and create long-lasting relations with their peers that will form networks promoting research into the sustainable development and management of the natural and built environments for decades to come.



2009 Postgraduate Student Colloquium

I congratulate Philip Roetman, Sue Irvine and Michael Heath ably assisted by Natalie Iglio and the organising team for preparing such a wonderful, exciting and stimulating program demonstrating the breadth, depth and interactivity of the research conducted by the Students of NBE!

Professor Patrick James
Head of School, School of Natural and Built Environments
November, 2009

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2009 Postgraduate Student Colloquium

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About the School

The School of Natural and Built Environments focuses on the unique relationships and synergies between natural and built environments, with a particular interest in teaching and research to support improved environmental and socio-economic sustainability for the future. Our vision is to be recognised nationally and internationally for creative and effective teaching and research in sustainability, while continuing to provide excellent professional and industry focused education in the various disciplines.

The School is located across two campuses – in the heart of Adelaide at the City East Campus and at the expanding and vibrant new suburb of Mawson Lakes on the northern fringe of the City. As part of the Division of Information Technology, Engineering and the Environment (ITEE), the School offers applied and relevant programs that take students out of the classroom and into the field.

Postgraduate Research Degrees

A range of postgraduate research degrees are offered that are aligned to the disciplines and research concentrations within the School:

- Doctor of Project Management
- PhD Building
- PhD Civil Engineering
- PhD Environmental Management
- PhD Geoinformatics
- PhD Planning
- PhD Transport Systems Engineering

- Master of Applied Science
- Master of Engineering (Civil Engineering)
- Master of Engineering (Transport Systems Engineering)
- Master of Planning

Research Concentrations

Research undertaken in the School is multi-disciplinary, which allows students and researchers to work with experts in different fields on complex topics and issues. The School's research effort is arranged into two University-funded research centres and two research groups governed by the Institute for Sustainable Systems and Technologies (ISST):

- **The Barbara Hardy Centre for Sustainable Urban Environments** is focused on the sustainability of cities, the conservation of biodiversity and the maintenance of the natural processes that sustain life.
- **SA Water Centre for Water Management and Reuse** aims to establish core capabilities in water and waste water treatment, water reuse, total water cycle management, water sensitive urban design, environmental biotechnology, water utilisation from the River Murray and the provision of water services for rural and desert communities.
- **ISST - Transport Systems** is one of Asia-Pacific's leading centres for academic excellence in traffic engineering, transport planning and environmental studies.
- **ISST - Building and Planning Studies** provides resources and opportunities for research into the planning, design and development functions of government, industry and community.

Colloquium Program

Thursday, 12th November

9.00am **Registration**

9.30am **Welcome: Professor Patrick James, Head of School**

9.40am **Session 1: Chaired by Professor Patrick James**

9.40am Chansiri Suksri

10.00am Paul Atem

10.20am Paul Corcoran

10.40am Salim Al Mamary

11.00am **Morning Tea**

11.30am **Session 2: Chaired by Assoc. Professor David Bruce**

11.30am Behnoosh Bazr Afkan

11.50am Gusri Yaldi

12.10pm Mary-Anne Binnie

12.30pm Sheryn Pitman

12.50pm **Lunch**

1.40pm **Session 3: Chaired by Dr Nicholas Chileshe**

1.40pm Cathryn Hamilton

2.00pm Jaruwit Prabnasak

2.20pm Michael Heath

2.40pm Susilawati (Susi)

3.00pm **Afternoon Tea**

3.30pm **Session 4: Chaired by Assoc. Professor Julie Mills**

3.30pm Reazul Ahsan

3.50pm Shuaifei Zhao

4.10pm Siti Zaharah Ishak

4.30pm Sue Irvine

4.50pm **Closing for Day One: Sue Irvine and Michael Heath**

5.30pm **Pre-Dinner Drinks Aroma Café (City East Campus)**

6.00pm **Evening Meal Aroma Café**

6.45pm **Guest Speaker Professor Patrick James**

"Researching the Tour: Unsustainable cycling"

Colloquium Program

Friday, 13th November

9.00am ***Registration***

9.30am ***Welcome to Day Two: Professor Chris Daniels***

9.40am ***Session 5: Chaired by Assoc. Professor Jon Kellett***

9.40am Usama Abu Risha

10.00am Alaa Gabr

10.20am Sally Freeman

10.40am Tim Johnson

11.00am ***Morning Tea***

11.30am ***Session 6: Chaired by Dr Alpana Sivam***

11.30am Jeff Lawson

11.50am Rosmala Dewi

12.10pm Wei Zhang

12.30pm Jintawadee Suksri

12.50pm ***Lunch***

1.40pm ***Session 7: Chaired by Professor Mike Taylor***

1.40pm Alec Townsend

2.00pm Philip Roetman

2.20pm Steven Nothrop

2.40pm Ying Yan Qu

3.00pm ***Election of 2010 Postgraduate Student Representatives***

3.15pm ***Closing Remarks and Awards: Head of School, Professor Patrick James***

Organising Committee

Mr Michael Heath, PhD candidate

Ms Sue Irvine, PhD candidate

Mr Philip Roetman, Masters candidate

Professor Chris Daniels, Director of Research

Ms Natalie Iglío, Project Officer: Research

Presentation Abstracts



Name: Chansiri Suksri
Degree: PhD Transport Systems Engineering
Supervisors: Professor Michael Taylor
Dr Wen Long Yue
Project title: Advanced congestion management using traffic control

Traffic control roles in congestion management

Abstract:

Traffic congestion has undoubtedly grown and affected transport system services as well as the economy in many cities. Considered a severe problem, treatment for congestion has been developed on both the demand and supply sides. Focusing on the supply side, apart from building additional roads for escalating travel demand, better traffic control should be a cost-effective choice to battle congestion problems efficiently by utilizing existing infrastructure. This presentation will give you an idea about the role traffic signal control plays in congestion management schemes and also give directions to use it as a tool to alleviate congestion.

Notes:



Name: Paul Atem

Degree: PhD Planning

Supervisors: Dr Lou Wilson
Dr Andrew Allan

Project title: Australian housing affordability crisis in the 21st Century: Its implications for migrants and refugees' settlement in Australia

Australian housing affordability crisis in the 21st Century: Its implications for migrants and refugees' settlement in Australia

Abstract:

In the past several decades, Australia has settled refugees from many countries of the world as part of its international obligation. This is indicated by the present diverse refugee population in Australia that has arrived in recent years. Refugee settlement and especially their access to housing have been key issues in Australian immigration research. In the last three decades Australia has experienced declining housing affordability and increased competition for private rental housing. Recent studies have reported significant, high rates of refugees' dissatisfaction with the current Australian housing system. Refugees are disadvantaged in Australian society because they are subject to discrimination due to their social, economic and cultural status. They are at risk of experiencing housing crisis and are vulnerable to becoming homeless. This paper explores current Australian housing affordability issues in relation to diminishing access to public and private housing and its implications for refugee settlement in Australia. The presentation discusses socioeconomic characteristics of refugees and their housing pathways in Australia, housing affordability issues and the implications these have on refugee settlements in Australia.

Notes:



Name: Paul Corcoran
Degree: PhD Geoinformatics
Supervisor: Assoc. Professor David Bruce
Project title: Organisational Participation in Geographical Information Systems (OPGIS): A case study of the Indigenous Land Corporation (ILC)

Organisational Participation in Geographical Information Systems (OPGIS): A case study of the Indigenous Land Corporation (ILC)

Abstract:

The research presents initial findings from a study that investigated how existing organisational GIS capability could be efficiently strengthened by further diffusion of GIS into business processes, thus improving delivery of programs and decision making. The ILC was chosen as the case study organisation and the research began with an examination of other government agencies and Indigenous representative bodies that use geospatial methodologies in the acquisition and management of Australian Indigenous lands and waters. A business process review was initiated to assess ILC GIS use and reveal potential avenues for GIS expansion. The study, so far, has revealed an enthusiasm from the ILC as a whole towards GIS, a desire from its non-GIS personnel to engage further with GIS, and revealed opportunities to improve business practice (e.g. non-GIS personnel creating/ editing database entries more efficiently and accurately by using the ILC Intranet Mapping Service).

Notes:



Name: Salim Al Mamary
Degree: PhD Project Management
Supervisor: Assoc. Professor George Zillante
Project title: Water Management in Aflaj system under changing climate: strategy for sustainability

Water Management in Aflaj system under changing climate: strategy for sustainability

Abstract:

The Aflaj systems are an indigenous engineering technique for an ancient irrigation system in Oman. These were created by the ancient Omanis civilisation hundreds of years ago to supply water for irrigation and domestic use and have become an important part of the Omanis social life and heritage. Climate change has had a profound effect on the Middle East and has led to a rise in temperature, a drop in rainfall and droughts and heat waves in recent years. The 2008 Stockholm World Water Week and the third Water WDR concluded that “The main impacts of climate change on humans and the environment occur through water”. The effect of climate change in the *Aflaj* system is reflected by a degradation of *Falaj* numbers and a noticeable reduction of water flow which is being seen as a warning and that it is time to commence taking steps to reduce the effect of climate change and save these systems from extinction. The research shows the effect of climate change on the *Aflaj* system and examines the risks associated with climate change and its impacts on the *Aflaj* system. Given the importance of the *Aflaj* system to the Omanis society, the research will highlight the potential negative effects and recommend strategies to mitigate the risks.

Notes:



Name: Behnoosh Bazrafkan
Degree: Master of Engineering (Civil Engineering)
Supervisors: Professor Chris Chow
Dr John van Leeuwen
Professor Dongsheng Wang
Project title: Development of coagulation in optimised removal of environmental pollutants

Development of coagulation in optimised removal of environmental pollutants

Abstract:

Climate change and extended drought periods in recent years have led to changes in water quality across Australia such as increasing cyanobacteria and bloom events, as a result of lower flows and higher nutrient levels in the water. The experimental part of my research focused on the impact of simulated blue-green algal (BGA) bloom events on water quality and how these can affect conventional treatment plant operation. In this study, two algal species, *Microcystis aeruginosa* and *Cylindrospermopsis raciborskii* were added to natural water and jar tests were conducted with three coagulants *alum*, *ACH* and *HPAC* to simulate conventional treatment processes to assess the removal efficiency of the coagulants based upon a range of water quality parameters. Results indicate that the performance of coagulant is affected by the species of BGA cells present. In addition, BGA were found to increase the small molecular weight hydrophilic organic matter fraction which has been shown to be difficult to remove by conventional treatment processes. Difficulty in comparing the results and experimental conditions will be discussed in this presentation.

Notes:



Name: Gusri Yaldi
Degree: PhD Transport Systems Engineering
Supervisors: Professor Michael Taylor
Dr Wen Long Yue
Project title: Developing artificial Neural Network approach for travel demand modelling

Refining the performance of Neural Network approach in modelling work trip distribution by using Lavenberg-Marquardt algorithm

Abstract:

The Neural Network (NN) approach has been adopted in travel demand modelling over one decade ago. Especially in work trip distribution estimation, NN approach was reported to have poor generalisation ability. It was claimed to be unable to satisfy the Production and Attraction constraints and there was no mechanism to enforce it. This presentation will show a comparison of neural network model with different training algorithms and suggest the one that can overcome the aforementioned drawbacks. The NN model trained by using the Lavenberg-Marquardt (LM) algorithm generates work trip numbers with a statistically higher accuracy than the well-known and widely used gravity model. It can satisfy both constraints with the same level of goodness-of-fit as the doubly-constrained gravity model. Therefore, the use of LM algorithm is suggested as one of the mechanism to refine the NN performance and to satisfy the constraints for work trip number distribution forecast.

Notes:



Name: Mary-Anne Binnie
Degree: Master of Applied Science
Supervisor: Professor John Cann
Project title: Application of benthic foraminifera to infer Holocene sea-level changes in Northern Spencer Gulf, South Australia

Benthic foraminiferal assemblages in the Onkaparinga Estuary – potential tools for palaeo-environmental analysis and interpretations

Abstract:

Analysis of surficial sediment samples collected along the Onkaparinga Estuary, South Australia, revealed the distribution patterns of benthic foraminifera. The total assemblage provided seasonally and time averaged data of populations inhabiting the estuary where species diversity is low in the upper reaches of the estuary but increases seawards. It thus appears that species diversity and abundance has a positive relationship to salinity tolerance and proximity to the sea. *Ammonia beccarii* and *Elphidium excavatum*, species which are characteristic of euryhaline conditions, dominate the total assemblage. Mid-estuarine conditions are indicated by the mutual maximum occurrence of *Reophax barwonensis*, *Ammobaculites barwonensis* and *Trochammina inflata*. The appearance of shallow-water marine species such as *Elphidium crispum* and *Quinqueloculina poeyana* in the lower regions of the estuary signify marine incursion. All of these modern species are also present in the fossil record, thus have the potential as proxies for interpreting past estuarine environments.

Notes:



Name: Sheryn Pitman
Degree: PhD Environmental Management
Supervisor: Professor Chris Daniels
Project title: Achieving sustainability in urban landscapes

The Sustainable Landscapes project

Abstract:

The Sustainable Landscapes Project (SLP) is a collaborative partnership hosted by the Botanic Gardens of Adelaide. It began in 2004 in acknowledgement of the high demand for, and consumption of, resources in urban landscapes. The project demonstrates and promotes appropriate landscape design, plant species and materials selections and sustainable horticultural practices for South Australian environments. During the past five years the SLP has evolved, leading the way that urban landscapes are considered, designed and assessed for sustainability. The promoting of eight key principles has generated a more holistic approach to urban landscapes than has traditionally been the case, with many sites identified and created to demonstrate these principles. In the progress and evolution of this work many questions have been raised, including:

- What is the potential for achieving sustainability in urban landscape environments?
- How important is having an ecologically literate community to achieving improved urban landscape sustainability outcomes?
- What are the most effective methods of improving ecological literacy and of improving urban sustainability?

Questions such as these are guiding the development of this research project.

Notes:



Name: Cathryn Hamilton
Degree: PhD Planning
Supervisors: Assoc. Professor Jon Kellett
Professor Steve Hamnett
Project title: Mechanisms for local government to support carbon neutral households

Local government actions to assist households to reduce carbon emissions

Abstract:

Climate change is forcing governments at all levels to develop and implement policies and other mechanisms to mitigate the carbon pollution arising from human activities. While national and state or regional governments are setting targets for carbon reduction and developing mechanisms such as emissions trading schemes, or providing subsidies for low carbon renewable energy technology and improving energy efficiency, these top-down approaches are then implemented in various ways by local government authorities. Surveys and interviews of various local government authorities in Australia, United Kingdom and Germany have been completed to identify the types of initiatives being implemented or proposed at the local level to assist households to reduce carbon emissions. Initial results will be presented indicating that the initiatives are targeted to the areas of responsibility that local authorities have for the delivery or management of services to householders and motivated by achieving targets devolved to or reported against at the local level.

Notes:



Name: Jaruwit Prabnasak
Degree: PhD Transport Systems Engineering
Supervisors: Professor Michael Taylor
Dr Wen Long Yue
Project title: Modelling of travel demand behaviour under motorcycle dominant environment: a case study in a medium-sized urban area

An exploration of vehicle ownership and mode choice behaviour in mid-sized Asian city: A case study in Thailand

Abstract:

This presentation provides a preliminary analysis of the nature of mode choice and vehicle ownership in these mid-sized cities, using Khon Kaen City, Thailand as the principal study area. Potentially important factors are examined using an econometric method based on the Khon Kaen Daily Travel Survey 2007 (KKDTS07) database. Regarding the models estimated in the study, several household and socio-demographic characteristics and trip characteristics were found to influence travel demand in the study area. Trade-off between private cars and motorcycles is also captured in both vehicle ownership and mode choice models. It is also found that in the study area predictions of travel demand associated with cars seem to be much less complicated and more likely to provide a reliable outcome than those related to motorcycles.

Notes:



Name: Michael Heath
Degree: PhD Environmental Management
Supervisors: Dr Fleur Tiver
Ms Joan Gibbs
Project title: Direct seed mix and tubestocking treatments for degraded agricultural land restoration

Direct seed mix and tubestocking treatments for degraded agricultural land restoration, Pt. Wakefield, South Australia

Abstract:

It is important that land managers have accurate knowledge of how direct seeding should be best used in the revegetation of degraded agricultural land, as treatment requires large amounts of native seeds which are in limited supply. As part of my thesis I am comparing the success of sowing a low diversity seed mix with a high diversity seed mix for revegetating an agriculturally degraded semi-arid site. I will determine whether the low and high diversity treatments are adequate for revegetating the site. I will also compare the results of these treatments to neighbouring remnant ecosystems and previous revegetation attempts. The vascular plant communities are to be compared in terms of density, frequency, percentage cover, species richness, species diversity and percentage exotics.

Notes:



Name: Susilawati (Susi)
Degree: PhD Transport Systems Engineering
Supervisors: Professor Michael Taylor
Dr Sekhar Somenahalli
Project title: The development of travel time reliability metrics for Adelaide's corridors

Travel time reliability assessment for two arterial roads in Adelaide

Abstract:

Travel time reliability has become an important factor in route choice analysis and is one of the key indicators for traffic performance assessment. Given that the current parameters used to measure travel time reliability might not be sufficient to represent the travel time reliability given the observed significant variability in travel times, a better understanding of the distributions of individual travel times can help to provide new metrics for travel time reliability measurement. Previous studies suggested that travel time distribution might follow either normal or log normal distributions. From substantial new data observations undertaken in Adelaide, including assessment of eight years of travel time data from two major arterial road corridors, these distributions appear inadequate. There is evidence of positive skew and very long upper tails and even bimodality in the actual travel time. This research proposes the use of alternative statistical distributions for longitudinal observations of travel times.

Notes:



Name: Reazul Ahsan

Degree: PhD Planning

Supervisors: Assoc. Professor Jon Kellett
Dr Sadasivam Karuppannan

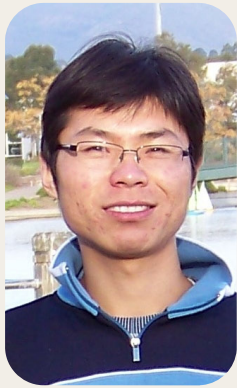
Project title: Climate change changing the urban planning system: A case study on Bangladesh

Climate change changing the urban planning system: A case study on Bangladesh

Abstract:

Over the last decade climate change impacts have forced the marginal rural poor to migrate to the urban areas from the coastal areas in Bangladesh. With one metre of sea level rise, 15 million people and 18 percent of the total land in Bangladesh will be affected. Such push factors caused by the climate changes are leading to a chaotic and overwhelming urbanization. Attendant congestion and pollution are choking urban growth as the tertiary level of impact. The total urban population in Bangladesh is 22.9 million and about 30 percent of these people (6.87 million) are extremely poor. About 25 percent of the extremely poor are forced to migrate because of climate change. Such unplanned migration changes the local physical environment and affects the planning system. Thus, planning policy needs to address the tertiary level impacts of climate change, the rapid urbanization, migration, and social structural changes. This study aims to conduct in-depth research on climate change and its tertiary impact on the urban planning process.

Notes:



Name: Shuaifei Zhao
Degree: PhD Civil Engineering
Supervisor: Assoc. Professor Linda Zou
Project title: Feasibility study of using forward osmosis to concentrate desalination brine

Why FO is more promising than RO?

Abstract:

With water scarcity and increasing demand for freshwater, various desalination technologies have been extensively applied to produce freshwater from alternative sources such as seawater and brackish water in the past several decades. Particularly forward osmosis (FO), as an emerging process, has recently received growing attention from numerous disciplines, such as water reclamation, wastewater treatment, seawater desalination, juice concentration, power generation and water purification. Compared with another membrane desalination technology reverse osmosis (RO), FO has many advantages: low or no hydraulic pressure, leading to lower energy consumption, lower costs and lower membrane fouling tendency. Overall, the wide range of applications and advantages of FO make it an attractive technology in water treatment and reuse.

Notes:



Name: Siti Zaharah Ishak
Degree: PhD Transport Systems Engineering
Supervisors: Dr Wen Long Yue
Dr Sekhar Somenahalli
Project title: The development of level crossing safety assessment model using Petri nets approach

The development of level crossing safety assessment model using Petri nets approach — model calibration and validation

Abstract:

This project presents the holistic approach in level crossing safety modeling by using Petri nets, mathematical modeling languages for the description of discrete distributed systems, with the use of data from South Australia as a case study. The Petri nets model will use the Australian Level Crossing Assessment Model (ALCAM) database — Level Crossing Management system (LXM) forming a basic guideline in identifying the most dominating parameters. The flexibility of the Stochastic Petri nets (SPN) and Petri nets tool Π -tools in dealing with qualitative and quantitative data makes it possible to use this approach in the real application of level crossing safety systems for South Australia.

This presentation will include discussions on the research work progress — model development process, sensitivity analysis, model calibration and validation.

Notes:



Name: Susan (Sue) Irvine
Degree: PhD Planning
Supervisor: Dr Lou Wilson
Prof Steve Hamnett
Assoc. Prof Jon Kellett
Project title: Integrating transit-oriented development (TOD) and 'green' affordable housing

Successful TODs

Abstract:

In a world faced with energy, water and climate challenges, successful transit-oriented development (TOD) offers the potential to address pressing environmental and social issues such as environmental sustainability, housing affordability and healthy urban communities. TOD has become increasingly popular with governments, planners and developers in low density cities designed for and highly dependent on private vehicle travel.

However, much development that has been labelled TOD lacks an essential pedestrian focus or 'walkability', high quality public amenities, diversity of site use and mix of dwelling types and sizes, all of which are needed for vibrant, liveable communities to emerge. Drawing on international practice, particularly in US cities comparable in size, density and level of car dependence to Australian cities, the factors which lead to optimal developments, as well as various obstacles, are examined. The presentation will incorporate images captured during the South Australian Government sponsored TOD study tour in the USA, Germany and France in May 2009.

Notes:



Name: Usama Abu Risha
Degree: PhD Environmental Management
Supervisor: Assoc. Professor Ian Clark
Project title: Recharge and evolution of great artesian basin groundwater at Dalhousie, South Australia

Constraining $^{36}\text{Cl}/\text{Cl}$ evolution models using ^{14}C

Abstract:

The occurrence of different sources and sinks of Cl and ^{36}Cl in groundwater complicates the use of the $^{36}\text{Cl}/\text{Cl}$ ratios to estimate its age. This study, for the first time, uses groundwater ^{14}C ages to constrain its $^{36}\text{Cl}/\text{Cl}$ evolution models. This application is invalid if the $^{36}\text{Cl}-\text{Cl}$ system is closed because no $^{36}\text{Cl}/\text{Cl}$ variations can be measured between any two unmixed ^{14}C -bearing waters. Contrarily, if “dead Cl” is added to ^{14}C -bearing groundwater, measurable $^{36}\text{Cl}/\text{Cl}$ changes may arise before the depletion of its ^{14}C content. In this case, groundwater ^{14}C ages can be used to determine the dead Cl addition rates and the $^{36}\text{Cl}/\text{Cl}$ evolution models. The results show that the $^{36}\text{Cl}/\text{Cl}$ evolution models of the studied southwestern Great Artesian Basin (GAB) groundwater samples are different, which reflects the complexity of the recharge, flow, and water-rock interaction processes of the GAB groundwater.

Notes:



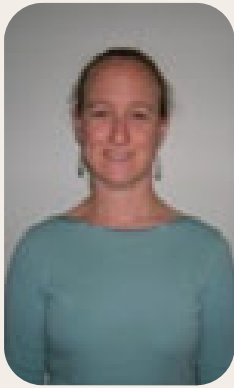
Name: Alaa Gabr
Degree: PhD Civil Engineering
Supervisor: Dr Don Cameron
Project title: Repeated load testing for primary evaluation of recycled concrete aggregate in pavements

Repeated load testing for primary evaluation of recycled concrete aggregate in pavements

Abstract:

This research will evaluate the suitability of Recycled Concrete Aggregate (RCA) materials for use in producing new basecourses for road applications. Adelaide based companies, ResourceCo and Adelaide Resource Recovery (ARR), are producing over 500,000 tonnes of RCA per annum. RCA is produced from crushing old concrete pavements and building components. The acceptance of RCA as pavement material has been limited because of the lack of laboratory and field performance data. The outcomes of this research study will add a new dimension to the technology of using RCA in new pavement construction and lead to the development of a unified national design standard for the application of RCA. The recycled aggregates tested may also be trialed with crushed brick or glass inclusions at various percentages by mass. A comprehensive series of laboratory tests will be conducted on the samples. Resilient modulus (repeated loading) tests will be conducted on well compacted specimens using cyclic triaxial test equipment. The influence of moisture content variation will be investigated. Trial pavements made from selected materials will be tested in a fully instrumented, laboratory controlled, pulsing pavement facility, which will simulate the influence of traffic more appropriately than cyclic triaxial testing.

Notes:



Name: Sally Freeman
Degree: PhD Transport Systems Engineering
Supervisors: Professor Michael Taylor
Dr Nicholas Holyoak
Project title: Vulnerability analysis of road networks: A case study of the urban road network of metropolitan Adelaide

Vulnerability analysis of the South Road / Anzac Highway intersection

Abstract:

Due to a number of catastrophic events, vulnerability analysis has been an area of increasing interest and research since the mid 1990s. This presentation seeks to apply some vulnerability measures to the South Rd / Anzac Highway intersection in 2006, before the construction of the Gallipoli underpass began. It considers the existing vulnerability metrics of importance and exposure, two measures of reliability. It also considers the measures for accessibility. As a two-year construction project at a major Adelaide intersection, long-term disruptions were faced by many travellers along the route. This implies that people eventually became accustomed to the changes in conditions before making their trips and hence adjusted their routes and trip timing accordingly.

Notes:



Name: Timothy Johnson
Degree: PhD Civil Engineering
Supervisor: Dr Don Cameron
Project title: Trees, stormwater, soil and civil infrastructure: Synergies towards sustainable urban design for a changing climate

Trees in built environments

Abstract:

Physical conflicts between tree roots and built infrastructure are well documented. The effects of sealed surfaces in urban streetscapes on tree growth are less well understood, with increased stormwater discharge, reduced soil moisture and lower soil oxygen levels possibly contributing to increased root conflicts with infrastructure, reduced tree health and reduced ecosystem service delivery. Monitoring of tree growth, soil moisture and soil oxygen levels over a three year period, followed by non-destructive examination of tree root systems, in purpose-built field trials constructed in 2009 will enable investigation of the influences of permeable footpath surfaces on tree and root development. It is anticipated that in Adelaide's semi-arid environment the rapid desiccation of permeable surface materials following rainfall events will limit shallow root growth and reduce conflicts with surface infrastructure while supporting development of deeper root systems and healthier trees. Quantifying these relationships may assist the improvement of infrastructure designs to reduce public asset lifecycle costs, to manage stormwater more effectively, and to reduce risk associated with damaged infrastructure.

Notes:



Name: Jeff Lawson
Degree: Master of Engineering
Supervisors: Dr John Van Leeuwen
Assoc. Professor Ian Clark
Project title: An improved understanding of the groundwater inflow into the Blue Lake, Mount Gambier, South Australia

An improved understanding of the groundwater inflow into the Blue Lake, Mount Gambier, South Australia

Abstract:

Mount Gambier is currently South Australia's largest rural city with a population of about 25,000 people. Its municipal supply comes from the iconic Blue Lake. Various studies have been conducted on the lake, including the determination that the feed source for the lake was from the unconfined aquifer. Recent work by Li *et al.* has shown that the Gambier limestone (unconfined aquifer) can be divided into 7 distinct units. This study starts at this point and will investigate the following aspects:

- Map the limestone units and faulting found within the Blue Lake Capture Zone.
- Map the limestone units contained within the Blue Lake including its base configuration.
- Map the limestone fracture direction and preferred groundwater inflow path.
- Water chemistry inside and outside the lake and its relationship to the limestone sub units.

Notes:



Name: Rosmala Dewi

Degree: PhD Environmental Management

Supervisor: Dr John Van Leeuwen

Project title: Optimized bio-treatment of pulp and paper mill

Comparison of raw and pre-treated pulp and paper mill effluent in a laboratory-scale secondary aerobic lagoon treatment system

Abstract:

Secondary Aerobic Lagoons (SAL) are used for biological wastewater treatment of effluents from the pulp and paper industry. Operation of these systems is straightforward and requires minimal monitoring and control, which render them as an economical wastewater treatment option. The effluent produced from this process may lead to variable improvements based on different wastewater quality parameters. Hence, other options may need to be considered and adopted to optimize the overall process. This study aims to optimize the treatment of wastewaters from a pulp and paper mill by conventional coagulation and by SAL treatment system. The SAL comprises a continuous stirred tank reactor, plug flow tank and stabilization tank. Results indicate that use of coagulation by alum as a pre-treatment step allows for high percentage removal of phosphorus and colour and significant percentage removals of COD. However, there is insufficient removal of BOD₅ and consequently biological treatment, SAL is needed. For reduction of BOD₅, nutrients are required to support microbial activity for degradation of the organics. This requires management of the process to ensure sufficient P remains present or addition of P to the post coagulated wastewater.

Notes:



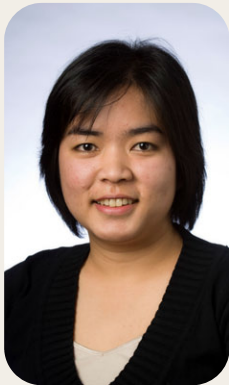
Name: Wei Zhang
Degree: PhD Civil Engineering
Supervisor: Assoc. Professor Linda Zou
Project title: New nanocomposite of porous materials and visible light sensitive catalysts for efficient wastewater purification

New nanocomposite of porous materials and visible light sensitive catalysts for efficient wastewater purification

Abstract:

This project is aimed at combining the visible light sensitive TiO₂ nanoparticles with the porous adsorbent such as activated carbon and zeolite, to design a new hybrid adsorbent that is able to not only trap the dissolved organic compounds but also decompose them efficiently in-situ. Three important features of this research are: 1) the developed material can achieve trapping and decomposing of dissolved organics within one process, without generating any waste for disposal; 2) the cutting edge TiO₂ nanoparticles will be sensitized under visible light condition, no UV irradiation is required; and 3) the increased adsorption of dissolved organics on the surface of catalysts will accelerate the degradation reaction. As a result, the new nanocomposites are expected to have higher photocatalytic activities under visible irradiation. The proposed research will be a significant innovation in water treatment field that reduces the energy consumption, uses low cost materials and targets real applications.

Notes:



Name: Jintawadee Suksri
Degree: PhD Transport Systems Engineering
Supervisors: Dr Raluca Raicu
Dr Wen Long Yue
Project title: Sustainable urban freight transport

Will less traffic be the consequence of online shopping?

Abstract:

The development of information and communication technology as well as the growth of electronic commerce (e-commerce) have significantly changed the way businesses and individuals do things. The advance in information and communication greatly influences the distribution of goods to be timely, reliable and flexible. Over the years online shopping is becoming more popular which results in changes in distribution patterns particularly in regards to home delivery.

This presentation will discuss the current e-commerce practices with particular focus on home delivery operation. The emerging issues and concerns on the impacts of e-commerce on urban freight transport and the environment will be discussed. E-commerce offers potential and challenges for achieving efficient and sustainable urban freight distribution systems.

Notes:



Name: Alexander (Alec) Townsend
Degree: PhD Environmental Management
Supervisor: Assoc. Professor David Bruce
Project title: Understanding the electricity demand/supply relationships of the Australian economy to determine the optimum location of new, low CO2 emission, electricity infrastructure.

The use of night-time lights satellite imagery as a measure of regional electricity consumption.

Abstract:

Satellite imagery of Earth at night has been used as a measure of regional electricity demand. The accuracy of night-time light imagery is limited by the diffraction of light by the atmosphere into surrounding areas, such that the image of Earth at night over-estimates the extent of human development and electricity demand. This presentation represents work on increasing the accuracy of night-time satellite imagery for use in energy modelling. The work has application for those regions of the world where data on electricity consumption may not be publically available due to commercial confidentiality, such as in Australia, or where the data has not been collated, such as many parts of the developing world. The corrected imagery provides an essential digital layer for use in electricity demand/supply modelling as the world moves into the future low carbon economy. This initial work is the first part of a more detailed hourly electricity demand model of Australia being developed, which is to be central to a comprehensive hourly demand/supply Australia Electricity Model that integrates the hourly supplies from solar, wind, biomass, landfill gas, natural gas, coal, and fossil fuels with carbon capture and storage (CCS).

Notes:



Name: Philip Roetman
Degree: Master of Applied Science
Supervisors: Professor Chris Daniels
Dr Delene Weber
Project title: Using Citizen Science to study Citizen Science: an analysis of Operation Possum and the benefits of community involvement in research

How can Citizen Science influence community attitudes?

Abstract:

Citizen Science is a research methodology that enables both data collection and education through a bilateral exchange of information between scientists and the wider community. This method of research is gaining in popularity, and techniques for engaging the community and collecting data are being refined. Proponents of Citizen Science, when listing its benefits, usually begin with how it enables extensive data collection. Indeed, this benefit is considerable; but it is the interaction between scientists and the community, and the ability for projects to inform both groups, that are perhaps the most exciting outcomes of this approach. In particular, community-gathered information, presented back to the community, can have considerable benefits. Because it represents the voice of the community, such information can strongly influence the attitudes and behaviour of individuals.

Notes:



Name: Steven Nothrop
Degree: PhD Civil Engineering
Supervisors: Dr John Van Leeuwen
Professor DongSheng Wang
Assoc. Professor Chris Chow
Mr Andrew Everson
Project title: Coagulation, sedimentation and sludge processing for the treatment of coloured waste water

Coagulation, sedimentation and sludge processing for the treatment of coloured waste water

Abstract:

Further regulatory guidelines for Kimberly-Clark Australia (KCA) waste water will be introduced in 2014. Existing waste water treatment at KCA includes primary clarification for suspended solids reduction followed by Aerated Stabilisation Basins for reducing BOD to regulatory standards before discharge into Lake Bonney South East via the English Gap drain. Reductions in colour, phosphorus, nitrogen and carbon will be required to comply with revised regulations. This research will consider the effectiveness of coagulation and flocculation for efficient removal of colour, BOD, carbon and nutrients from the KCA waste water utilising the redundant KCA #1 clarifier for sedimentation. This research will also consider effective sludge processing applications for efficient dewatering and composting of sludge produced utilising the existing KCA FKC Rotary Screen Thickener and steam heated FKC Screw Press together with composting operations at Van Shaik's Bio Grow.

Notes:



Name: Ying Yan Qu

Degree: PhD Civil Engineering

Supervisor: Professor Simon Beecham

Project title: Modelling of unsteady flows in siphonic roofwater harvesting systems

An unsteady flow model for siphonic roofwater harvesting systems

Abstract:

The Adelaide community is now more aware of the importance of resource conservation and reuse, especially regarding water. It is evident that treating stormwater as a waste product to be disposed of quickly into urban streams is becoming a less acceptable stormwater management option. It is also clear that amongst the alternative supply options under discussion, stormwater reuse is being considered. Both large and small-scale systems for stormwater reuse are being pursued to alleviate the Australian 'water crisis'.

Despite these aims, harvesting and reusing roofwater in highly built up commercial and industrial areas, and particularly in CBDs, is a major challenge. The aim of this project is to provide a new type of modelling tool that will facilitate the harvesting and reuse in such areas. The project will produce the first unsteady flow model for siphonic roofwater harvesting system. This will provide a useful tool for industry and will lead to more roofwater harvesting from large buildings.

Notes:

Research Students Unable to Present



Name: Helen Waudby
Degree: PhD Environmental Management
Supervisor: Dr Sophie “Topa” Petit
Project title: The role of cracking clay soils in maintaining rangeland biodiversity in South Australia: implications for sustainable management of arid-zone landscapes

The role of cracking clay soils in maintaining rangeland biodiversity in South Australia: implications for sustainable management of arid-zone landscapes

Abstract:

Rangelands constitute most of the Australian continent; pastoralism is the dominant commercial industry. Cracking clay soils are patchily present throughout the arid rangelands. These clays may be important for maintaining rangeland biodiversity; but, this role and the effects of grazing on cracking clays have not been quantified. I aim to determine the role of cracking clays in maintaining rangeland biodiversity. I will relate crack characteristics to shelter properties and species’ use, identify arid-zone food webs in cracking clay areas, compare biodiversity between grazed and less-grazed sites, and determine if cracks help maintain seed viability. Shelter studies commenced in winter 2009 and data loggers (inside and out of cracks) recorded temperature and humidity over a 24-hr period. Temperature ($p = 0.003$) and humidity ($p < 0.001$) inside cracks differed significantly from outside of cracks. Over 6 507 trap nights, five mammal and ten reptile species have been caught, including a plains rat (*Pseudomys australis*).

Notes:



Name: Thanh Hai Phan
Degree: PhD Project Management
Supervisor: Assoc. Professor Justin Cole
Assoc. Professor George Zillante
Project title: Official Development Assistance (ODA) in Vietnam: analyses and lessons being learned from their development and project implementation

Initial findings of Official Development Assistance (ODA) development in Vietnam from 1993 to 2007

Abstract:

Official Development Assistance (ODA) is a resource for promoting social and economic development of developing countries, and of particular relevance to this research, the Socialist Republic of Vietnam. This project has been undertaken with the objectives of improving ODA development and project implementation in Vietnam, and also contributing further project management perspectives to current knowledge. This research has been investigated and analyzed by studying three research questions relating to ODA development and project implementation in Vietnam from 1993 to 2007, and using appropriate research methodologies in both data collection and analysis. Over the period 1993-2007, Vietnam has achieved many remarkable socio-economic developments by ODA resources. However, during this period, Vietnam still has many issues which reduce effectiveness of ODA development and project implementation. This research has identified that many of these issues can be related to a lack of knowledge of Project management principles and practices of the organizations responsible for project implementation in Vietnam. Therefore, this research has proposed recommendations in order to resolve those issues.

Notes:

Name:	Wella Hewage Chathurika Subhashini
Degree:	PhD Civil Engineering
Supervisors:	Dr Guna Hewa Alankarage Mr David Pezzaniti
Project title:	Methodologies to assess the performance of Water Sensitive Urban Design (WSUD) measures in maintaining natural status of flow regimes of urbanised catchments

Methodologies to assess the performance of Water Sensitive Urban Design (WSUD) measures in maintaining natural status of flow regimes of urbanised catchments

Abstract:

Developing natural catchments into urbanised areas are inevitable due to escalating population growth. Urbanisation of a catchment increases its imperviousness which affects the entire catchment hydrology from extreme floods to low flows. The purpose of this study is to quantify how different degrees of urbanisation affect high, medium and low flow regimes and assess the performance of WSUD measures in maintaining pre-urbanised status of the selected flow regimes. To evaluate the effectiveness of current WSUD measures, the catchments will be modelled using continuous simulation of SWMM at three different scenarios viz. natural, urbanised and maintained conditions. The urbanisation impact on flood, 'dominant' and low flow regimes of different urbanised scenarios and maintained scenarios will be quantified and compared with the natural flow regimes. Hence the ability of WSUD measures in maintaining natural flow regimes in urbanised catchments is assessed.

Notes:
