Sino-Australian Research Centre for Coastal Management (SARCCM) 2013 Report

Dr Xiao Hua Wang (王小华)
(SARCCM Director)

Cover Image:

Pictured at ***The Fourth Sino-Australian Research Centre for Coastal Management Advisory/Management Committee Meeting*** held at **Ocean University of China, Qingdao 25 October 2013** are (left to right front row): **A/Prof. Andrew Neely; Prof. Warrick Lawson; Prof. David Lovell**; **Prof. Xiulin Wang**, Vice Chairman of Qingdao Chinese People's Political Consultative Conference (CPPCC); **Prof. David Raftos**, Deputy Chair of the Scientific Advisory Committee for Sydney Institute of Marine Science (SIMS); **Prof. Michael Frater**, the Rector of UNSW Canberra, **Prof. Dexing Wu**, the President of OUC and Chair of the SARCCM Advisory Committee, **Prof. Joseph Lai**, Associate Dean International, UNSW Canberra; **A/Prof. Stuart Pearson**, SARCCM Team member; **A/Prof. Xiao Hua Wang**, UNSW SARCCM Director**; Prof. Hua Dai**, Director of International Office of OUC; and **Prof. Michael O'Donnell**.

Centre Contacts:

Assoc. Prof. Xiao Hua Wang,
Director The Sino-Australian Research Centre for Coastal Management,
UNSW Canberra at the Australian Defence Force Academy
PO Box 7916
Canberra BC ACT 2610

Email: Please use *sarccm@adfa.edu.au* to contact the Centre by email.

Website: *http://pems.unsw.adfa.edu.au/SARCCM*

Other Useful Contact in Australia:

- **Assoc. Prof. Xiao Hua Wang (Director, Advisory Committee, Management Board, SARCCM Team)**
- **Emeritus Prof. Brian Lees (Management Board, SARCCM Team)**
- **Prof. Jenny Stewart (SARCCM Team)**
- **Prof. Ric Pashley (SARCCM Team)**
- **A/Prof. Sik-Cheung Robert Lo (SARCCM Team)**
- **A/Prof. Stuart Pearson (SARCCM Team)**
- **Ms Julie Kesby (Research Officer - SARCCM Team)**

Objectives of the Centre:

The objectives of this joint research centre are:

- to develop a state-of-the-art integrated coastal zone marine forecasting and management system in order to address key issues in coastal zone management;
- to provide best research supervision and training facilities to the students in the field of coastal zone management in China and Australia; and
- to enhance research capacity for collaboration by forming a network of coastal scientists, engineers and managers from Australia and China.

Director's Report/About the Centre:

The Sino-Australian Research Centre for Coastal Management (SARCCM) was established in November 2010. SARCCM is a Research Centre of the University of New South Wales with a multidisciplinary/multi-faculty focus. It works closely with the Ocean University of China (OUC is one of UNSW MOI universities, and a key partner for the BEZ construction in China) in collaborative research on coastal science and management. The UNSW Canberra campus and several faculties of UNSW in Sydney contribute to the Research Centre. SARCCM has strong team of 18 researchers from UNSW and its collaborative organizations, as well as 2 external funded postdoctoral fellows, 12 HDR students, one Visiting Fellow from OUC and 2 other short term Visiting Fellows.

Highlights for 2013 include:

1. In December, ABC Radio Australia ran an interview reporting our work (**A/Prof. Xiao Hua Wang**) that tidal flat reclamation on the east coast of China will flood the west coast of Korea (http://www.radioaustralia.net.au/international/radio/program/asia-pacific/south-koreas-west-coast-vulnerable-to-chinas-unbridled-development/1238900)
2. In November, three SARCCM members (**A/Prof Robert Lo, Chris Lane and A/Prof Stuart Pearson**) were invited to speak at the third *China Qingdao International Blue Economy Forum*.

These are examples of growing profile and strengthening collaborations with China's academics, government and business through SARCCMs research collaboration.

Other 2013 highlights are:

- 3 HDR graduations, all gaining postdoc/academic employment including two now working at OUC and Zhejiang University (C9)
- Two OUC Canberra grants totalling $98K
- 11 publications
- 8 meetings and workshops.

If you are interested in working with us at SARCCM, in collaborative research or as a postgraduate, please contact us to discuss how we might progress our common interests. We look forward to working with you.

Associate Professor Xiao Hua Wang (王小华) (SARCCM Director)

Advisory Committee:

- Prof. Dexing Wu (吴德星)
- Prof. Ping Shi (施平), The South China Sea Institute of Oceanology, Chinese Academy of Sciences
- Prof. Michael Frater
- A/Prof. Xiao Hua Wang (王小华)
- Prof. Xiangmin Xu (徐祥民)
- Dr Junji Song (宋军继)
- Mr Xiaohua Bu (卜笑华)
- Industry advisor (1x)
- Government Department representatives (1x)

Management Board:

Australia:
Director:
A/Prof Xiao Hua Wang (王小华)
Management Board:
Prof. Michael Frater
A/Prof. Xiao Hua Wang (王小华)
Emeritus Prof. Brian Lees
A/Prof. Linlin Ge (葛林林)

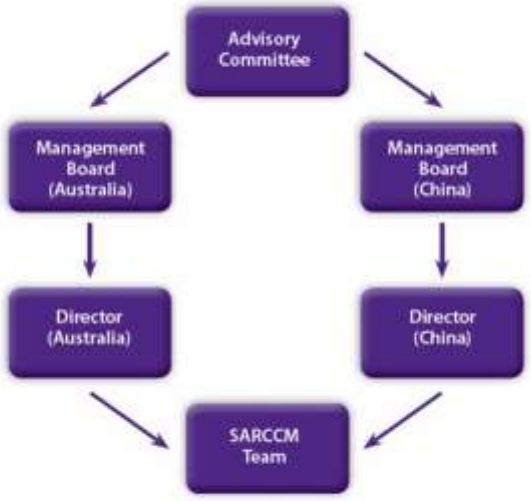
China:
Director:
Prof. Xiangmin Xu (徐祥民)
Management Board:
Prof. Dexing Wu (吴德星)
Prof. Xiangmin Xu (徐祥民)
Prof. Huajun Li (李华军)
Prof. Yinjie Ma (马英杰)

SARCCM Team:

Australia:
A/Prof. Xiao Hua Wang (王小华)
Emeritus Prof. Brian Lees
Prof. James Goff
Prof. Jenny Stewart
Prof. Ric Pashley
Prof. John Morrison
Prof. Andrew Short
A/Prof. Sik-Cheung Robert Lo
A/Prof. Stuart Pearson
A/Prof. Linlin Ge (葛林林)
Dr Xiuping Jia (贾秀萍)
Mr Christopher Lane
Dr Jian Zhang (张剑)
Dr David Leary
Dr Matthew Browne
Dr Younjong Sun (Research Associate)
Ms Julie Kesby (Research Officer)

China:
Prof. Xiangmin Xu (徐祥民)
Prof. Huajun Li (李华军)
Prof. Ge Chen (陈 戈)
Prof. Gang Fu (傅 刚)
Prof. Guifang Xue (薛桂芳)
Prof. Jie Bai (白 洁)

Centre Governance:



Sino-Australian Research Centre for Coastal Management

Collaborative Organisations:

- The University of New South Wales (UNSW)
- School of Earth and Environmental Sciences, University of Wollongong (UOW)
- CoastalCOMS
- Ocean University of China (OUC)
- Yantai Institute of Coastal Research, Chinese Academy of Sciences (YIC)
- State Oceanic Administration of China (SOA)

Research Programs

The centre has established five research programs to address key issues in coastal oceanography, coastal engineering, remote sensing, marine policy and law, climate change and socio-economics:

1. The coastal oceanography focuses on development and evaluation of the coastal ocean observing and forecasting system and its socio-economic impact.

2. The coastal engineering concentrates on engineering issues in the risk management in coastal infrastructure.

3. The remote sensing concerns the gap of Chinese/ Australian capacity for utilizing spaceborne measurements in the framework of an operational ocean forecasting system.

4. The marine policy and law aims at analysis of similarities and differences of legal and regulatory frameworks related to the coastal zone management of the two countries.

5. The climate change and socio-economics focuses on planning policy formulation to deal with the major socio-economic impacts of climate change on the coast.

Program 1 - Coastal Oceanography

Development and evaluation of the coastal ocean observing and forecasting system (COOFS) and its socio-economic impact

Program responsibility: Assoc. Prof. Xiao Hua Wang, Prof. John Morrison, Dr Younjong Sun

Objectives:

- To develop regional COOFS in China and Australia
- To explore the relationship between COOFS and potential benefit- related sectors
- To evaluate the potential economic benefits that different users and public agencies can gain from COOFS information and related services. We will narrow our research to two potential benefit related sectors: maritime transport and commercial fishing
- To conduct the cost-benefit analysis of COOFS in China and Australia.

Description of work:

We will firstly investigate the current COOFS facilities in coastal seas both in China and Australia such as Bohai and Yellow Seas and the Australian eastern seaboard including the Great Barrier Reef region, and explore the extent to which COOFS has been used by coastal managers. To evaluate the potential economic benefits from COOFS, as being widely used in the literature, the constant percentage increase evaluation method will be the main evaluation method. But the specific percentage such as 1% increase evaluation method may underestimate the economic benefits from the advanced ocean observing system. Therefore more advanced model will be developed. We will focus on the following sectors of the economy: maritime transport and commercial fishing.

Deliverables:

- A socio-economic benefits evaluation of COOFS in China and Australia that can provide economic evidence as how COOFS information could benefit potential beneficiaries; and assist in persuading the potential beneficiaries to use the products of COOFS.
- A cost-benefits analysis report for COOFS in China and Australia
- A set of management recommendations aimed at a more scientifically rigorous approach to the distribution of these COOFS facilities.

Program 2 - Coastal Engineering

Risk management in coastal infrastructure

Program responsibility:
Assoc/Prof. Robert Lo

Objectives:

This program addresses engineering issues in the management of coastal infrastructure. The time scale is current to tens of years into future, and the assumption is the infrastructure either exist or will exist in some form within the time scale being considered.

- The broad objectives are:
- To identify special loadings and management issues with coastal infrastructures
- To develop risk management models
- To investigate effect of climate change and thus develop risk mitigation plan

Description of work:

- Evaluate current management practice
- Structural health monitoring
- Extreme event analysis
- Probability modeling (collaborate with remote sensing)
- Consequence analysis (collaborate with economist)
- Effect of climate change on the probability models (collaborate with oceanographer and/or climate specialist)
- Risk mitigation (engineering approach)

Program 3 - Remote Sensing

Review and utilization of space-borne observing systems

Program responsibility: Assoc/Prof. Linlin Ge, Dr Xiuping Jia

Objectives:

In this task, we will examine and assess to which extent the routine measurements from spaceborne sensors are combined and used together with model-based forecasting systems. The outcome shall form the basis of a series of recommendations concerning bridging the gap of Chinese/Australian capacity for utilizing spaceborne measurements in the framework of an operational ocean forecasting system.

Description of work:

- Collect the information on the satellites which will be launched until 2010 in both China and Australia for coastal ocean observation (SST, wind, waves, sea ice, ocean colour and surface current).
- Investigate if the existing algorithms of retrieving the ocean environmental parameters match the goals of ocean applications in the China Seas and Australia waters.
- Recommendations for future Chinese/Australian satellite programs.

Program 4 - Marine Policy and Law

Comparative research on legal and regulatory frameworks related to CZM in China and Australia

Program responsibility: Prof. Jenny Stewart, Assoc. Prof. Stuart Pearson, Dr Jian Zhang, Dr David Leary, Shengnan Chen

Objectives:

Analyse the similarities and differences of legal and governance frameworks related to CZM and maritime security of the two countries and provide policy recommendations in relation to these frameworks. Identify what lessons Australia and China can learn from each other's experience.

Description:

- A comprehensive assessment and analysis of legal and governance framework related to CZM and maritime security of the two countries;
- Comparison of the similarities and differences of legal and governance framework related to CZM and maritime security in the two countries;
- Facilitation of joint collaborative research in international law and environmental law related CZM.

Specific issues including:

- Management of Environmental impact-environmental impact assessment processes;
- Planning and development in the coastal zone;
- Reconciling conflicts with stakeholders;
- Employment of economic instruments in achieving legal and policy objectives;
- Domestic policy-making process in China in the area of maritime security; and
- Management of environmental impact associated with energy exploration and exploitation (oil and gas) and off-shore renewable energy generation, shipping, fishing and pollution (both land based sources and vessel source);
- Australian and Chinese approaches to international law, Antarctica and the Southern Ocean.

Approaches to achieve the purpose and objectives:

- Sectors industries impact effectiveness law-making process
- Legal framework /policy initiatives /institutional structure

Deliverables:

- Identifying the areas that the two countries can learn from each other in CZM;
- Provide policy recommendations in relation to the CZM legal and governance frameworks by submitting an edited volume.

Program 5 - Climate Change and Socio-economics

Policy design for mitigating socio-economic impacts of climate change on coastal zone

Program responsibility:
Prof. Brian Lees

Objectives:

This task focuses on planning policy formulation to deal with the major socio-economic impacts of climate change on the coast. These appear to be driven by (1) climate-driven sea level rise, and (2) changes in storm frequency. The former is already the subject of numerous studies but this task looks at planning policies to mitigate the socio-economic impact of these drivers operating jointly.

Key Scientists – SARCCM

Assoc. Prof. Xiao Hua Wang graduated from Ocean University of China, and holds a PhD in Physical Oceanography from James Cook University in Australia. He is the Founding **Director of the Sino-Australian Research Centre for Coastal Management**, University of New South Wales, Australia. He has been appointed as an Adjunct Professor at the Ocean University of China. He has over 20 years experience in both undergraduate and postgraduate teaching. His research concerns numerical modelling of water circulation, bottom boundary layer and sediment transport dynamics in estuaries and coastal oceans. He has over 50 publications including peer-reviewed journal papers, book chapters, international conference abstracts and government/technical reports. His work has been funded by a variety sources including the Australia Research Council, the EU Framework, and US Office of Naval Research.

Much of Xiao Hua Wang's research work is based on numerical modelling and this has included modelling water circulation in estuaries and coastal embayments, bottom boundary layer dynamics in estuaries and ocean basin. In recent years his work has been involved in understanding and modelling sediment transport and nepheloid layer (fluid-mud layer) effects on the bottom boundary layers in coastal seas. This research has largely been based on the Adriatic Sea (Italy), Yellow and East China Seas and Jervis Bay (New South Wales, Australia). His work on bottom boundary layers and sediment transport has been his major and most important research contribution to international Oceanography, and the results of this work have been applied to the study of biogeochemical processes in marine ecosystems and coastal management. This is both innovative and cutting-edge research. He has been involved in several international collaborative projects with both European and US scientists. He spent 6 months at Princeton University USA in 1995; 5 months in the Institute of Atmospheric and Oceanic Sciences-CNR, Italy in 1999 as a visiting scientist; 5 months at the University of Bologna Italy in 2001 as a visiting professor; and 4 months in Woods Hole Oceanographic Institution in 2005 as a guest investigator. From 1999-2004, he spent approximately one month per year in Bolonga, Italy to conduct his study about the Adriatic Sea. Since 2005, he has spent one month per year in China to study sediment dynamics in the Yellow and East China Seas.

Professor James Goff is the **Director of the Natural Hazards Research Laboratory and Australian Tsunami Research Centre at the University of New South Wales**. He is an expert on tsunamis, earthquakes and cyclones with interests in geology, geomorphology, Traditional Environmental Knowledge, numerical modeling, hazard, risk and vulnerability assessment, disaster and emergency management, community education and awareness. He has worked extensively with national and local governments, universities and government agencies throughout the Pacific on a range of hazard and risk assessment projects.

His international experience amongst other things includes UNESCO-IOC tsunami surveys for Papua New Guinea (1998); Vanuatu (2000); Indonesia, Thailand, Sri Lanka, the Maldives (2004); Indonesia (2006); Wallis & Futuna, Samoa (2009); and Chile (2010). Over the past 20 years he has carried out extensive natural hazard research in the Pacific region including New Zealand, Australia, Vanuatu, Samoa, Hawaii, Papua New Guinea, Wallis & Futuna, Canada and the Pacific Northwest USA. James is an **Adjunct Professor at the University of Hawaii** and **Research Associate at the University of Auckland**.

Emeritus Professor Brian George Lees graduated from the University of Sydney with a PhD studying the sediment dynamics of shallow, tidal seas. He is Editor of the International Journal of Geographic Information Science, is on the editorial boards of GEOINFORMATICA and Transactions of the Institute of British Geographers, and has just completed a term on the editorial board of *Transactions in GIS*.

Professor Lees is **Chairman of the International Geographical Union Commission on Geographical Information Science**, and also as a Member of the Australian Academy of Science National Committee for Geography. He has received a number of awards for his work including the Australasian Institute of Spatial Information Science and Technology (AISIST) Prize in recognition of a "substantial contribution to the study of the science of Urban and Regional Information Systems", 1997; the Land Victoria Fellowship, University of Melbourne, 1999 and the Eminent Individual Award; Australasian Urban and Regional Information Systems Association (AURISA) 1999. He was made a Fellow of the Australasian Urban and Regional Information Systems Association in 2003, a Fellow of the Spatial Science Institute in 2005, and a Fellow of the Institute of Australian Geographers in 2009. Professor Lees has been appointed as a **Special Invited Professor**, Institute of Soil and Water Conservation (ISWC), Chinese Academy of Sciences, Yanling, as an **Adjunct Professor** in the State Key Laboratory of Resources and Environmental Information Systems (LREIS), Institute of Geographical Sciences and Natural Resources Research, Chinese Academy of Science, Beijing, and as a **Member of the Academic Consultative Committee**, Key Laboratory of Virtual Geographic Environment, Nanjing Normal University, Ministry of Education, China.

Professor Lees maintains an active research program focused on aspects of Global Change. The first phase was the construction of a database of geomorphic evidence for past climate change across coastal northern Australia. In the second phase he set up a research program to improve the reliability of change detection techniques. This led to work in adapting inductive and data driven modelling techniques to the

predictive mapping of land cover and land degradation. He and his students have built up comprehensive GIS databases based on a range of field sites. These have been used to test, and refine the use of inductive learning, and other artificial intelligence techniques such as neural networks and genetic algorithms, for environmental management. They have been very successful. His research activity continues to be the development and application of tools to carry out integrated analysis of global data.

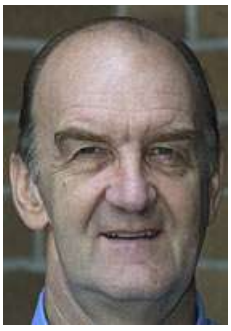
Professor Andrew Short is a **Senior Coastal Scientist with CoastalComs**, and has a wealth of experience in coastal research, teaching and publication. He has degrees from the University of Sydney, University of Hawaii and Louisiana State University, completing his masters on the balmy beaches of Hawaii and PhD (Marine Science) on the frigid beaches along the north coast of Alaska, where there is surf amongst the ice. He has since studied coastal systems throughout North and South America, Ireland, the UK, Europe and New Zealand, and the entire Australian coast.

Andrew is the author of 12 books, seven covering every beach in Australia, and in 2008 published The Coast of Australia, the definitive book on Australia's coastline. He has also written more than 200 publications covering a wide range of coastal topics.

Since 1987 he has worked closely with Surf Life Saving Australia, developing the Australian Beach Safety and Management Program, in the process generating a database on every Australia beach and developing the beach hazard rating system. He assisted Surf Life Saving New Zealand, Surf Life Saving Great Britain and the Hawaiian Lifeguard Association to develop similar programs. More recently he helped organise and opened the First International Surfing Reef Symposium and as co-founder of National Surfing Reserves Australia he has assisted in the dedication of five iconic Australian surf breaks as National Surfing Reserves.

Professor Jenny Stewart joined the School of Business in July 2009 as **Professor of Public Policy, UNSW Canberra**. Before joining the School Jenny was Associate Professor of Public Policy at the University of Canberra and prior to that until 1993, Jenny was a policy adviser in the Australian Public Service, working in a number of agencies, including the Australian Science and Technology Council.

Jenny researches, teaches and writes in the fields of policy analysis, change management and public sector reform. Her books include *The Lie of the Level Playing Field*, (Text Publishing 1994), *Renegotiating the Environment: The Power of Politics* (co-authored with Grant Jones and published by Federation Press in 2003) *The Decline of the Tealady: Management for Dissidents* (Wakefield Press, 2004). Later this year, Palgrave Macmillan will publish Jenny's monograph *Public Policy Values*. She is currently developing a major project linking public policy and governance. A recent book is *The Dilemmas of Engagement: The Role of Consultation in Governance*, ANU e-press and Australian New Zealand School of Government, 2009 http://epress.anu.edu.au/dilemmas_citation.html.



Professor John Morrison is a **BHP Professor of Environmental Science, University of Wollongong**. He has used his expertise in environmental analytical chemistry to develop new techniques for studying the movement of elements between the solid and aqueous phases of ecosystems. Much of this effort has focused on systems where salinity contributes to the analytical difficulties. In addition, a substantial body of work has been completed on the transport and transformation of elements in the complex estuarine environments where conditions of salinity, oxygen and other element concentrations and turbidity are constantly changing. Prof. Morrison has worked in United Kingdom, United States of America, Australia, New Zealand, Uganda, Fiji, Tonga, Samoa, Solomon Islands, Vanuatu, Kiribati, Nauru, Federated States of Micronesia, Marshall Islands, Guam, China, Vietnam, Thailand. He also visited or carried out short consultancies in about 20 other countries in Africa, S.E. Asia, Europe, South America and the Pacific. He has over 200 publications including more than 80 papers in refereed journals, over 30 book chapters and over 20 major technical reports on marine pollution, estuarine lake and lagoon water quality, environmental impact assessment, sediment quality, port environments, hazardous chemicals management.

With professional colleagues and postgraduate students, currently investigating the following:

- Scientific study and management of coastal and estuarine water bodies in NSW.

- Marine pollution problems in the South Pacific with particular reference to land based sources, lagoons and river discharges into the marine environment.
- Chemistry, mineralogy and ion exchange properties of Pacific Island soils including nutrient cycling; genesis and taxonomy of Pacific Island soils
- Environmental projects in the Sydney/Illawarra region of NSW, Australia, including, land-based re-use of sewage sludge and effluent, phosphorus management in coastal catchments, acid sulfate soils management, waste management, trace (heavy) metals in southern NSW.

Professor Ric Pashley obtained his PhD from Imperial College, London before moving to Australia in 1978. Since then, he worked at the ANU as Professor of Chemistry where he also served as Dean of the Faculty of Science, Chair, Board of the Faculties and as DVC (Education). In 2009, he was appointed the Founding Chief Investigator of the new National Centre of Excellence in Desalination, Murdoch University, Perth. He took up his current position as **Research Professor at UNSW Canberra** in September 2010.

Prof. Pashley's main research interests include:

- Water treatment and purification, water recycling, desalination, membrane filtration and fouling.
- Emulsion and colloidal stability and flocculation.
- Properties of electrolyte and surfactant solutions.
- Experimental and theoretical study of forces between surfaces and colloidal particles.

Assoc. Prof. Stuart Pearson is a **Geographer at UNSW Canberra**. He has a range of research and communication management experiences in leading agencies and has demonstrated expertise at preparing scientific knowledge for adoption. He is committed to having an impact on natural resources through ensuring management brings appropriate science to work. His current involvement with the Sino-Australian Research Centre for Coastal Management includes:

*Shengan Chen's PhD project on a Comparative analysis of the Legal and Regulatory Frameworks Related to Integrated Coastal Zone Management in China and Australia

*Bo Dong's PhD project on Biofuel Research, Policy and Adoption in Agricultural Systems: A Comparison of China and Australia.

*Zhaosu Meng's project on the Impact of El Nino-Southern Oscillation on Rice Production in China (completed 2012 - supervised by Prof Brian Lees)

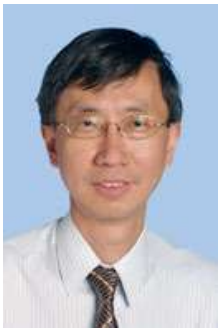
He has worked with others in the Centre to be ready to support the research agenda of the Shandong Peninsula Blue Economic Zone (AUD$42.5 billion). In 2012 he worked with Prof Hong Mei & Shengnan Chen on a paper titled "Judicial Experience in Environmental Protection: An Interview with the Chief Judge of the Land and Environment Court of New South Wales". In 2013 he undertook a sabbatical in Ocean University China - learning more about China's research and environmental management.

Stuart has outstanding experience as a research manager providing leadership and support on emerging social and biophysical natural resource management issues. At Land & Water Australia he was responsible for the strategic direction and research impact of A$2.5 million of new investments each year and managed 61 current projects and an active portfolio of A$8.8 million in research. This included management of 23 postgraduate scholars at multiple universities. Stuart demonstrated an excellent capacity to identify emerging research needs, understand the diversity of existing research and take opportunities to integrate meaning for achievement to various stakeholders.

He has over 27 research publications, book chapters and conference papers since 2005 and has received $669,000 from 26 competitive grants. Yet he is also able to step into media, policy and practical domains - key stakeholders in research.

Stuart gained experience with monitoring and evaluation, measuring research impacts and using reporting of those impacts to drive immediate and long-term improvements (Pearson et al. 2012). A part of this work (a modified triple bottom line Return on Investment approach) went on to become the key approach

adopted by rural Research and Development Corporations to report their performance to shareholders and has been endorsed by the Productivity Commission and Parliamentary Committees.



Assoc. Prof. Sik-Cheung Robert Lo is an **Associate Professor in the School of Engineering and Information Technology, UNSW Canberra**. He graduated from the University of Hong Kong and obtained his PhD in geotechnical engineering from UNSW. He was a visiting Professor of Johns Hopkins University in 1996. His recent awards includes: Best presented paper award, Intl Symposium on Reinforced Earth, Kyushu; and Telford Prize, Institution of Civil Engineers, UK. His research interest spans from applied to basic. Those of particular relevance to coastal infrastructure are: soft clay engineering; coastal disaster mitigation; and reliability and risk analysis. A/Prof Lo has an esteemed internal profile as attested by the following Honorary Intl Appointments:

* Appointed Member, Intl Technical Committee on Reinforced Soil (ITC-9), Intl Society of Soil Mech Geotechnical Engineering, 2001-2005.

* Core member, Intl Technical Committee on Geotechnical Engineering for Coastal Disaster Mitigation (ITC-39), Intl Society of Soil Mech Geotechnical Engineering, 2005-2009.

* Core member, Intel Geotechnical Safety Network, 2006-present.

* Executive Member, International Joint Working Group on Geotechnical Engineering for Disaster Mitigation, 2004-present.

* Corresponding member, Intl Technical Committee on Limit State Design in Geotechnics (ITC-23), Intl Society of Soil Mech Geotechnical Engineering, 2002-2009.

* Advisor, Centre for Research and Professional Development, Hong Kong, 2001-present.

Assoc. Prof. Lo also has a strong track record in collaborating with researchers from PRC as attested by joint publications since 1988. In 2009, he organised a research collaboration workshop with South China University of Science and Technology, Quangzhou.

Assoc. Prof. Linlin Ge upon graduating with a PhD from The University of New South Wales, won an ARC Postdoctoral Fellowship (2002-2004), which allowed him to ramp up research into differential Interferometric Synthetic Aperture Radar (DInSAR) for ground deformation monitoring. In 2004 he was appointed at the position of Senior Lecturer in the School of Surveying & Spatial Information Systems. Linlin is leader of the CRC for Spatial Information project 4.2 "Digital Elevation Model Generation & Differential Synthetic Radar Interferometry". As from 1 January 2008 Linlin Ge was appointed Associate Professor to support CRC-SI and NSW Department of Lands projects.

Current research:

* InSAR & DInSAR applications

* Interpretation of continuous GPS (CGPS) array results including: (a) kinematic interpretation of CGPS data (using CGPS as GPS seismometers); (b) interpretation of CGPS data by incorporating synthetic aperture radar interferometry ('soft' densification of CGPS array); (c) interpretation of dual-frequency CGPS data by incorporating single-frequency GPS results ('hard' densification of CGPS array); (d) 'soft' and 'hard' densification verification.

Dr Xiuping Jia received the B. Eng. Degree from Beijing University of Posts and Telecommunications, Beijing, China, in 1982 and the PhD degree in Electrical Engineering from The University of New South Wales (UNSW), Australia, in 1996. She joined the then School of Electrical Engineering, UNSW@ADFA, in 1988. Dr Xiuping Jia is currently a **Senior Lecturer with research interests in remote sensing and imaging spectrometry**.

Dr Jia has actively conducted research in remote sensing data analysis and image processing. She has developed a number of feasible and effective classification methods and procedures for reliable information extraction from remote sensing data. The developed methods address the practical problems of the limited available prototype data in classifier designs, enhance class separability, and reduce computational load. They have been applied to various applications, such as, land cover and land use mapping, target detection and medical image processing.

Dr Jia is the co-author of the remote sensing textbook, *Remote Sensing Digital Image Analysis*, Berlin, Germany: Springer-Verlag, 3rd (1999) and 4th (2006) eds. She was awarded a senior IEEE member in 2003. She has been an Associate Editor of IEEE Geoscience and Remote Sensing since 2005, and a member of the International Committee for Imaging Science since 2006. She has given invited talks to several places, including Beijing Normal University, Harbin Institute of Technology, ITC, Netherlands, CSIR, South Africa, RIT, USA.

Christopher Lane is the **R&D at CoastalCOMS Australia** and the **founder of Coastalwatch Holdings**. Christopher heads the CoastalCOMS research team and coordinates activities with industry and academic partners. Christopher has a wealth of experience in the design, implementation and management of large scale coastal management information systems. He has designed, developed and managed the largest public network of cameras in Australia over the last 10 years and as well as developing strategic alliances with university and commercial partners that have resulted in internationally original and marketable coastal safety and management.

Chris has a Masters of Computing, a Bachelor of Health Sciences, an Associated Diploma of Electrical Engineering and Electronics and a Trade Certificate in Instrumentation Process and Control - a unique combination that has provided him with the tools to provide innovative solutions to the technical challenges faced by CoastalCOMS.

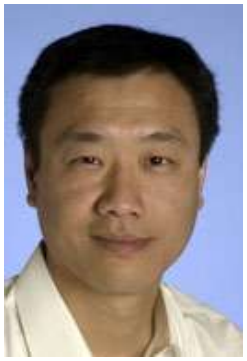
Chris has designed and implemented a Virtual Private Network (VPN) for the Coastalwatch infrastructure - a VPN unicast streaming video system - which permits a performance enhancement of streaming capability for the more than 150 cameras that Coastalwatch has located around the world. Chris is also responsible for developing strategies for technology commercialisation platforms that integrate with key technologies and community information including data information feeds a range of services.

Dr David Leary is a **Senior Lecturer in the Faculty of Law at UTS** having joined UTS from the UNSW Sydney He is admitted as a Solicitor of the Supreme Courts of New South Wales and Western Australia and the High Court of Australia. He currently holds an unrestricted practicing certificate as a Solicitor in New South Wales. Prior to entering academia he had extensive experience as a lawyer in private practice and as an in house counsel for a major corporation. As a lawyer he practiced primarily in commercial law which is also one of his areas of teaching at UTS. Since becoming an academic he has developed research and teaching interests outside of commercial law having published widely in relation to the Law of the Sea, International Environmental Law, Biotechnology, climate change, renewable energy and the Arctic and Antarctica. Dr Leary is a member of the International Scientific Advisory Board of the Arctic Centre (Finland), a Visiting Research Fellow at the United Nations University-Institute of Advanced Studies (Japan), and a member of the IUCN Commission on Environmental Law.

Dr Paulo A.L.D. Nunes has been working in the field of economics of biodiversity and valuation of ecosystem services since the mid 90's. He graduated from the Katholieke Universitat Leuven with a Master of Science in Economics with cum laude and was awarded his PhD from the same institution on the Economics of Environment in 1999. His main areas of expertise include economic valuation of environmental goods; cost-benefit analysis; econometrics of non-market valuation; economics of marine biodiversity and coastal ecosystem services; social dimension of biodiversity conservation; the role of ecosystem services in promoting poverty alleviation; scaling-up ecosystem services values to macro-economic dimensions; impacts of climate change and ecosystem effects on human wellbeing, welfare analysis and policy guidance. Today, Paulo A.L.D. Nunes is the **coordinator of the Marine Economics Programme at the Mediterranean Science Commission - CIESM (Monaco)** and **guest Professor** at the **Department of Agricultural & Resource Economics, University of Padova (Italy)**. Past working positions include senior economist and the Head of the 'Biodiversity Economics Research Group', FEEM; Professor of Environmental Valuation, School for Advanced Studies - Venice International University; Research Fellow, Vrije Universiteit Amsterdam (The Netherlands); Professorial Lecturer at the Johns Hopkins University School of Advanced International

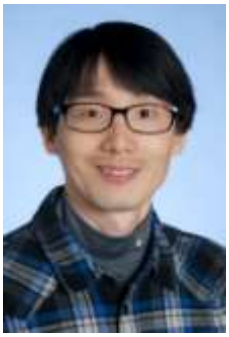
Studies, Bologna Center (Italy), researcher at the Centre of Excellence for Sustainable Development, University Ca' Foscari of Venice (Italy), and Visiting Researcher at the University of California San Diego and Colorado State University (USA).

In the recent years, Nunes has contributed with his technical expertise to a wide set of international initiatives, including, for example, 'The Economics of Ecosystems and Biodiversity - TEEB', 'Costs of Policy Action' and the 'Social Dimension of Biodiversity Policy', initiatives coordinated by the European Commission; 'Scaling-up Ecosystem Service's Values', initiative coordinated by the European Environmental Agency; the development of an operative framework for business and corporate sector so as to value ecosystem services, initiative coordinated by the World Business Council for Sustainable Development and with the technical support of the IUCN; the 'Ocean Health Index - OHI' initiative, coordinated by Conservation International; and, more recently, the Wealth Accounting and the Valuation of Ecosystem Services (WAVES), initiative coordinated by the World Bank. Nunes is also author or coauthor of 50+ scientific publications in a variety of international journals. His most recent book is *Bioeconomic Modelling, Valuation and Stakeholder Analysis for Sustainable Management of Exploited Marine Ecosystems*.



Dr Jian Zhang is a **Senior Lecturer in Politics** in the **School of Humanities & Social Sciences, UNSW Canberra**. He received his Bachelor's and Master's degrees from Zhejiang University, China and completed his PhD in Murdoch University, Australia. Prior to joining UNSW Canberra in 2000, he formerly held teaching and research positions in the School of Economics at Zhejiang University and the Asia Research Centre of Murdoch University. Dr Zhang's primary areas of research are Chinese domestic politics, Chinese foreign policy and Australia-China relations. He is the author of Government and Market in China: A Local Perspective (2004) and has also published widely in various international journals and edited volumes. More recently, his research focuses on China's maritime policy and naval development and the implications for Australia. Dr Zhang is currently a member of the Australian Committee of the Council for Security Cooperation in the Asia Pacific (CSCAP), a member of the Australian Institute for International Affairs and an **Adjunct Senior Fellow** at the **School of Public Administration of Zhejiang University, China**.

Dr Matthew Browne is currently a **Lecturer at Central Queensland University**. He completed a PhD at Griffith University in psychophysiological signal processing and went on to do post-doctoral work at GMD-Japan (part of the Fraunhofer Gessellschaft) in Fukuoka, developing vision systems for mobile autonomous robots. During a second post-doctoral position at Griffith University, Matthew worked on statistical image processing methods for environmental remote sensing applications with CoastalWatch and the Griffith Centre for Coastal Management. As a research scientist with CSIRO CMIS, he developed methods for modelling data from marine benthic surveys in the Torres Straight and Great Barrier Reef that have now become established in that organisation. He also initiated a collaborative research program funded by the Australia-Japan Foundation. As a technical lead in a major CoastalCOMS-led SmartState project, Matthew and colleagues developed and validated image processing algorithms that are now in use throughout the world. He has published over 30 peer-reviewed papers, acts on the editorial board of several engineering journals, and continues to pursue a diverse range of research topics. Continuing to collaborate across the academy, government and industry, **Matthew looks to develop applications in the application of statistical data analysis and image processing to remote sensing and environmental informatics**.



Dr Younjong Sun has joined **SARCCM as a Research Associate** to work on the Australian regional forecasting system. Younjong comes from Gwangju, Korea. After finishing Master's degree in Korea, Younjong worked for KORDI (Korea Ocean Research and Development Institute), and carried out the observation and evaluation of the ocean environment and its change after the dike construction (Saemangum) as a Research Assistant. Younjong earned a PhD, majoring in Physical Oceanography and Ocean Modeling in Earth System Science and Technology from Kyushu University, Japan. Younjong is interested in tidal front, which is a unique structure in coastal waters where tidal mixing is dominant during the summer.

Dr Fernando Andutta (Research Associate) is working in an **ARC Funded Postdoctoral position** to design and implement a field campaign to observe fluid mud layers in Darwin Harbour and the port at Shanghai, and to develop predictive models to investigate these layers. Fernando Pinheiro Andutta completed a technical course in Electronics at Etec Aristteles Ferreira in Santos (February 1996-November 1999). He then completed his BSc (Honours) in Mathematics at Unimonte in Brazil (February 2000-November 2003), and attended the Preparation Center of Officers R2 in Brazil (2000). Fernando studied his Master of Sciences MSc (February 2004-June 2006) and his Doctorate of Sciences DSc (January 2007-April 2011) in Physical Oceanography at University of So Paulo, Brazil. Recently, he has completed his Doctor of Philosophy PhD in Applied Physics at James Cook University in Australia (June 2008-March 2012). Fernando's research interests include: Estuaries, bays and coastal hydrodynamics; Estuaries, bays and coastal hydrodynamics modelling (Delft3D and SLIM); Analysis and interpretation of processes at small and meso-scale in physical oceanography; Transport time scales such as: residence time, flushing time, age and exposure time; Numerical modelling in general.

Marina Industries Association of Australia (MIAA) Ltd is the peak body for marinas, slipways, boatyards, and other marine storage facilities including sailing and cruising boating clubs. The key objective of the MIAA is to contribute to the sustainable development of marinas through promotion and the provision of education, environmental accreditation, research programs and policy development. MIAA represents 85% of major Australian marinas with a growing Asia Pacific membership (8% pa). The MIAA has a total of 190 members including those from New Zealand, Singapore, Thailand, Malaysia, Pacific Islands & Middle East.

Current Research Students:

Field of Study: Oceanography

Shengnan Chen, PhD - Research Topic - Comparative research on legal and regulatory frameworks related to integrated coastal zone management in China and Australia.

Zhibing Li, PhD - Research Topic - Modelling sediment transport in Port of Abbot Point and its adjacent Great Barrier Reef waters.

Guandong Gao, PhD - Research Topic - Land reclamation and its impact on hydrodynamics and sediment transport in Jiaozhou Bay, Qingdao, China.

Junru Guo, (CSC Joint Training PhD student) - Research Topic - Ecosystem modelling of Bohai Sea, China.

Fatemeh Ziaeyan Bahri, PhD - Research Topic - Correlation between East Australian Current and sea level rise along the east coast of Australia

Ashish Sadhu, PhD - Research Topic - Study of suspended magnetic particles and sediment transport in a coastal embayment

Amanda Xiao, PhD - Research Topic - Modelling hydrodynamics and sediment transport in Sydney Harbour

Recent Research Students:

Field of Study: Oceanography

Weijiao Song, (1+4 Program, OUC funded practicum HDR) - Research Topic - Tidal power plant in Shandong, China. Cross-faculty collaboration with PEMS (UNSW Canberra) and Law (Faculty of Law, UNSW).

Xi Zhang, (1+4 Program, OUC funded practicum HDR) - Research Topic - Remote sensing of the turbidity maxima in the Yellow Sea, China. Cross-school collaboration with PEMS, SEIT and Geoscience Australia.

Recent Submissions by Research Students:

Field of Study: Oceanography

Donghui Jiang, PhD- Research Topic - An operational circulation and ecology forecast system for Jervis Bay, NSW.

Recent Graduate Students:

Field of Study: Oceanography

Li Li, Modelling the tidal and sediment dynamics in Darwin Harbour, Northern Territory, Australia, PhD thesis 2013. Available online: http://handle.unsw.edu.au/1959.4/53024

Zhaosu Meng, Impact of El Niño-Southern Oscillation on rice production in China, PhD thesis 2012. Available online: http:// handle.unsw.edu.au/1959.4/52235.

Dehai Song, A skewness-based analysis and numerical simulations on tidal asymmetries, dynamics, and suspended sediment transport, PhD thesis, 2013. Available online: http://handle.unsw.edu.au/1959.4/52795.

Wen Wu, Evaluating the Australian Defence Force Environmental Management System: A case study of Shoalwater Bay Training Area, Queensland, PhD thesis 2012. Available online: http://handle.unsw.edu.au/1959.4/52063.

Fan Zhang, Benefits of regional ocean and weather forecast systems: Evidence from the Australian East Coast, PhD thesis 2012. Available online: http://handle.unsw.edu. au/1959.4/52425.

UNSW PhD graduate Wen Wu is the first graduate of the OUC China Scholarship Council program anywhere in the world. Wen is pictured toasting her alma maters' OUC VP Yu and UNSW Canberra's Rector Michael Frater at the SARCCM meeting dinner held at Ocean University of China, Qingdao. During the UNSW Canberra delegation visit to China Wen gave a presentation to the students of Ocean University about her good experiences as a student of PEMS.

PhD Opportunities and Scholarships

View the SARCCM website for a listing of Potential PhD projects. ***http://pems.unsw.adfa.edu.au/SARCCM***

If you require any further information, are interested in collaborative research with members of the group, or looking at a potential PhD or Research Masters topic then please contact:

A/Prof. Xiao Hua Wang Director The Sino-Australian Research Centre for Coastal Management, UNSW Canberra PO Box 7916, Canberra BC ACT 2610

Email: Please use ***sarccm@adfa.edu.au*** to contact SARCCM by email.

Recent Visitors:

- Prof Eric Wolanski, JCU
- Mr David Williams, AIMS
- Prof Xiaopei Lin, OUC

SARCCM Meetings & Workshops:

- ***Increasing the Depth of Research Collaborations between Australia's UNSW and China's OUC, 9 January 2013***

On the 9 January 2013, Ocean University of China, Qingdao, people representing a range of government managers, regulators and researchers interested in Jiaozhou Bay's current and future management met to discuss mutual research interests. The meeting was to link science to management for better coastal zone urbanization of Jiaozhou Bay with a view to 2050.

A/Professors Robert Lo, Hua Wang and Stuart Pearson represented SEIT (Engineering), SARCCM and PEMS (Science) from UNSW Canberra, respectively. SARCCM Director A/Professor Hua Wang also had meetings with Vice President Research of OUC Prof. Yan, State Ocean Administration's North Sea Branch Deputy Director Dr Guo Mingke, and Deputy Mayor Dr Xiulin Wang, Qingdao Municipal Government. A/Professors Hua Wang and Stuart Pearson also met with the leading state-owned development corporation executive as the international part of the submitted Australian Research Council Linkage Research Grant.

This is a specific example of the increasing depth of the research collaborations between Australia's UNSW and China's OUC. Topics discussed at the workshop included:

- Research investment context within OUC China's 985 Project (Prof. Zhou)
- Sediment transport dynamics and tidal asymmetry in ports, estuaries and other coastal environment (A/Prof. Xiaohua Wang)
- Risks Analysis and Management: an integrated quantitative approach (A/Prof. Robert Lo)
- A brief summary of Australian experiences with Integrated Research in Natural Resources Management (A/Prof. Stuart Pearson)
- The laws and institutions on the management of Jiaozhou Bay (Prof. Yingjie Ma)
- Study on the total amount control of Qingdao land-based pollutants discharging into coastal water (Prof. Shengkang Liang)
- The Evolution of Jiaozhou Bay over the Last Hundred Years (Dr Jinghao Shi)
- Situation and plans of Qingdao Urban Planning Bureau and Qingdao Environment Protection Bureau (Ms Sun, Mr Liu)

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- ***Coastal Management of Tropical Islands in Hainan, China***

A/Prof. Robert Lo and SARCCM Director A/Prof. Hua Wang visited Haikou from 10-12 Jan, and Saya 13-14 Jan in Hainan, China. In Haikou, they had meetings with researchers from 1) Hainan Research Academy of Environmental Sciences; 2) Hainan Marine Development Plan and Design Institute. In Sanya, they met researchers from the newly established Sanya Institute of Deep-Sea and Engineering, Chinese Academy of Sciences. Research collaborations in the following areas were discussed:

- Desalination in Hainan tropical islands;
- Coastal and ocean management;

- Coastal and coral reef island reclamation and infrastructure development;
- Coastal and deep ocean monitoring and forecasting;
- Coastal hazard mapping and risk management.

It is agreed that an initial step towards full collaboration maybe joint postgraduate student training utilizing the China Scholarship Council Schemes.

***A/Profs Robert Lo and Hua Wang (SARCCM Director) met with researchers from Hainan Research Academy of Environmental Sciences*.**

A/Prof. Robert Lo and SARCCM Director A/Prof. Hua Wang met with researchers from the newly established Sanya Institute of Deep-Sea and Engineering, Chinese Academy of Sciences.

A visit to the construction site for the new Institute that will be completed in 2014.

- ***Ocean University of China Delegation Visit to UNSW Sydney on 12 March 2013***

Pictured are: Profs Dai, Hoffman, Dong and Warren-Poole (from left to right)

PVCs Laura Warren-Poole (Research training), Mark Hoffman (Research) and A/Prof. Hua Wang (SARCCM Director) met with Prof. Shuanglin Dong, Vice-President (Graduate Studies) and Prof Hua Dai, Director, International Office. Marine Science research and training, and Blue Economic Zone activities in China was the focus of discussion during the meeting. Prof. Hoffman expressed an interest to initiate collaboration between UNSW and OUC in the areas of Oceanography, Marine Fouling, Climate Change and Coastal Management.

- ***April 2013 Meeting in Qingdao Discussing Jiaozhou Bay Research Funding Opportunities***

Research needs, policy and management challenges were discussed in a meeting on the 29th April 2013 with Qingdao's former Vice Mayor Wang Xiulin (an active Jiaozhou Bay, Qingdao, China research and community leader). UNSW SARCCM Director A/Prof. Hua Wang, A/Prof. Stuart Pearson and PhD student Shengnan Chen from PEMS/SARCCM attended the meeting. The meeting was informed that Ocean University of China (OUC) is taking research of Jiaozhou Bay seriously under OUC's Vice President (Research) Prof. Ju Yan's leadership. Prof. Ju Yan visited SARCCM at UNSW Canberra on 27 November 2012. OUC is currently offering SARCCM some seeding funding for Jiaozhou Bay integrated research. This funding will partially fund a proposed UNSW/OUC Workshop in October 2013. This workshop will include a special session on Jiaozhou Bay together with other sessions such as Oceanography, Climate Science, Marine Bio-Innovation, and Law of the Sea. The group will aim to produce a special issue out of the workshop papers. Next year is OUC's 90th anniversary. The OUC Senior Vice President Prof. Yifa Yu has further proposed a higher level UNSW/OUC Symposium in Sept/Oct 2014 to celebrate the occasion. The ultimate objective from these workshop activities is to consolidate and expand the UNSW/OUC research collaboration in marine sciences. This will prepare researchers for joint applications for a major China State Oceanic Administration (SOA) or China Ministry of Science and Technology (MOST) grant to support coastal research, and the matching of funding to several UNSW SARCCM grant applications currently under review by respective funding agencies.

- ***SARCCM Workshop on Integrated Research in Jiaozhou Bay, Qingdao, China, 19th July 2013***

On July 19th 2013, a SARCCM workshop on Integrated Research in Jiaozhou Bay (JB), Qingdao, China, was held in the meeting room of College of Chemistry and Chemical Engineering at Ocean University of China. The workshop discussed a range of issues including marine pollution, land reclamation and sediment transport in Jiaozhou Bay, as well as the scientific and technological applications in JB's coastal zone integrated management. The former Vice Mayor of Qingdao Prof. Wang Xiuling, Ms Summer Zhao of OUC International Office and other OUC JB researchers attended the meeting. The workshop produced the following recommendations:

1. A UNSW/OUC research workshop is to be held on Oct 25 2013. A NSFC Program Officer may be invited by OUC to attend this workshop. The workshop will be a full day forum combining the JB project kick-off meeting as well as UNSW/OUC research workshop on impact on embayments and their ecosystems by man-induced activities;

2. The workshop will discuss a UNSW/OUC Joint proposal of JB Integrated Research to apply funding from the NSFC International Collaboration Funding Program in March 2014;

3. Based on the JB project, a Special Issue on Impact on embayments and their ecosystems in Yellow and East China Seas by man-induced activities may be produced in *ECSS (Estuarine, Coastal and Shelf Science*, IF2.32, ERA A) by December 2014. Submissions of papers will also be solicited from Japanese and Korean scientists. The journal chief editor has been consulted and has given initial approval.

4. The above will lay down the foundation work for a major MOST "973" project application entitled 'Impact on embayments and their ecosystems by man-induced activities in China' in March, 2015.

- ***Four SARCCM members were invited to speak at China Qingdao International Blue Economy Forum 2013***

In November 2013, three SARCCM members (**A/Prof Lo, Chris Lane, and A/Prof. Stuart Pearson**) were invited to speak at the third *China Qingdao International Blue Economy Forum*. This an example of growing profile and strengthening collaborations with China's academics, government and business through SARCCMs research collaboration.

1*. Image Source: http://www.sdlb.gov.cn/art/2013/11/14/art_556_264351.html*

2. Associate Professor Stuart Pearson presents at the Forum.
Photo Credit: Laurent Bellavance (Directeur Général, Technopole Maritime du Québec).

- Stuart's plenary paper, *Integration through collaborative research and development* was well received. It provided examples of the importance of evaluation of research investments using economic, social and environmental knowledge. He spoke about the benefits of knowledge brokers in the emergence of sustainable Coastal and Marine societies.
- A/Prof Robert Lo's paper on *Risks Analysis and Management: An integrated quantitative approach* added this important issue to the discussion.
- Chris Lane's business background (CoastalCOMS)and track record in providing image and data management (including Australia's most accessed sporting web page Coastalwatch) was shown in his paper, *Australia's Coastal Database integrated with the development of Australia's coastal observation network for real-time monitoring and management of the coastline*. It will be a valuable contribution to the emerging interest in environmental monitoring.
- Prof Xue Guifang (Julia, formerly OUC and now Chair of KoGuan Law School Shanghai Jiao Tong University) spoke on the *Construction of maritime strategy and roads towards a marine state*.

We were also able to talk about Ric Pashley's recent inventions and patents in the country where commercial scale desalination is underway.

Perhaps the most significant business of the Forum was the unveiling of the indices that together make the Marine Development Indicator (Xinhua 2013) that is measuring China's Blue Economy performance. Given China's aid commitment to Africa and the Asia-Pacific, the lessons of the Blue Economy and Indicators may have global application.

The 300+ Government and Academic people at the Forum particularly welcomed the outsiders' perspectives and there are further opportunities to broker research knowledge; gathering questions and knowledge needs and matching them to existing knowledge or the capacity to discover answers through research. This is an important part of China and Australia relations.

- ***SARCCM members invited to provide advice at Qingdao Marine Eco-Tech or Blue Tech Development area - north east of Qingdao (date?)***

Chris Lane and **Stuart Pearson** were invited to the Marine Eco-Park being constructed north of Qingdao. It has been called the Blue Silicon Valley or the Blue Tech Zone during design and construction. This 200 km^2 site will include 10M m^2 of buildings and is still very much under construction. It aims to put China in the top 7 in the world for marine research through provision of facilities (express trains, accommodation, hospitals and schools), attracting 600 PhD and 6000 Masters students and building on the 28 marine research institutions nearby. Thirty percent of China's top marine scientists live nearby. There was a strong invitation to SARCCM and other international guests to return and do collaborative research here.

The new Microsoft building in the Blue Tech Zone.

An area under construction with expected completion within 12 months.

Mr Jun Wang, Chairman of Qingdao Science and Technology Association welcomes the delegation.

Prof Liu Hongbin, Key Organiser of the meeting and member of the Pacific Association and OUC Faculty Member.

Christopher Lane, from CoastCOMS and SARCCM, speaks about coastal risk management experiences in Australia.

Prof Ma Yingjie OUC SARCCM at work. These collaborations are only possible through the dedicated careful and considered work of members of SARCCM. Their work is greatly appreciated.

- ***The Fourth Advisory/Management Committee Meeting of the Sino-Australian Research Centre for Coastal Management (SARCCM) and UNSW-OUC Collaborative Research Workshop (Jiaozhou Bay Project Kick-off Meeting) Ocean University of China, Qingdao 25 October 2013 Meeting Minutes***

The Advisory/Management Committee Meeting of the Sino-Australian Research Centre for Coastal Management (SARCCM) and the UNSW-OUC Collaborative Research Workshop (Jiaozhou Bay Project Kick-off Meeting) were held in the No. 1 Meeting Room of the Library at Laoshan Campus of Ocean University of China (OUC). Prof. Hua Dai, Director of International Office of OUC, chaired the meeting. Attending the Advisory/Management Committee Meeting were: Prof. Dexing Wu (President of OUC/Advisory Committee Chair); Prof. Michael Frater (Rector of the University of New South Wales (UNSW) Canberra); Prof. David Raftos (from Sydney Institute of Marine Science); Prof. Xiulin Wang (Vice Chairman of Qingdao Chinese People's Political Consultative Conference (CPPCC)); and A/Prof. Xiao Hua Wang (SARCCM Director). Also in attendance were 39 experts and academics from the National Natural Science Foundation of China, the National Marine Environmental Forecasting Centre of the State Oceanic Administration (SOA), the National Marine Data and Information Service of SOA, the First Institute of Oceanography of SOA, the Yantai Institute of Coastal Zone Research of the Chinese Academy of Sciences (CSA), the Institute of Oceanology of CSA, the Qingdao Municipal Environmental Protection Bureau, the Qingdao Environmental Monitoring Centre and OUC's College of Physical and Environmental Oceanography, College of Chemistry and Chemical Engineering, College of Environmental Science and Engineering, College of Marine Geosciences, and the Law & Politics School.

The Meeting was opened by a speech delivered by Prof. Dexing Wu, President of OUC. In the warm welcome by the President he said, "it was nice to see our old friends and to meet new friends also". He also welcomed the convocation of the Centre. He reiterated that in the support for the Centre full use of the strengths of both Universities were being made. He commended the organizers of the 4th Advisory/Management meeting held since the Centre's establishment and drew attention to the 10 research higher degree students recommended and the 8 student completions. He mentioned the staff and teaching exchange as a commitment to strengthen the international quality of courses and that they were popular with Chinese and international students. He mentioned the reporting of the Centre's work in contribution to Wehai Government BEZ construction, Qingdao City Construction Investment Group (QCCI) marina management, legislative proposals of Jiaozhou Bay (JZB), the countermeasures of Qingdao coast and land area, new integrated research on JZB. In his pledge of continued support he said, "I believe that SARCCM should take a more important role and this is important to the internationalization of OUC and to improve the management of China's coast zones".

Prof. Xiulin Wang, Vice Chairman of Qingdao CPPCC introduced the major issues and corresponding recommendations of the marine ecological civilization construction in Qingdao. Prof. David Raftos from Sydney Institute of Marine Science presented the marine issues in Sydney Harbour and a World Harbour Project.

Pictured at The Fourth Sino-Australian Research Centre for Coastal Management Advisory/Management Committee Meeting held at Ocean University of China, Qingdao 25 October 2013 are (left to right front row): A/Prof. Andrew Neely, Prof. Warrick Lawson, Prof. David Lovell, Prof. Xiulin Wang, Prof. David Raftos, Prof. Michael Frater, Prof. Dexing Wu, Prof. Joseph Lai, A/Prof. Stuart Pearson, A/Prof. Xiao Hua Wang, Prof. Hua Dai and Prof. Michael O'Donnell.

A/Prof. Xiao Hua Wang, reported the major achievements of SARCCM in 2012-2013 and presented the Centre's Strategic Research Plan for the next five years. He formally thanked President Wu and Rector Frater for their support of SARCCM, including the financial support of OUC and UNSW. He drew attention to the highlights of the last reporting period (a written report was provided separately). He mentioned specifically the completion of 4 higher degree research students, grants worth more than AU$98k, 17 publications and 7 scientific meetings including a SARCCM delegation to the 2013 China Qingdao International Blue Economy Summit Forum 5-7 Nov 2013. Recent SARCCM research innovations include studies of effects of land reclamation on tidal dynamics and sedimentation in coastal areas. He reported a study showing an increase in tidal range of about 1 metre to the west coast of Korea due to a proposed reclamation on the east coast of China. The Centre's 5 years Strategic Research Plan was outlined and included:

- Continued recruitment of 2-4 research students per year
- *ECSS (Estuarine, Coastal and Shelf Science)* (ERA ranked A, Q1, IF = 2.32) Special Issue on 'Impact on coasts and their ecosystems in the Yellow and East China Sea by intensive anthropogenic activities'
- ARC linkage 2014-2017
- NSFC International Cooperation Project (2014-2019) based on JZB Integrated Research
- MOST 973 Impact of embayments (2015-2020), and
- Participation in SIMS World Harbour Project.

Prof. Michael Frater, Rector of UNSW Canberra made concluding remarks. He accepted the report, noted the growth of the Centre, and said the "foundation of the Centre and the work it does nourishes our Universities and is leading to important scientific results". He was impressed by the impact of the land reclamation research and said "I look forward to the work of the Centre and execution of the Strategic Plan that A/Prof. Wang has outlined. Through this we all look forward to an even closer relationship between UNSW and OUC".

There were in total 16 academic presentations with themes on Jiaozhou Bay integrated research, large scale oceanic processes, climate change and its impact on coastal systems, and coastal monitoring and remote sensing. Workshop participants demonstrated the research achievements on the long-term

evolution of the environment in Jiaozhou Bay and also presented the research findings on the marine ecosystem of Jiaozhou Bay, nutrients in Dagu River watershed, and total pollutant loads control in Qingdao sea area. Prof. Guangxue Li gave a presentation on the coastline changes of Jiaozhou Bay and the evolution of its hydrodynamics. Prof. Shengkang Liang did a presentation on the long-term variation of seawater quality in Jiaozhou Bay and its coastline evolution. A/Prof. Xiao Hua Wang gave a talk on the land reclamation and its impact on hydrodynamics in Jiaozhou Bay. Prof. Yingjie Ma reviewed the legal issues of Jiaozhou Bay. A/Prof. Stuart Pearson suggested the experience of integrated coastal zone management in Australia could be adopted in the sustainable development of the Blue Economic Zone. As for the research achievements on climate change and its impact on coastal systems, Prof. Xiaopei Lin introduced the coastal ocean response to global climate change, Dr Xuanliang Ji presented the temporal and spatial variability of carbon cycle in the Northwestern Pacific, and Prof. Huiwang Gao showed the impact of terrigenous dust from China on chlorophyll in the northern Pacific. For the research achievements relating to the Chinese coastal zone, the participants gave presentations on evolution analysis of Chongming Dongtan Shoreline in the recent 39 years based on remote sensing, and the zooplankton community structure in the Yellow Sea and East China Sea for autumn 2007.

The meeting had a discussion on publishing in the *ECSS (Estuarine, Coastal and Shelf Science)* Special Issue, application for National Natural Science Foundation of China (NNSFC) International Collaboration Funding Program, "973" project application, and a World Harbour Project. Prof. Jianguo Ren, Director of NNSFC, advised that it would be more beneficial to apply for funding programs simultaneously from Chinese and Australian Foundations. Prof. Jianguo Ren also suggested applying for the key program in NNSFC and receiving support from the Chinese Foundation. Prof. Xiulin Wang, Vice Chairman of Qingdao CPPCC, suggested we should get support from the universities on the basis of key scientific programs and multi-disciplinary research, and also apply for NNSFC programs for basic research, and key technology R&D programs and local government programs for applied research. Prof. David Raftos considered the Qingdao Port as one important research subject for the World Harbour Project and noted that SARCCM is a bridge for the cooperation between the Sydney Institute of Marine Science and OUC. At the end of the meeting, Ms Lingli Yue, Qingdao Municipal Environmental Protection Bureau, expressed gratitude to both Chinese and Australian scientists for their advice on the development of Qingdao City.

Attendees

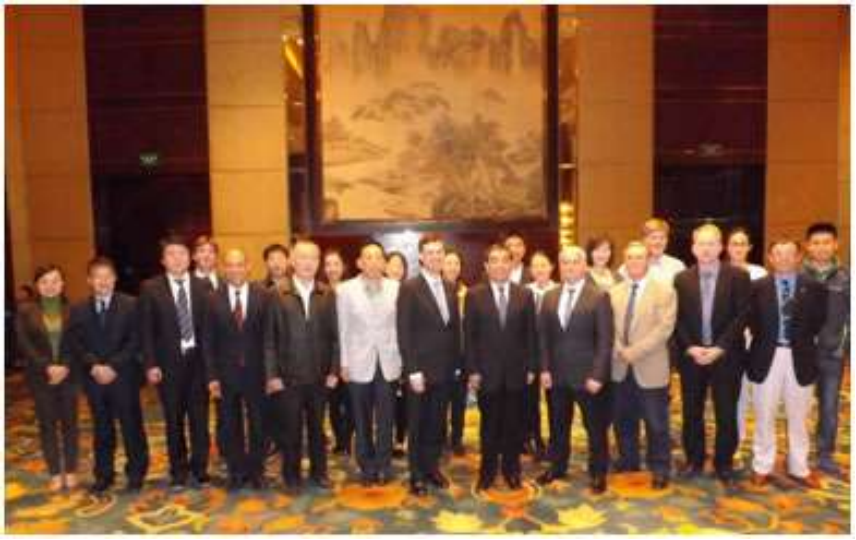
SARCCM Advisory Committee members:

- Prof. Dexing Wu, President, Ocean University of China
- Prof. Michael Frater, Rector, UNSW Canberra
- Assoc Prof. Xiao Hua Wang, Director UNSW SARCCM
- Prof. Ping Shi, The South China Sea Institute of Oceanology, Chinese Academy of Sciences (apology)
- Prof. Xiangmin Xu, Director OUC SARCCM (apology)
- Dr Junji Song, Director of General (2011-2013), Shandong Peninsular Blue Economic Zone Construction Office (apology)
- Mr BU Xiaohua, The Vice President, Qingdao City Construction Investment Group (QCCI) Industry advisor (apology)

Other participants:

- Prof. Joseph Lai, Associate Dean (International), UNSW Canberra
- Prof. Warrick Lawson, Head of School of Physical, Environmental and Mathematical Sciences, UNSW Canberra
- A/Prof. Andrew Neely, Deputy Head of School of Engineering and Information Technology, UNSW Canberra
- Prof. David Lovell, Head of School of Humanities and Social Sciences, UNSW Canberra
- Prof. Michael O'Donnell, Head of School of Business, UNSW Canberra
- A/Prof. Stuart Pearson, SARCCM team member, UNSW Canberra
- Prof. David Raftos, Sydney Institute of Marine Science/Department of Biological Sciences, Macquarie University
- Prof Xiulin Wang, Vice Chairman, Qingdao Chinese People's Political Consultative Conference (former Vice Mayor, Qingdao)
- Prof. Jian-guo Ren, National Natural Science Foundation of China, Director
- Dr Wei Li, National Natural Science Foundation of China, Vice Director
- Ms Ling-lin Yue, Qingdao Municipal Environmental Protection Bureau, Deputy Director
- Ms Wen-lian Cui, Environmental Monitoring Centre of Qingdao, Deputy Director
- Prof. Guang-tao Zhang, Institute of Oceanology, CAS
- Prof. Zhi-jun Dong, Yantai Institute of Coastal Zone Research Zone Research, CAS

- Dr Xuan-liang Ji, National Marine Environmental Forecasting Center, SOA
- Dr Jun Song, National Marine Data and Information Service, SOA
- Prof. Ze-xun Wei, The First Institute of Oceanography, SOA
- Prof. Rong-jie Liu, The First Institute of Oceanography, SOA
- Prof. Hua Dai, Director International Office, OUC
- Prof. William Zou, International Office, OUC
- Ms Summer Zhao, International Office, OUC
- Prof. Huiwang Gao, OUC
- Prof. Guang-xue Li, OUC
- Prof. Xian-wen Bao, OUC
- Prof. Xiao-pei Lin, OUC
- Prof. Ying-jie Ma, OUC
- A/Prof. Lulu Qiao, OUC
- A/Prof. Hong-ju Chen, OUC
- A/Prof. Sheng-kang Liang, OUC
- A/Prof. Ke-Qiang Li, OUC
- A/Prof. Yan-bin Li, OUC
- Dr Chao Ma, OUC
- Dr Wen Wu, OUC
- Dr De-hai Song, OUC
- Dr Zhao-su Meng, OUC
- Ms Sheng-nan Chen, UNSW/OUC



OUC Senior Management & UNSW Canberra alumni attended a formal dinner hosted by Rector Prof. Michael Frater at the China Hall, Shangri-la Hotel, Qingdao, on 24 October 2013. The Rector noted this was, to his knowledge, the first UNSW research student alumni meeting in China and outside of Shanghai.

Grants:

- X.H. Wang (CI), (with Mr David Williams and Prof. Weibing Guan), INPEX Browse Ltd, State Key Laboratory of Satellite Ocean Environment Dynamics, *Understanding and Predicting Sediment Distribution and Net Transport in Estuaries and Coastal Oceans with an Emphasis on Muddy Bottom Layers*, ARC Linkage, 2011-2013: LP110100652, $240,000. This project will design and implement a field campaign to observe fluid mud layers in the muddy harbours and develop predictive models to investigate these layers. This research will give new direction to port management by developing adaptive tools to solve water quality and siltation problems in muddy ports and harbours in Australia.

- *Linking Science to Management for Sustainable Coastal Development in Jiaozhou Bay* (Qiao *et al.*) Ocean University of China Basic Research Funding Scheme 2013, 1 yr: CNY200,000 ($40,000).

- *Temporal-spatial Variability of COD, N and P in Jiaozhou Bay under Anthropogenic Impacts* (Liang *et al.*) Ocean University of China Basic Research Funding Scheme 2013, 1 yr: CNY200,000 ($40,000).

Recent Grant applications:

- Australian Research Council/Linkage Project Application LP130100099 “Linking Science to Management for Better Coastal Infrastructure Development” which was unsuccessful.

- ‘Developing Collaborative Research on Integrated Coastal Zone Management between Australia and China’, Australia-China Council, DFAT which was unsuccessful.

Recent Publications:

2013

Book Chapter

Wang, X.H. & Andutta, F., 2013, Sediment transport dynamics in ports, estuaries and other coastal environments, in: *Sediment Transport Processes and their Modelling Applications*, A. Manning (ed.), INTECH, pp. 3-35, SARCCM Paper No. 10.

Journal - Refereed & Scholarly Article

Lu, J., Qiao, F., **Wang, X.**, Teng, Y., Jung, K. & Liu, Y., 2013, Modeling the Yellow River sediment flux and its deposition patterns under climatological conditions, *Ocean Dynamics*, 63(6), 709-722, doi: 10.1007/s10236-013-0626-0.

Mei, H., **Pearson, S. & Chen, S.**, 2013, Judicial experience in environmental protection: An interview with the Chief Judge of the Land and Environment Court of New South Wales, Australia, *China Environmental Law Review*, vol. 9, pp. 87-101. SARCCM Paper No. 8*.

Song, D. & Wang, X.H., 2013, Suspended sediment transport in the deepwater navigation channel, Yangtze River Estuary, China, in the dry season 2009: 2. Numerical simulations, *Journal of Geophysical Research: Oceans*, 118(10), pp. 5568-90, doi: 10.1002/jgrc.20411. SARCCM Paper No. 16.

Song, D., Wang, X.H., Cao, Z. & Guan, W., 2013, Suspended sediment transport in the deepwater navigation channel, Yangtze River Estuary, China in the dry season 2009 - Part I: Observations, *Journal of Geophysical Research*, 118(10), 5555-5567, doi: 10.1002/jgrc.20411. SARCCM Paper No. 15.

Song, D., Wang, X.H., Zhu, X. & Bao, X., 2013, Modeling studies of the far-field effects of tidal flat reclamation on tidal dynamics in the East China Seas, *Estuarine, Coastal and Shelf Science*, 133, 147-160, doi: 10.1016/j.ecss.2013.08.023. SARCCM Paper No. 14*.

Wang, X.H., Bhatt, V. & Sun, Youn-Jong, 2013, Study of seasonal variability and heat budget of the east Australian current using two eddy-resolving ocean circulation models, *Ocean Dynamics*, 63(5), 549-563, doi: 10.1007/s10236-013-0605-5.

Wang, X.H., Wu, W., 2013. A review of environmental management systems in global defence sectors. *American Journal of Environmental Science*, 9(2), 164-181, doi: 10.3844/ajessp.2013.164.181. SARCCM Paper No. 11.

Wu, W., Wang, X.H. & Paull, D 2013, Evaluating the Australian Defence Force stakeholder participation at Shoalwater Bay Training Area, Queensland, Australia, *Journal of Environmental Planning and Management*, pp. 1-29, doi: 10.1080/09640568.2013.839445. SARCCM Paper No. 12.

Zhang, F. & Wang, X.H., 2013, Assessing preferences of beach users for certain aspects of weather and ocean conditions: Case studies from Australia, *International Journal of Biometeorology*, 57(3), 337-347, doi: 10.1007/s00484-012-0556-4. SARCCM Paper No. 9.

Conference

Ng, T., Jiang, D., Jia, X., Paull, D. & Wang, X., 2013, Change detection for sustainability monitoring using satellite remote sensing data, *The Third International Conference on Digital Information Processing and Communications (ICDIP13)*, Islamic Azad University, Dubai, Jan. 30 to Feb 1, 2013. SARCCM Paper No. 14.

Thesis

Li, Li, 2013, Modelling the tidal and sediment dynamics in Darwin Harbour, Northern Territory, Australia, PhD thesis. Available online: http://handle.unsw.edu.au/1959.4/53024.

Song, Dehai 2013, A skewness-based analysis and numerical simulations on tidal asymmetries, dynamics, and suspended sediment transport, PhD thesis. Available online: http://handle.unsw.edu.au/1959.4/52795.

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