

Sino-Australian Research Centre for Coastal Management (SARCCM) 2013/2014 Report for 5th Advisory/Management Committee Meeting

**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:

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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 2013/2014 include:

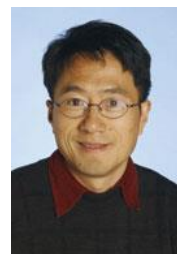
1. In December, ABC Radio Australia ran an interview reporting our work (A/Prof. Xiao Hua Wang) that tidal flat reclamation on the east coast of China will flood the west coast of Korea (<http://www.radioaustralia.net.au/international/radio/program/asia-pacific/south-koreas-west-coast-vulnerable-to-chinas-unbridled-development/1238900>)
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*.
3. An *Estuarine, Coastal and Shelf Science* (ECSS, ERA A) Special Issue on impact on coasts and their ecosystems in the Yellow and East China Sea by intensive anthropogenic activities: A total submission of 36 papers from China, Japan, Korea and Taiwan.
4. Tracking the paths of identified floating objects to assist the search for missing Malaysian Airlines flight MH370 and pinpoint the crash site zone: <http://pems.unsw.adfa.edu.au/SARCCM/Malaysia%20Flight/index.html>
5. These are examples of growing profile and strengthening collaborations with China's academics, government and business through SARCCMs research collaboration.

Other 2013/2014 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
- 14 publications
- 13 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. Yongming Luo (骆永明), Yantai Institute of Coastal Zone Research, Chinese Academy of Sciences

Prof. Michael Frater

Dr 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 advisors (1x)

Government Department representatives (1x)

Management Board

Australia:

Director:

Dr Xiao Hua Wang (王小华)

Management Board:

Prof. Michael Frater

Dr Xiao Hua Wang (王小华)

Emeritus Prof. Brian Lees

A/Prof. Linlin Ge (葛林林)

SARCCM Team Australia:

Dr Xiao Hua Wang (王小华)

Emeritus Prof. Brian Lees

Prof. James Goff

Prof. Ric Pashley

Prof. Jenny Stewart

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:

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 China:

Prof. Xiangmin Xu (徐祥民)

Prof. Huajun Li (李华军)

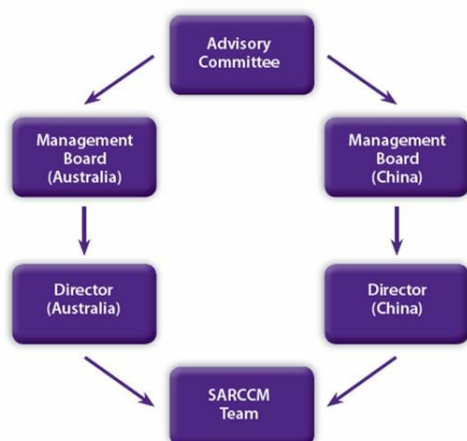
Prof. Ge Chen (陈戈)

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)

SARCCM Capacity and Capabilities Statement:

The vision of The Sino-Australian Research Centre for Coastal Management (SARCCM, <http://pems.unsw.adfa.edu.au/SARCCM>) is to become a world leader in coastal integrated research with a focus on observation and numerical modelling of coastal and estuarine processes, to support sustainable development and improve the management of coastal zones worldwide.

SARCCM has a proven track record of providing high-quality research outcomes to inform coastal zone management, e.g. (i) numerical simulations of Darwin Harbour have indicated that if the mangroves and tidal flats were reclaimed, the total sediment flux would be orientated reversely from seaward to landward causing increased harbour siltation. (ii) A recent study on the impact of Chinese land reclamation on tides in Korea has predicted that planned reclamation of coastal wetlands on China's Jiangsu coast will lead to an immediate increase in the high tide level of 400 mm on the coast of Korea. This will cause frequent flooding in the low lying areas including Incheon and Mokpo, and dwarfs the current IPCC estimation of sea level rise due to global warming of 1.7 mm/year. (iii) One of the most challenging problems in the Yangtze Estuary is the severe silting in the Deepwater Navigation Channel (DNC) of Shanghai Port. The annual amount of dredging for maintaining the DNC in 2013 exceeded 100 million m³, with an estimated dredging cost of AUD\$780 million. Research undertaken by SARCCM has shown that the upstream non-local sediment intrusion through the spill-over-mechanism at the opening of the DNC is a major source of the sediment trapping in the DNC after the morphological changes.

SARCCM is a Research Centre of the University of New South Wales-Australia with a multidisciplinary/multi-faculty research focus on coastal problems. SARCCM was established in November 2010, and resides in the School of Physical, Environmental and Mathematical Sciences (PEMS). It has a productive team of 18 researchers from UNSW and its collaborative organizations include the University of Wollongong, University of Technology (Sydney), and Central Queensland University. Since 2010, SARCCM has attracted strong interest from the national and international scientific community as well as industry partners in Australia and China. The need for SARCCM has increased and matured since its establishment. This is demonstrated by an expanding research network of collaborators from scientists, government managers, as well as industrialists both in Australia and China. SARCCM is currently working with Australian and Chinese institutions on the matter of management and development in coastal eco-systems. Key partnerships include sustained collaboration and competitive grant applications with the Ocean University of China (OUC), Qingdao City Construction Investment Ltd (QCCI), and the Marina Industry Association of Australia (MIA).

SARCCM's key capability is research and research training in observing and modelling hydrodynamics, sediment transport, and the biochemical processes in coastal environments (bays, harbours, estuaries and their adjacent shelf waters). An emerging capability is in research higher degree training in environmental management that combines human and biophysical research insights into actionable knowledge.

SARCCM is collaborating on the World Harbour Project (WHP) with the Sydney Institute of Marine Sciences (SIMS). For the next 3-5 years SARCCM will be undertaking research in Jiaozhou Bay (China), and thus providing expertise on hydrodynamics and sediment transport dynamics for the WHP. Expanding collaboration in other countries will enhance the visualization of the Centre by the international scientific community, e.g. an Indonesian coastal management research frontier is being established in 2014 using SARCCM as an incubator.

The World Harbour Project

The World Harbour Project is a SIMS initiative aimed to facilitate, link and enhance programs of research and management across major urban harbours of the world, in order to help build resilience globally for these iconic urban waterways and the cities that surround them. SARCCM is both a part of this initiative and an independent research centre, at UNSW and is taking the lead to facilitate Chinese partnerships in the WHP.

The Chinese partners are: Jiaozhou Bay in Qingdao (Ocean University of China, Qingdao Environment Protection Bureau), and Shanghai Port (East China Normal University). Other international partners include:

- Sydney (Australia): SIMS and the Sydney Harbour Research Project
- Auckland (New Zealand): Massey University
- Singapore: National University of Singapore, The Singapore Centre on Environmental Life Sciences Engineering
- Jakarta (Indonesia): Bandung Institute of Technology
- Abu Dhabi / Dubai (the United Arab Emirates): New York University @ Abu Dhabi
- Rio de Janeiro (Brazil): Federal Fluminense University (UFF)
- St. Georges (Grenada): Dept. of Agriculture and Fisheries
- Chesapeake Bay (USA): Smithsonian Environmental Research Centre

ECSS Special Issue on impact on coasts and their ecosystems in the Yellow and East China Sea by intensive anthropogenic activities

The problem of environmental degradation in coastal waters of heavily populated coasts such as the Yellow and East China Sea is particularly serious because multiple environmental pressures mount on these regions from rapid growth, coastal erosion, land reclamation, dredging, increased navigation, oil and gas infrastructure development, and sediment/nutrients run-off due to increased human activity in the catchment areas. This SI aims to examine and document the physical and ecological impacts on the biogeochemical evolution and mechanism of the coasts in the Yellow and East China Sea due to intensive human activities and their effects on the coastal ecosystem structures and functions. It will assess the influences of the human activities on environmental degradation and sustainable use of the marine resources in these environments and probe into scientific approaches to manage and recover the coastal ecological functions. The submitted papers are listed below:

China

1. Integrated coastal zone management of Jiaozhou Bay, Qingdao, China.
2. Long-term variation of seawater quality in Jiaozhou Bay and its correlations with the Land-based pollutant emission and the coastline evolution.
3. Identification of the critical emission areas for nitrogen and phosphorus in Dagou River watershed, Qingdao, China and assessment of various environmental management practices.
4. A structural assessment of land-based source for COD, nitrogen and phosphorus in Qingdao City, China.
5. Land reclamation and its impact on hydrodynamics in Jiaozhou Bay, Qingdao, China.
6. Sediment transport and its role in the nutrient dynamics in the Jiaozhou Bay, Qingdao, China.
7. Numerical modelling of physical processes controlling the green tides in Qingdao, China.

Korea

1. The effect of wind on the dispersal of the Keum River estuarine plume, South Korea.
2. A note on parameterizations of broad band photosynthetic irradiance for ocean ecosystem models.
3. Impact of the Dam Water and River Discharges on the Circulation System in the Gwangyang Bay, Korea.
4. Intratidal asymmetry of the velocity profile in an estuary.
5. Phytoplankton community in the freshwater and marine zones of a physically-disconnected estuary by a dike.
6. Short-term variations of estuarine phytoplankton experiencing an acute change of salinity.
7. Presence characteristics of micro-plastics in marine compartments in high-tidal coastal area of Korea.

Japan

1. Seasonal variation of chlorophyll-a and its mechanism in the Yellow Sea and East China Sea.
2. Impacts of variation in supplied nutrient element ratio on the primary production in the Yellow Sea and East China Sea.
3. The source of atmospheric deposition and its effect on the primary production at Omura Bay, western Kyusyu, Japan.
4. The effect of mesoscale variations on the intrusion of the subsurface Kuroshio water onto the continental shelf northeast of Taiwan.
5. Horizontal and vertical heterogeneity of nutrient distribution on the continental shelf of the East China Sea during summer.
6. Atmospheric nitrogen and phosphorus inputs to the eastern East China Sea surface waters.
7. Drastic changes of phytoplankton community in the East China Sea associated with the Kuroshio frontal eddy.
8. Impact of *Porphyra yezoensis* (Nori) aquafarming on the water circulation in Ariake Sea, Japan.
9. Long term variation in transparency in Ariake Sea, Japan: The effect of reclamation Taiwan
10. Temporal variations of seawater chemistry under natural and anthropogenic forcings in the East China Sea.
11. Impact of long term habitat destruction on the resource of the *Anguilla japonica*.
12. Coastal cetacean distribution under the impact of long-term land reclamation activities.
13. Long-term fluctuations of the upwelling in the southern East China Sea shelf.
14. Impact of global warming on the circulations in the Yellow and East China Seas.

Taiwan

1. Temporal variations of seawater chemistry under natural and anthropogenic forcings in the East China Sea.
2. Impact of long term habitat destruction on the resource of the *Anguilla japonica*.
3. Coastal cetacean distribution under the impact of long-term land reclamation activities.
4. Long-term fluctuations of the upwelling in the southern East China Sea shelf.
5. Impact of global warming on the circulations in the Yellow and East China Seas.

SARCCM Oceanographers track floating objects to original location

SARCCM Oceanographers led by **Associate Professor Xiao Hua Wang, Director of The Sino-Australian Research Centre for Coastal Management**, were tracking the paths of identified floating objects to assist the search for missing Malaysian Airlines flight MH370 and pinpoint the crash site zone.

By using ocean modelling techniques the researchers have back-tracked and forward-tracked floating objects identified by the Australian Maritime Safety Authority (AMSA), the China National Space Administration (CNSA) and Malaysian Remote Sensing Agency (MRSA) satellites on 16, 18 and 23 March (see videos at: <http://pems.unsw.adfa.edu.au/SARCCM/Malaysia%20Flight/index.html>).

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 Weihai Government BEZ construction, Qingdao City Construction Investment Group (QCCI) marina management, legislative proposals of Jiaozhou Bay (JZB), and 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

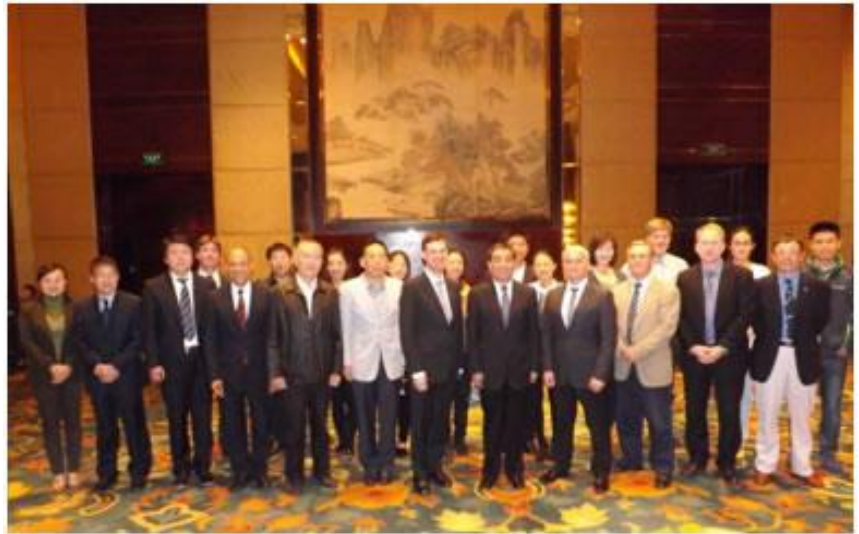
SARCCM Advisory Committee members:

- 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 Xiaohua Bu, 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, 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.

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 modelling (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

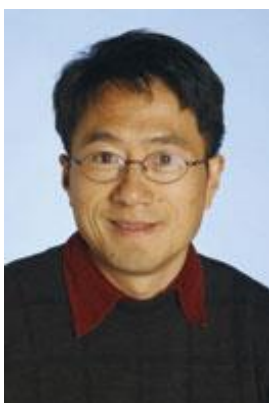
Program responsibility:

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 Bologna, 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 modelling, 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.

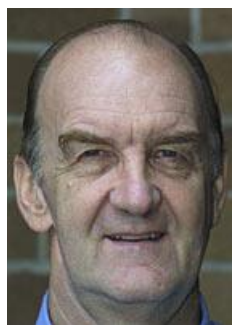
Andrew is the author of 12 books, seven covering every beach in Australia, and in 2008 published *The Coast of Australia*, the definitive book on Australia's coastline. He has also written more than 200 publications covering a wide range of coastal topics.

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 & Shengan 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, Intl 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

SARCCM 2013/2014 Report for 5th Advisory/Management Committee Meeting

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.

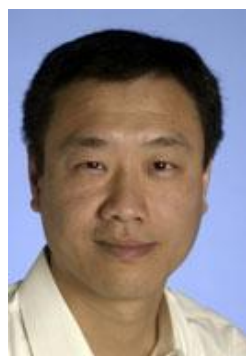


Dr David Leary is a **Senior Lecturer in the Faculty of Law at UTS** having joined UTS from the UNSW Sydney. He is admitted as a Solicitor of the Supreme Courts of New South Wales and Western Australia and the High Court of Australia. He currently holds an unrestricted practicing certificate as a Solicitor 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 co-author 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*.

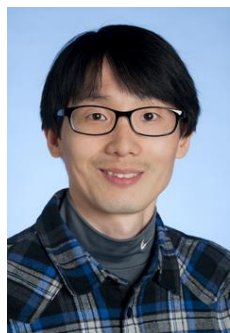


Dr Jian Zhang is a **Senior Lecturer in Politics** in the **School of Humanities & Social Sciences, UNSW Canberra**. He received his Bachelor's and Master's degrees from Zhejiang University, China and completed his PhD in Murdoch University, Australia. Prior to joining UNSW Canberra in 2000, he formerly 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 Gesellschaft) 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 Strait 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 Modelling 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 & the Middle East.

SARCCM welcomed two new researchers in 2014: **Professor Peter Steinberg** and **Dr Moninya Roughan**. Peter is a **Director and CEO of the Sydney Institute of Marine Science (SIMS)**, **Professor of Biology and Director of the Centre for Marine Bio-Innovation** at The University of New South Wales, and **Co-Director of the Advanced Environmental Biotechnology Centre** at Nanyang Technological University in Singapore. **Moninya is a physical oceanographer** with expertise in coastal and continental shelf dynamics. She is also affiliated with **UNSW Sydney and SIMS**.

Current Research Students:

Field of Study: Oceanography

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

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

Zhixin Cheng, MPhil, - Research Topic - Hydrodynamic study of sediment transport patterns in estuary and coastal area: Case study on Yalu River Estuary.

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

Wenyun Guo, (ECNU Joint Training PhD student) - Research Topic - Numerical study of sediment dynamics in Shanghai Port.

Maozeng Jiang, PhD - Research Topic - Legal and cultural frameworks for risk management in Antarctic and Subantarctic areas: What Informs Australia's and China's positions and activities in relation to environmental protection.

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

Saiful Marbun, MPhil - Research Topic - Impacts of marine and fisheries industrialisation and the blue economy policy in Indonesia on the local communities and the environment in Indonesia.

Amanda Putri, PhD - Research Topic - Water pollution in Jakarta Bay and the impacts on environmental degradation and social-economic aspects of local fishers.

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

Ziyu Xiao, (Amanda), PhD - Research Topic - Modelling hydrodynamics and sediment transport in Sydney Harbour.

Haifeng Zhang, PhD - Research Topic - Investigating sea surface temperature diurnal variation over the tropical warm pool using MTSAT-1R.

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.

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

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>.

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 and Visiting Fellows:

- **Prof. Eric Wolanski**, JCU
- **Mr David Williams**, AIMS
- **Prof. Xiaopei Lin**, OUC
- **Dr Jianyu Hu**, Prof. of Physical Oceanography, State Key Laboratory of Marine Environmental Science, College of Ocean and Earth Sciences, Xiamen University, China is visiting SARCCM from 16/4/14-15/10/14 to carry out collaborative research for the project entitled 'The coastal eddies and upwellings'.
- **Dr Chunhui Zhou** is a Visiting Fellow to SARCCM, sponsored by the China Scholarship Council (CSC). Dr Zhou is from the School of Navigation, Wuhan University of Technology, China. Chunhui will be visiting SARCCM for 12 months. He is an expert in Photogrammetry and Remote Sensing and will be working with A/Prof. Xiao Hua Wang on a project entitled 'Remote sensing of coastal upwelling along the southeast coast of Australia'.

SARCCM Meetings & Workshops:

- **Four SARCCM members speak at the China Qingdao International Blue Economy Forum 2013**

In **November 2013**, three Australian 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 (November 2013)**

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 km² site will include 10M m² 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.

▪ ***Radio Interview December 2013 - "South Korea's west coast vulnerable to China's unbridled development"***

In December 2013, ABC Radio Australia ran an interview reporting SARCCM's 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>)

▪ ***SIMS/SARCCM Visit to OUC on March 3rd, 2014***

On the morning of March 3rd 2014, Prof. Li Huajun (Vice President of the Ocean University of China (OUC)) met Prof. Peter Steinberg (Director, CEO of the Sydney Institute of Marine Science (SIMS)), Prof. Warrick Lawson (Head of School, School of Physical, Environmental and Mathematics Sciences), as well as A/Prof. Xiao Hua Wang (Director of the UNSW Sino-Australian Research Centre for Coastal Management) at its Laoshan campus. They exchanged views towards strengthening the research cooperation and collaboration of the World Harbour Project (WHP).

Prof. Li Huajun welcomed the visitors and reviewed the history of cooperation with the University of New South Wales. He introduced the background of OUC and said that OUC would enhance its cooperation with the SIMS and UNSW in student exchange as well as joint research via the WHP. Prof. Peter Steinberg said that they had chosen OUC, Qingdao as a strategic partner, which showed its conformity and value to OUC in education and scientific research. During the meeting, Associate Professor Liang Shengkang from OUC presented a paper on the variability of the water quality of Jiaozhou Bay due to Qingdao's urbanization during the past 60 years. He pointed out that the main reasons for the deterioration of sea water quality in the Bay were the rapid increase of land-based pollution, and the ever-increasing intensity of the land reclamation.

A/Professor Xiao Hua Wang introduced his team's research results in studying the effects the Jiaozhou Bay reclamations on its tidal dynamics. One of the team's research conclusions is that reopening the Hongdao Island waterway would make little impact to increasing the residual tidal currents or improve the flushing of the Bay. Their research has attracted much attention by the Qingdao Environmental Protection Bureau and the Municipal Government of Qingdao, because it could provide scientific guidance on reopening the Hongdao Island waterway. This guidance may save billions of dollars for the country. Meanwhile, A/Prof. Wang said that the different locations of the reclamations had various influences on the tides of Jiaozhou Bay, which had provided a useful reference for Qingdao's future urban development. In a speech, Prof. Warrick Lawson expressed his wishes to strengthen the mutual understanding through communications and further enhance the cooperation between UNSW and OUC. OUC colleagues from the International Exchange and Cooperate Centre, College of Ocean Environmental and Engineering, College of Law and Politics, College of Chemistry and Chemical Engineering, and the College of Marine Geosciences, attended the meeting.



SIMS/SARCCM delegation meeting with Vice President Prof. Li Huajun of OUC.

Further to the above meeting, OUC President Prof. Wu Dexin met the SIMS/SARCCM delegation on the morning of March 5th 2014. President Wu welcomed the delegation to OUC and again expressed his strong support for the WHP. He is looking forward to a successful SIMS/OUC research collaboration.



SIMS/SARCCM delegation meeting with OUC President Prof. Wu Dexin.

The Outcomes of the Visits:

The meetings of the SIMS/SARCCM delegation with OUC, QEPB, QCCI and SOA East China Sea Marine Monitoring Centre have led to the following agreements on the World Harbour Project:

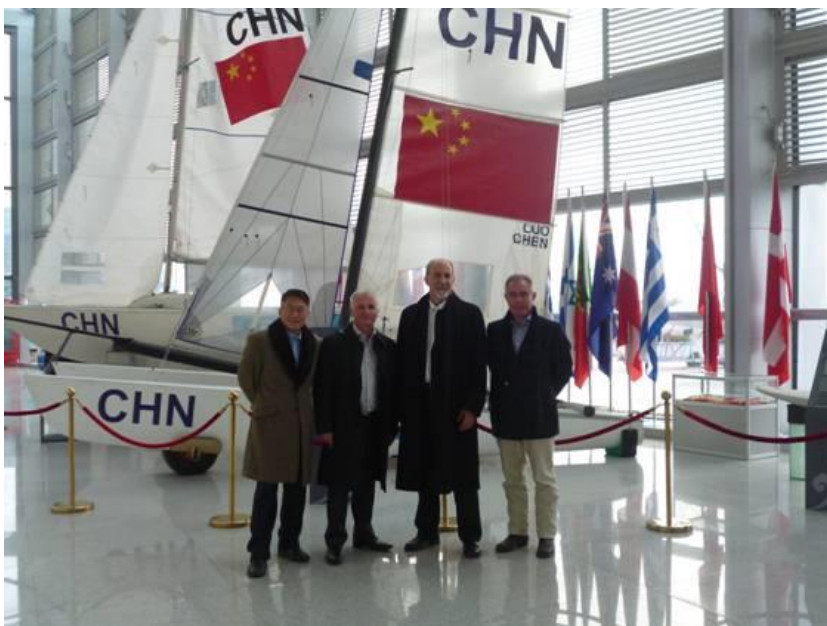
1. Letter(s) of intent to participate (in principle) in the WHP.
2. UNSW/OUC Jiaozhou Bay and Sydney Harbour Research Synthesis Workshop at OUC on 24 October 2014 to celebrate OUC's 90th Anniversary.
3. Participation in a workshop by SARCCM and appropriate other representatives from Qingdao/Shanghai at the IUCN Congress where the WHP would be announced and the work program of the WHP discussed and initiated.
4. In parallel pursuit of funding for the project, both in Qingdao/Shanghai and for the Australian component which will need to fund specific activities and an overarching framework. Some of this has begun with the NSW State Government.

▪ ***SIMS/SARCCM Visit to QEPB/QCCI on March 4th, 2014***

On the morning of March 4th, 2014, Prof. Peter Steinberg, Prof. Warrick Lawson and A/Prof. Xiao Hua Wang met with Mr Sun Hekun (Director of Qingdao Environmental Science Research Institute, Qingdao Environmental Protection Bureau (QEPB)). Mr Sun Hekun introduced his Institute's research on Jiaozhou Bay and their protection plan for the Bay, expressing their wish of further cooperation with SIMS/SARCCM. Prof. Peter Steinberg gave an introduction of the WHP and mentioned that this project would be launched on the IUCN's World Parks Congress this year in Sydney when scientists from more than 20 countries would discuss the same topic, and that it would be an important opportunity for cooperation with scientists from all over the world.

On the afternoon of March 4th, 2014, the delegation paid a visit to the Qingdao City Construction Investment Group (QCCI) and had a discussion with its Vice President Mr Xiaohua Bu as well as the other QCCI members. The Chairman of the Marina Industry Association of Australia, Mr Andrew Chapman, also attended the meeting. Prof. Peter Steinberg reported the background of SIMS, the Sydney Harbour Research Program and the WHP, including its current status. Mr Bu introduced the Qingdao Harbour construction project. Mr Chapman discussed marina and harbour management issues in Australia and expressed his strong support for the World Harbour Project. It should be noted that, under Mr Chapman's support, QCCI's Qingdao Marina had been accredited a 4.5 star ranking according to the world marina grading standard. Mr Xiaohua Bu said that the QCCI would continue to strengthen cooperation with the OUC as well as the Australian partners in order to protect Jiaozhou Bay's environment.

After the meeting, the Australian visitors conducted a tour around the Qingdao Olympics Sailing Venue and Museum.



Visiting Olympic Sailing Venue and Museum (from left: Xiao Hua Wang, Warrick Lawson, Peter Steinberg and Andrew Chapman).

▪ ***SARCCM Visit to State Oceanic Administration (SOA) East China Sea Branch in Shanghai on March 8th, 2014***

On March 8th, A/Prof. Xiao Hua Wang visited SOA East China Sea Marine Monitoring Centre in Shanghai. Hua presented SARCCM's work on Shanghai Port sediment dynamics, and discussed collaboration on the Changjiang estuary, green tides research and the WHP with the Director of the Centre, Prof. Xu Ren. Director Xu is very interested in the WHP and said that his Centre is keen to be involved.

▪ ***Report on SIMS/SARCCM Delegation to the State Oceanic Administration (SOA) East China Sea Branch, Shanghai, on the World Harbour Project***

In the afternoon on May 6 of 2014, SIMS/SARCCM delegation visited the State Oceanic Administration (SOA) East China Sea Branch in Shanghai. The delegation was welcomed by the Branch Director General Mr Liu Gaifu. Peter presented an introduction of the WHP; Moninya on the Sydney Harbour Research Program. Mr Xu Ren, Director of SOA East China Sea Marine Monitoring Centre, introduced his Centre's work on the Shanghai Port. He reported that SOA East China Sea Branch is interested to collaborate with

SIMS/SARCCM on the WHP. The Branch's proposal to collaborate with SIMS/SARCCM on the WHP is now under consideration in the SOA Central Office in Beijing.

After the meeting, the delegation toured the SOA research facility.



(From left to right) A/Prof. Xiao Hua Wang, Dr Moninya Roughan, Prof. Peter Steinberg of SIMS/SARCCM, Prof. Ren Xu of SOA, Dr Dehai Song of OUC and Dr Li Li of Zhejiang University at SOA East China Sea Branch in Shanghai.

▪ ***Report on SIMS/SARCCM Delegation to State Key Laboratory of Estuarine and Coastal Research (SKLEC), East China Normal University (ECNU) on the World Harbour Project***

In the morning on May 6 of 2014, Prof. Peter Steinberg, A/Prof. Xiao Hua Wang and Dr Moninya Roughan from the Sydney Institute of Marine Science (SIMS) and the Sino-Australian Research Centre for Coastal Management (SARCCM) at the University of New South Wales (UNSW), a partner in SIMS, visited the State Key Laboratory of Estuarine and Coastal Research (SKLEC), East China Normal University (ECNU). Prof. Yunxuan Zhou and SKLEC board members attended the discussion on the World Harbour Project and related issues.

During this visit, Prof. Yunxuan Zhou, Director of SKLEC/ECNU, introduced SKLEC about its team and research. Prof. Peter Steinberg, Director of SIMS, introduced about SIMS and the World Harbour Project (WHP). Dr Moninya Roughan reported her research on Sydney Harbour, the East Australian Current and EAC's roles in ecological connectivity. A/Prof. Wang presented his work on sediment transport dynamics in Darwin Harbour.

The World Harbour Project is a SIMS initiative aimed to facilitate, link and enhance programs of research and management across major urban harbours of the world, in order to help build resilience globally for these iconic urban waterways and the cities that surround them. SARCCM is both a part of this initiative and an independent research centre, at UNSW and is taking the lead to facilitate Chinese partnerships in the WHP. SKLEC is interested to join the WHP as the research team for Shanghai Harbours.

Planned activities for future cooperation:

- Try different funding sources globally
- SKLEC will send students to UNSW/SIMS for up to twelve months as visiting students, or four years for PhD degree. (Possible for dual PhD degrees?)
- Students can also apply for scholarships from UNSW directly.
- SKLEC welcomes SIMS students with CSC scholarships for both short term and long term study.

- SKLEC will send early-career scientists and technical staff to visit SARCCM and SIMS for short term research and training.
- SKLEC would like to invite scientists from SARCCM and SIMS to do short visit and give lectures to graduate students.
- SKLEC welcome scientists from SARCCM/SIMS to conduct cooperative research.

The group of the workshop has been invited to attend the workshop held by the Sino-Australian Research Centre for Coastal Management, October 24, 2014 at OUC, Qingdao.

WHP will be launched during Nov. 11-19, 2014, at the IUCN World Parks Congress in Sydney. A WHP specific workshop will be held immediately prior to the Congress, and SKLEC will be invited to attend the workshop and Congress.

Based on the above issues, SKLEC would like to formulate formal agreements with SARCCM and SIMS on collaboration framework. The first step is for ECNU to provide Prof. Steinberg and SIMS with a letter of support for the WHP.



SIMS/SARCCM delegation meeting with Director of SKLEC/ECNU Prof. Yunxuan Zhou and his Board of Directors.

▪ **OUC SARCCM Meeting, Qingdao, China, 8 May 2014**

Assoc. Prof. Xiao Hua Wang chaired an OUC SARCCM meeting in Bohai Hall, Blue Horizon Hotel Qingdao, on 8 May 2014. The purposes of the meeting are to: (1) summarize the progress made after the UNSW-OUC Workshop in mid-October 2013; (2) discuss the future SARCCM work plans.



Assoc. Prof. Xiao Hua Wang chaired an OUC SARCCM meeting in Bohai Hall, Blue Horizon Hotel Qingdao, on 8 May 2014.

Then five topics were discussed in the meeting:

1. ECSS Special Issue (ECSS Yellow Sea Special Issue)

Assoc. Prof. Xiao Hua Wang said the periodical has received 36 papers from countries and regions including China, Japan, Korea and Taiwan, in which 11 were rejected, 1 was received for publication, 5 needed further modification and 19 were still in examination as of March 31, 2014. The periodical is planned to be published by the end of this year. The quality of papers is generally good, especially those contributed by scholars from Ocean University of China (OUC), for there is no paper being rejected for language issues.

2. The establishment of Jiaozhou Bay Institute for Marine Science and Management (JIMSAM)

Assoc. Prof. Wang proposed to establish JIMSAM with reference to the Sydney Institute of Marine Science. Prof. Li Guangxue said that OUC once proposed to the Qingdao Municipal Government for the establishment of a special institute for the Jiaozhou Bay research during the demonstration period of “Development through Environmental Protection around the Jiaozhou Bay” and also negotiated with the Bureau of Science and Technology, but due to the government transition, there were no follow-up results. Assoc. Prof. Wang suggested that with the providence of the application documents by Prof. Li Guangxue and discussion during the meeting, Assoc. Prof. Liang Kangshen will formulate a new application and submit it to OUC again.

3. Application for the State Key Sino-Australian Laboratory

The development of the application for the State Key Sino-Australian Laboratory was reported by Prof. Ma Yingjie. Also, the related policies of Ministry of Education (MOE) on the approval of key Sino-foreign laboratories were introduced by Prof. Lin Xiaopei.

4. UNSW-OUC Research Workshop on 24 Oct 2014

Assoc. /Prof. Wang introduced the schedule of the October UNSW-OUC Workshop 2014: in the morning of October 23, 2014, the Australian delegation will arrive at Qingdao, and in the afternoon, a meeting with OUC CSC students and interviews will be arranged; On October 24, 2014 the UNSW-OUC Research Workshop will be held; on October 25, 2014 some of the delegation members will attend the 90th anniversary celebrations of OUC and OUC Global Ocean Summit on 25-26 October. The workshop will be attended by three delegations from Australia: UNSW Sydney, Sydney Institute of Marine Science and UNSW Canberra, and two delegations from the East China Normal University (ECNU) and the East China Sea Branch, SOA. The workshop will also be attended by members of Qingdao Municipal Institute of Environmental Protection and Qingdao City Construction Investment Group. The workshop title was identified as "The Comparative Study of Sydney Harbour, Shanghai Port and Jiaozhou Bay". The main topics include: sediment; interaction between estuaries and shelves; the impact of dredging, dam construction and reclamation on the environment; the impact of eutrophication on ecology; wetland research; ecology; ocean colour and light physics; coastal management and policy (law); disaster assessment and risk management; observation and remote sensing; coastal ecology economy and coastal engineering.

5. IUCN World Parks Congress (November 11 to November 19, 2014)

Assoc. Prof. Wang briefed the World Parks Congress and proposed OUC sending a delegation led by one of its Vice Presidents to attend the Congress, and the Qingdao Municipal Institute of Environmental Protection and Qingdao City Construction Investment Group can be members of the delegation. The deadline for the registration in grace period is June 30, 2014, while the deadline for registration is October 1, 2014.

List of Attendees:

Experts	Organizations	Titles
Wang Xiulin	College of Chemistry and Chemical Engineering, OUC	Prof.
Wang Xiaohua	Sino-Australian Research Center for Coastal Management, The University of New South Wales (UNSW)	Assoc. Prof. / Director
Fu Hui	Qingdao Municipal Institute of Environmental Protection	Senior Engineer
Gao Huiwang	College of Environmental Science and Engineering, OUC	Prof.
Li Guangxue	College of Marine Geosciences, OUC	Prof.
Lin Xiaopei	Key Laboratory of Physical Oceanography, MOE, China, OUC	Prof.
Ma Yingjie	Law and Politics School, OUC	Prof.
Liang Shengkang	College of Chemistry and Chemical Engineering, OUC	Prof.
Li Keqiang	College of Chemistry and Chemical Engineering, OUC	Assoc. Prof.
Ma Aihua	Alumni Association Office, OUC	Director
Zhao Jing	International Office, OUC	Vice Director
Li Li	Ocean College, Zhejiang University	Dr
Wu Wen	College of Physical and Environmental Oceanography, OUC	Dr
Song Dehai	Key Laboratory of Physical Oceanography, MOE, China, OUC	Dr

▪ **SARCCM and PEMS, UNSW Canberra participate at the AMSA Conference 6-10 July 2014**

The **Australian Marine Science Association (AMSA) 51st Anniversary Conference** was held recently (6-10 July 2014) at the National Convention Centre in Canberra. AMSA is the premier professional society for marine sciences in Australia. As such the event offered a great opportunity to engage with marine scientists, researchers, graduate students from universities, policy makers and environmental consultants for professional networking, exchanging ideas, identifying new collaborations and making new friends. The School of Physical, Environmental & Mathematical Science (PEMS), UNSW Canberra and the Sino-Australian Research Centre for Coastal Management (SARCCM) was well represented at the conference with PhD student **Shengnan Chen** giving an oral presentation; **Xiaohua Wang, Robin Robertson, Amanda Putri, Saiful Sahat Tua Marbun, Stuart Pearson, Fernando Pinheiro Andutta, Younjong Sun** each presenting a poster (presentation titles below); and **Amanda Xiao** attending.

The posters were displayed over four days and the delegates answered many different questions about presented research projects and postgraduate research at UNSW Canberra. Shengnan Chen did very well with her talk and received good feedback from the interested audience. The conference ended up with a fantastic gala dinner at Old Parliament House.

PEMS's sponsorship is acknowledged for an exhibition stand where SARCCM and PEMS Oceanography research was displayed throughout the conference.

Posters:

- **Amanda Putri and Stuart Pearson** – Poverty and pollution impacts in Jakarta's fishing villages.
- **Robin Robertson** – Investigating tidal effects on mixing and cross-shelf transport and their impacts on nitrate and other nutrient concentrations.
- **Sheng-Kang Liang, Stuart Pearson, Wen Wu, Ying-jie Ma, Lu-lu Qiao, Xiao Hua Wang, Ling-mei Li and Xiu-lin Wang** – Review of research and management of Jiaozhou Bay, Qingdao, China.
- **Wen Wu, Xiao Hua Wang and David Paull** – Evaluating the Australian Defence Force environmental management system: A case study of Shoalwater Bay Training Area, Queensland.
- **Shengnan Chen and Stuart Pearson** – Comparison of the legal and regulatory frameworks surrounding marina developments in Qingdao and Sydney.
- **Li Li, Xiao Hua Wang, David Williams and Fernando Andutta** – Effects of the mangroves and tidal flats on suspended sediment transport in Darwin Harbour, Northern Territory of Australia.
- **Youn-Jong Sun, Xiao Hua Wang and Donghui Jiang** – A coastal upwelling by wind-driven forcing in Jervis Bay, NSW – A numerical study of 2011.
- **Saiful Marbun and Stuart Pearson** – Indonesian Marine Policy – Impacts of fisheries industrialisation and the Blue Economy Policy.



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:

2014

Book Chapter

Andutta, F., Wang, X.H., Li, L. & Williams, D., 2014, Hydrodynamics and sediment transport in a macro-tidal estuary: Darwin Harbour, in: Eric Wolanski (ed.), *Estuaries of Australia in 2050 and Beyond*, Springer, Dordrecht, ISBN, 978-94-007-7018-8. SARCCM Paper No. 13.

Journal - Refereed & Scholarly Article

Gao, G.D., Wang, X.H. & Bao, X.W., 2014 (accepted), Land reclamation and its impact on tidal dynamics in Jiaozhou Bay, Qingdao, China, *Estuarine, Coastal and Shelf Science*, doi: 10.1016/j.ecss.2014.07.017, SARCCM Paper No. 19.

Li, L., Wang, X.H., Andutta, F. & Williams, D., 2014 (accepted), Effects of mangroves and tidal flats on suspended-sediment dynamics: Observational and numerical study of Darwin Harbour, Australia, *Journal of Geophysical Research: Oceans*, doi: 10.1002/2014JC009987, SARCCM Paper No. 17.

Hu, J. & Wang, X.H., Progress on upwelling studies in the China Seas since 2000, *Progress in Oceanography*. June 2014 submitted, SARCCM Paper No. 21.

Wang, X.H., Bhatt, V. & Youn-Jong, S., 2014 (May resubmission), Seasonal and inter-annual variability of western subtropical mode water in the South Pacific Ocean, *Ocean Dynamics IWMO2013 Special Issue*, SARCCM Paper No. 18.

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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