



## Happy Chinese New Year!

Welcome to 2018 and the year of dog! This year also marks a decade of CAGS activities. Initiated in 2008, the China Australia Geological Storage of CO<sub>2</sub> (CAGS) project is now in its third phase (2016-December 2018). CAGS is a collaborative program between the Australian and Chinese governments and is managed by Geoscience Australia (GA) in partnership with the Administrative Centre for China's Agenda 21 (ACCA21).

Since our last newsletter, we have made great progress on capacity building activities, CCUS research projects and exchange programs. We have two exciting new announcements:

### The CAGS-sponsored CCUS symposium (27-29 June, Perth) is calling for papers with abstracts due on 15 April.

More details can be found in this newsletter or by visiting [Applied Energy CCUS symposium](#).



### Round two for the CAGS exchange program is now open for 2018 applications (deadline 15 April).

More details can be in the next section or by visiting [CAGS website](#).

## SCIENTIFIC EXCHANGES

The CAGS3 scientific exchange program offers a mechanism for Australian and Chinese researchers working in the field of geological storage of CO<sub>2</sub> to collaborate through knowledge sharing and joint activities.

**Round two of the CAGS exchange program is now open for 2018 applications.** If you are interested in applying, please visit [CAGS website](#) for more information or [contact us](#). Applications are to be submitted by 15 April 2018; the exchanges are to be completed by 30 September 2018.

CAGS sponsored eight researcher exchanges during 2017.

#### 1. [Dr Zhejun Pan](#) (CSIRO) to Institute of Rock and Soil Mechanics, Chinese Academy of Sciences



Dr Pan presenting at IRSM

Dr Pan, from the Australian Government Commonwealth Scientific and Industrial Research Organisation (CSIRO), visited the Chinese Academy of Sciences Institute of Rock and Soil Mechanics (IRSM) in Wuhan in May and June 2017. He worked with Prof Qi Li and his team on CO<sub>2</sub> storage in aquifers to enhance water recovery, which has significant environmental and economic implications in places such as Xinjiang, China and the Cooper Basin, Australia. Through numerical studies and laboratory measurements, they studied the impact of fault permeability on the sealing capability of CO<sub>2</sub> injected in saline aquifers. The visit also provided an excellent opportunity for Dr Pan and researchers at IRSM to discuss topics such as CO<sub>2</sub> storage in coal seams and enabled further strengthening of the collaboration between the two organisations.

## 2. [Dr Ruina Xu](#) (Tsinghua University) to Sydney University



*Dr Xu with Prof Wiley at Sydney University*

During her visit to the School of Chemical and Biomolecular Engineering at the University of Sydney in July and August 2017, Dr Ruina Xu worked closely with Prof Dianne Wiley to study the impact of flexible CO<sub>2</sub> transport on the safety of CO<sub>2</sub> transport and geological storage. This collaboration is providing insights into the operation of the whole CCS chain in order to promote the development of new ideas and solutions to issues related to the practical implementation of large-scale commercial CCS projects.

## 3. [Dr Matt Myers](#) (CSIRO) to China University of Petroleum, Beijing



*Dr Myers at China University of Petroleum, Beijing*

Dr Matt Myers was hosted by Prof Bo Peng from the China University of Petroleum in Beijing from August to September 2017. He worked with researchers on X-ray CT imaging of core samples and the development of research plans to collaborate in the areas of chemical tracers and core flooding. During his exchange, he visited researchers working in CCS

related areas in Shanghai, Wuhan, Guangzhou and Qingdao. The exchanges resulted in his collaboration with Chinese researchers on the publication of several papers related to chemical tracers and possible submission of joint funding proposals related to experimental studies on CO<sub>2</sub> clathrates.

## 4. [Dr Liuqi Wang](#) (GA) to Xinjiang Oil Co. & Center for Hydrogeology and Environmental Geology Survey, China Geological Survey

Dr Liuqi Wang visited Karamay Research Institute of Petroleum Exploration and Development, Xinjiang Oilfield in September 2017. During his visit, Dr Wang worked with the modelling team for CO<sub>2</sub>-EOR in the Petroleum Development Section on developing both static and dynamic reservoir models for a CO<sub>2</sub>-EOR project in the Junggar Basin.

After Karamay, Dr Liuqi Wang undertook his exchange at the Center for Hydrogeology and Environmental Geology Survey, China Geological Survey (CHEGS, CGS), Baoding, Hebei Province in October 2017. In Baoding, Dr Wang worked with the reservoir modelling team on CO<sub>2</sub>-EWR (enhanced water recovery) in the Junggar Basin.



*Dr Wang with colleagues from China Geological Survey*

During the exchange period, Dr Wang shared his knowledge and research experience on the recent Australian CCS activities and in the petroleum reservoir modelling through several presentations on reservoir modelling and CCS.

## 5. [Dr Sam Xie](#) (Curtin University) to China University of Petroleum, Beijing

During his three-month exchange to the School of Petroleum Engineering, China University of Petroleum (Beijing), Dr Xie worked with Prof Xinwei Liao and his team on the effect of changes in net effective pressure on multiphase flow during CO<sub>2</sub>

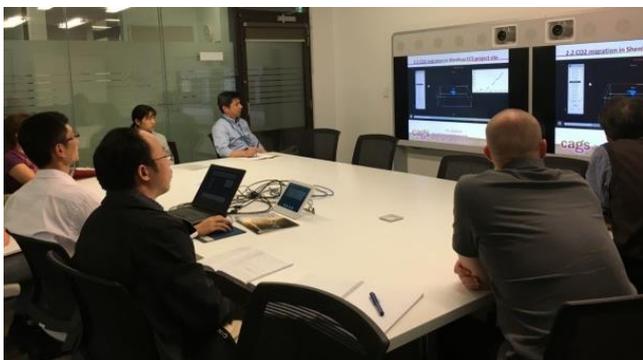
storage, which has significant environmental and technical implications. His research included assessing CO<sub>2</sub> storage potentials in China's Songliao and Ordos basins, and Australia's Gippsland and Otway basins. This exchange has promoted further collaboration between Curtin University and CUPB, and will be beneficial for CCUS research in China and Australia.



*Dr Xie presenting at China University of Petroleum*

#### 6. [Dr Yujie Diao \(CHEGS, CGS\) to CSIRO](#)

Hosted by CSIRO, Dr Yujie Diao undertook an exchange at the Department of Earth Science and Resource Engineering in Melbourne from November to December 2017. He focused his research on reservoir modelling of CO<sub>2</sub>-EWR in East Junggar Basin working closely with Prof Jonathan Ennis-King's team. During his visit, he also visited CO2CRC Otway project, Geoscience Australia, National Geosequestration Laboratory and Western Australian Government's Department of Mines, Industry Regulation and Safety in Perth.



*Dr Diao sharing his research with colleagues from CSIRO in Melbourne*

#### 7. [Mr Chengkai Fan \(IRSM, CAS\) to Monash University](#)

In August 2017, Mr Chengkai Fan, a postgraduate student from the Institute of Rock and Soil Mechanics (IRSM), participated in a three-month exchange at Monash University. Studying under the supervision of Prof Ranjith Gamage of the Department of Civil Engineering School, Mr Fan conducted laboratory experiments investigating how pressure and salinity influences the saturation of solutions after CO<sub>2</sub> was injected into core specimens at different pressure levels. The study aims to better understand CO<sub>2</sub> migration mechanism and CO<sub>2</sub> sequestration efficiency.

With the assistance of Dr Zhejun Pan from CSIRO, Mr Fan completed a paper on monitoring core flooding experiments of saline water saturated sandstone using high-precision fiber Bragg grating (FBG). He will continue his collaboration with researchers from Monash University and CSIRO.



*Mr Fan at the 3Gdeep laboratory at Monash University*

#### 8. [Mr Xufeng Li \(CHEGS, CGS\) to Geoscience Australia](#)

Xufeng Li visited Geoscience Australia (GA) from 30 September to 28 November 2017 in Canberra. Mr Li focused his research on hydrogeological mapping of carbon dioxide enhanced water recovery (CO<sub>2</sub>-EWR) in the Junggar Basin together with Dr Andrew Feitz, the leader of the CCS research team at GA. Mr Li

worked closely with GA researchers who recently produced the highly acclaimed *Hydrogeological Atlas of the Great Artesian Basin*. Their experience and expertise greatly assisted Li in developing a hydrogeological map of the Junggar Basin in China. Xufeng Li was also invited by GA to participate in the groundwater sampling fieldwork of the Nulla Basalt Province drilling program in Charters Towers in Northern Queensland and gained invaluable knowledge of fieldwork processes and operations in Australia.



Mr Li with colleagues during a groundwater survey in Queensland

## CAPACITY BUILDING ACTIVITIES

### **CAGS3 Symposium, 26 June 2018, Perth, Australia**

CAGS Phase Three will conclude by the end of 2018. CAGS is organising a symposium to celebrate the achievement of Phase Three and ten years of formal cooperation between the Australian and Chinese governments. The symposium will be held on 26 June 2018 in Perth. The sessions will include results from CAGS3 research projects, CAGS achievements, CCS /CCUS projects updates, and opportunities for continuing collaboration between China and Australia.

Participation in the symposium is by invitation.

### **Applied Energy CCUS2018 Symposium, 27-29 June 2018, Perth, Australia**

Following the one day CAGS symposium, CAGS in collaboration with the international journal, *Applied Energy*, and Applied Energy Innovation Institute (AEii) will be holding a two-day technical symposium to share the most recent progress of research in carbon capture, utilization and storage in Perth on 27-28 June. The participants will have the opportunity to visit the Western Australian Government's [Southwest Hub CCS project](#) during a field trip on 29 June.

### **The CCUS2018 symposium is currently calling for papers (abstracts due on 15 April 2018).**

If you are interested in participating or presenting at the symposium, please visit [Applied Energy CCUS2018 symposium](#).

## RESEARCH PROJECTS

The three research projects funded by CAGS Phase Three have been completed and the final reports are currently under review. The research outcomes will be shared at the CAGS3 symposium in Perth on 26 June 2018.

- Research Project 1: A comprehensive Monitoring System for Yanchang CO<sub>2</sub>-EOR Demonstration Project
- Research Project 2: Prefeasibility Study on the Xinjiang Guanghui Fuyun Coal to Gas CCUS Pilot Project
- Research Project 3: CCUS Potential in Junggar Basin and the Opportunities for Pilot Projects in the Eastern Junggar Region

## UPCOMING EVENTS

26 June 2018: CAGS3 Symposium, Perth, Australia

27-29 June 2018: CCUS Symposium, Perth, Australia

Round two of the CAGS exchange program is open for 2018 [applications](#).