

Welcome to the Winter 2011 CICCS Newsletter!

Another year is closing and it was a very exciting one for CICCS. This last issue of 2011 is packed with exciting news!

We “refurbished” **our website** with improved information and navigation tools.

Our director Prof. Mercedes Maroto-Valer featured at the prestigious **BBC “Planet Earth”** the state-of-art experiments on mineral carbonation we are conducting at CICCS.

Hold your breath because you will follow our “scientist diver” Dr. Giorgio Caramanna during his **recent field-work** on the study of a submarine natural CO₂ seepage.

He did it again!. Qui Liu (Jerry) received another stunning **award for excellence** as a Chinese studying for a PhD in the UK. And speaking of prizes, Dr. Yolanda Fernández Díez won the II **Prize AZSA** 2011 from Spanish company Asturiana de Zinc, S.A. (AZSA) and the Fundación Universidad de Oviedo (Spain).

Yolanda and Giorgio were tutors for the **Summer Placement 2011**, where two outstanding undergraduate students had the opportunity to get their “hands on” experiencing what a future would be like as researchers. Several CICCS members attended **interesting conferences** on CCS topics.

The CICCS was also proudly selected to be one of the **“champions”** for the University of Nottingham’s “Impact” fund-raising campaign.

Last but not least in this newsletter, we would like to introduce you a **fundraising initiative** co-organized by Giorgio and aimed to support the Japanese Red Cross for the aftermath of the earthquake and tsunami which hit Japan in March 2011. As some of you may remember from our Autumn newsletter, Giorgio was in Tokyo as a visiting researcher at the Kashiwa Campus when the earthquake happened.

Our best wishes for the upcoming winter holidays. See you in 2012!



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A renewed CICCS website is online on the University of Nottingham portal. The new structure follows the upgraded layout of the University’s website with a clearer format and easier navigation through the webpages.

On the website you will find more information about the CICCS activity, our people, useful links and contacts and, of course, a copy of this and of previous newsletters.

<http://www.nottingham.ac.uk/ciccs>



The new CICCS webpage

Dr Yolanda Fernández Díez, a postdoctoral researcher in the CICCS since March 2011, received the II Prize AZSA 2011 from Spanish company Asturiana de Zinc, S.A. (AZSA) and the Fundación Universidad de Oviedo. As the award winner, Yolanda will receive eighteen thousand euros to develop a project based on the “Development of visible light-driven photocatalytic processes for CO₂ reduction” in the CICCS. The award ceremony was presided over by director of metallurgical operations for AZSA, Jaime Arias; vice-chancellor of the University of Oviedo, Vicente Gotor, and research assistant vice-chancellor, Santiago García Granda.

Yolanda presented the main aspects of her project and emphasized the fact that this project is included within CCS technologies, and more specifically, CO₂ utilization. This innovative option provides an alternative to CO₂ storage in that it not only reduces CO₂ emissions, but also converts CO₂ into useful products.



Dr Yolanda Fernández Díez (right), at AZSA Prize

Mr. Qi Liu (Jerry) has received the Chinese Student Award by GBCET (Great Britain-China Educational Trust). This award aims to reward “The Genius” – the academic excellence of a Chinese student studying for a PhD in the UK. Mr Qi Liu is on the final year of his PhD at CICCS under the supervision of Prof. Mercedes Maroto-Valer. Mr Liu's performance is outstanding and he has published several refereed journal papers and conference proceedings. He has also been awarded the 2011 Chinese Government Award for Outstanding Chinese Students Studying Abroad by the China Scholarship Council. Congratulations, Jerry!



Mr. Qi Liu working at his experimental rig

Prof. Mercedes Maroto-Valer was featured in the “Planet Earth” podcast ‘Where do all the salmon go, and making CO₂ bricks.’

Carbon capture and storage is being touted as one of the most promising ways to cut CO₂ levels in our atmosphere. The idea is to capture the gas as it's released from power stations and pump it deep underground. But what if you could do something more useful with it, like turn it into bricks?

Richard Hollingham from “Planet Earth” went to the University of Nottingham to find out more about this emerging technology, dubbed carbon capture and utilisation.



Prof. Mercedes Maroto-Valer and the CICCS team showing a “CO₂ brick”

Dr. Giorgio Caramanna went to the island of Panarea in southern Italy at the beginning of October to conduct some field-work on the study of the impact of CO₂ seepage on the marine environment.

The studied area is characterized by the presence of volcanic gas vents on the seafloor in shallow water and it is used as a “natural-lab” to test detection and monitoring techniques for potential CO₂ seepage from sub-seabed geological storage sites.

Giorgio was joined by researchers from the University of Plymouth and two colleagues from Kyushu University in Japan. A short video of the underwater research activity is available at:

<http://www.nottingham.ac.uk/ciccs/videos/panarea.a.aspx>



Testing CO₂ sensors in Panarea

The CICCS team participated in the “Ingenuity” event of “Impact: The Nottingham Campaign.” This five-year fundraising campaign is aimed at achieving £150 million in philanthropic support for the University. The Campaign builds upon existing strengths and capacity by supporting research priorities that tackle global issues, including carbon capture and storage. The CICCS team, together with colleagues from BGS, are developing novel geological and engineering solutions to meet worldwide demand for environmentally-friendly and cost-effective energy. Addressing the issue of global warming through CCS could also create huge commercial opportunities and thousands of jobs.

More information and a video featuring the “Ingenuity” event can be found at:

<http://www.nottingham.ac.uk/impactcampaign/campaignpriorities/ingenuity/ingenuity.aspx>



The CICCS team presenting at the “Impact Campaign”



Impact
The Nottingham Campaign

Giorgio and Yolanda were tutors for “summer placement” students, who worked with them for two months. The aim of this placement was to give to undergraduate students some practical research experience.

Miss Mei Ying, BEng Environmental Engineering, collaborated on a very innovative experiment aimed at understanding the effects of CO₂ seepage on the environment. This topic is one of the most important for risk management and gaining public acceptance of CO₂ storage projects. The experiment generated a lot of interest which led to collaborations within the Faculty of Engineering at the University of Nottingham and with researchers from other universities in the UK (University of Plymouth and Hull University), in Europe (University of Rome, German Geological Service) and overseas (USA, Japan). Mei was followed by Giorgio and by Miss Yang Wei, who is finishing her PhD working on these experiments.



Miss Mei (left) and Miss Wei controlling the experiment

PhD students Oluwafunmilola (Funmi) Ola, Dong Liu, Rea Laila Antoniou Kourouniotti attended this year's International Conference on Carbon Dioxide Utilisation (ICCDU) held in Dijon (France) last June. They presented two posters and an oral communication outlining their work on CO₂ photoreduction using different TiO₂ catalysts. Our team spoke with experts in the field and received a lot of interest including very useful feedback and suggestions. We are anticipating some successful collaborations following these discussions.

Mr Junwei Yang, BEng Environmental Engineering, worked with Yolanda in the field of CO₂ photoreduction, with the aim of synthesising photo-catalysts with efficient activity under visible light to convert CO₂ into CH₄.

This option opens another route within CCS technologies, namely CO₂ utilisation, which offers not only reduction of emissions to meet environmental targets, but also sustainability and safe conversion. Yunwei's work dealt with the preparation and characterisation of titania based photocatalysts after single and co-doping of TiO₂ using nitrogen and different metals. Yunwei was trained on the use of different techniques, such as X-ray diffraction or X-ray photoelectron spectroscopy, and had the opportunity to acquire laboratory experience.

We hope that Mei and Yunwei enjoyed their summer placement and that they will decide to pursue a research career.

Funmi and Rea also attended the Artificial Photosynthesis, Faraday Discussion in Edinburgh, Scotland, in September on the use of artificial photosynthetic systems for solar fuel production. They presented two posters and an oral communication. This conference provided a multidisciplinary forum for joining outstanding scientists to discuss recent innovations in artificial photosynthesis. Not only did it represent an opportunity to broaden their knowledge and understanding of this vast field, but it also created a platform for the exchange of ideas and up-to-date information that can be incorporated into their research. The event was an excellent networking opportunity.

The 3rd International Symposium on Occupational Scientific Diving (ISOSD 2011) was hosted by the Italian Association of Scientific Divers (AIOSS) in Porto Cesareo, Lecce, Italy. More than seventy delegates gathered in November for the bi-annual event to present their research and to discuss the future of scientific diving as a tool for scientists who are involved in a wide range of studies – from biology to geology and archaeology.

Dr. Giorgio Caramanna of CICCS was a member of the organising committee and chaired the geology session of the symposium and a round table on the safety of scientific diving. He also presented research he conducted by means of scientific diving techniques.

The new edition of John Heine's book *Scientific Diving Techniques* was also released at the symposium. This edition enhances a book that is still considered to be the main reference source for scientific diving. Giorgio contributed to the book with several pictures of techniques he uses during his underwater research activity to study the presence of CO₂ in marine environments.



The ISOSD 2011 conference



Giorgio (centre) with colleagues



Marco visiting the Puertollano plant

Mr. Marco Dri, one of our most promising (and photogenic!) PhD students, attended the 2011 International Clean Coal Technology Conference in Zaragoza, Spain. The event was organized by the IEA clean coal centre and the Instituto de Carboquímica (ICB) Zaragoza.

Marco presented the poster “Utilization of industrial waste materials for value-added permanent sequestration of CO₂” and a paper was also published in the conference proceedings.

The conference gave the attendees the opportunity to visit the IGCC plant in Puertollano, and Marco really enjoyed it.

Dr. Aimaro Sanna attended the “International Conference on Coal Science and Technology 2011” organised by the National Institute of Coal (INCAR-CSIC) in the city of Oviedo, Spain. This bi-annual conference is focused on coal, which is expected to continue to play an important role in the energy mix over the next 150-200 years based on reserves available. The conference was very interesting and over 230 presentations on different aspects of coal science and technology were presented. Among them, about 40 presentations were on CCS. Aimaro successfully presented a work on the improvement of the CCS mineral carbonation technology developed at Nottingham.



Thinking of Homeland Japan

Dr. Giorgio Caramanna was a visiting researcher at the University of Tokyo during the time of the March 2011 earthquake. Soon after his safe return to UK, he started to co-organise, together with Kate Ferrucci of Quarto Design and illustrator Saeko Furukata, a project to benefit the Japanese Red Cross.

"Thinking of Homeland" is a limited-edition set of 20 art prints by Japanese artists in a wood frame. The mission is to raise funds for the Japanese Red Cross to assist with the ongoing support needed in areas affected by the earthquake and tsunami in Japan, through the sale of this collection of prints.

All proceeds collected via the sale of the edition will be donated to the Japanese Red Cross. For more information and to see images of the prints:

<http://www.thinkingofhomeland.wordpress.com/>

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