

# Petroleum Geoscience and Engineering at Manchester

December 2009

*This is the first issue of a quarterly newsletter about Petroleum Geoscience and Engineering research and teaching being undertaken within the University of Manchester, this issue focuses on the School of Earth Atmospheric and Environmental Sciences.*

## Articles:

- New MSc course starts in 2010
- Petroleum Engineer strengthens teaching team
- Leading Carbonate Research

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## Record MSc applications

This year has seen a significant increase in the number of applications for the Petroleum Geoscience MSc, and a record intake of 43 students, reflecting both the wider increase in applications experienced by all Universities, and our increasing international reputation as one of the leading Petroleum Geoscience and Engineering establishments in the UK. We have an international group, with students from

UK/EU, Nigeria, Egypt, Kazakhstan, Brunei, Pakistan and Spain.

Extra staff will assist on fieldtrips and more demonstrators used in practicals. To maintain the close interaction with students, an additional field trip is planned for 2010 to Ireland with Prof Brian Williams, to run in

parallel with the Mallorca field course, so each trip will run with 20-25 students.

A new dedicated teaching facility opened this summer and we are now upgrading to 45 workstations to meet the increased demand (see suite below).



## New MSc course to start in 2010

Next year (2010) we will offer a new MSc stream, ***Petroleum Geoscience for Reservoir Production and Development***.

This course combines the teaching and research strength of our geoscience and chemical engineering schools. The oil industry has clear objectives to maximize recovery from oil and gas fields, and to extend the life of existing fields. This course aims to meet the

need for skilled personnel by training graduates that specialise in appraisal / development / production geoscience and the fundamentals of reservoir engineering.

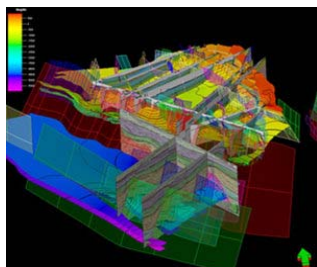
Building upon the established international reputation of the ***Petroleum Geoscience MSc*** at Manchester University, the programme draws upon the expertise of our strong clastic and carbonate

research groups. The course concentrates on characterization and modeling of the reservoir, fluid flow, and the impact of recovery mechanisms and dynamic displacement.

The new course structure will allow us to restrict entry to approximately 25 on each MSc, and maintain the level of contact and specialism we value.



*“Petroleum Engineering at Manchester - building on strong foundations.”*



Sophisticated 3D modelling in Petrel

## BP Scholarships for Manchester University

BP is offering six scholarships aimed at 1st and 2nd year undergraduate students within the School of Earth Environmental and Atmospheric Sciences, and two scholarships on the Petroleum Geoscience MSc. The aim of the scholarship is to recognize, reward and support academic

excellence and support the potential for future achievement.

Students who are awarded one of BP scholarships will not only receive a financial reward but will also get the opportunity to gain an insight into the exciting careers available in BP and will be able to forge

strong relationships with industry experts. Successful applicants will also receive a guaranteed place at a BP assessment centre.

This is in addition to 3 NERC scholarships available on the MSc and other scholarships available for overseas students (Exxon, PTDF).

## New appointments strengthen teaching team

Dr Rossmary Villegas has joined CEAES in December, strengthening the Petroleum Engineering teaching team, both for the undergraduate BEng and MEng courses, and the new Reservoir Development and Production MSc due to start in 2010.

Rossmary previously taught at Leeds University, and has

industrial experience from her time working with PDVSA in Venezuela.

In April Dr Mads Huuse joined the group from Aberdeen University as Reader. His research areas are in seismic analysis, injectites, fluid flow, glacial geology and basin evolution.

Jim Armstrong, with 25+ years industry experience

as a geochemist, also joined in 2009 as Senior Teaching Fellow, taking over as the Petroleum Geoscience Course Director and supporting the Petroleum Engineering students.

Further appointments are anticipated in 2010

## Manchester – new Dallas of the North?

Manchester may not be the first “oil town” to spring to mind, but the growth of our research and taught courses has put Manchester firmly on the map as far as international oil companies are concerned

when recruiting staff and conducting collaborative research projects. An increasing number of companies come to Manchester to present to the students, both MSc and undergraduates, looking to recruit the

best, as well as to support our growing research. These included ExxonMobil, Statoil, Conoco, Talsiman, Neflex, Hess, BP and Shell. Many companies followed up the presentations with a day of initial interviews.

## RAE Results – International Excellence

The research excellence in Earth Atmospheric and Environmental Sciences is well-established through the recent external review. The school has a renowned research rating and strong links with industry that provide students with an extensive range of opportunities. The school has excellent facilities and a state of the art computer workroom, including a new 3-D

visualisation centre. Results from RAE2008 confirm that SEAES is among the top Earth and Environmental Sciences Departments in the UK (in the top 20% out of 41 submissions assessed by the Earth Systems and Environmental Science sub-panel). 70% of our assessed research activity was rated as internationally

excellent, including 20% rated as world-leading



Manchester ranked among Top 5 UK Universities

## Petroleum Systems Software – a first for Manchester

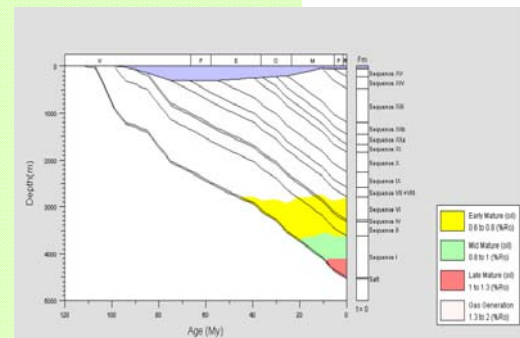
Platte River Associates has donated \$500,000 worth of software for Petroleum System analysis

The two software packages, BasinMod and Petroanalyst can be used together or individually to assess hydrocarbon prospectivity in basins or just licence block. These packages will be used for teaching and research.

The addition of these programmes builds on our basin modelling capability, with access to a suite of basin modeling packages including Zetaware's Genesis and IES's PetroMod suite.

Several projects, looking at relatively under-explored areas have been produced by past MSc students and this new software capability will

allow students to produce more integrated assessments.



## LPS Careers Day - return visit

The London Petrophysical society (LPS) annual careers day will be hosted by Manchester University in 2010. This event, which was last held in Manchester in 2007, will be held on January 27th. The aim is to introduce

Msc students from around the country to petrophysics, meet with leading representatives of companies and showcase potential careers. During the day a number of lectures will present both the basics of petrophysics

and more advanced applications, plus advice on careers.

For further information contact Jim Armstrong  
james.armstrong@manchester.ac.uk



## Industrial Research Consortia - NARG

The **North Africa Research Group (NARG)** continues to conduct multi-disciplinary basin analysis research with a petroleum geoscience theme in Algeria, Egypt, Morocco, Libya and Tunisia. The research includes projects with integrated sedimentology, geochemistry, seismic interpretation, petrophysics and reservoir engineering theme, sponsored by 9

leading oil companies. This year field work has been undertaken in Sicily by Myron Thomas looking at deepwater channels within the Nummidian Flysch, and in Libya by Laurent Petitpierre building new depositional models for the Carboniferous Marar Fm. Works continues on the regional Early Cretaceous study that spans Libya and Tunisia with Jonathan

Wood and Dr Stephane Bodin. Two new projects also started in 2009, the *Source Rock Hunter Project* led by Dr Álvaro Jiménez Berrocoso and a Fractured Carbonate study (*FRAC*), led by Dr Guy Spence, who undertook fieldwork in Egypt, with Dr Chris Horsfall.

<http://www.narg.org.uk/>



Above: Jonathan Wood and Laurent Petitpierre, both NARG PhD students, in the field in Libya 2009. Below: the view from the Messak escarpment looking out over the desolate Libyan desert in the Murzuk basin

## Industrial Research Consortia - TRAP

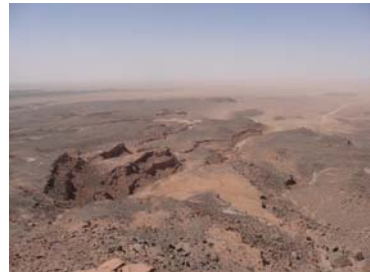
Phase 2 of **The Rift Analogues Project (TRAP)** is underway, sponsored by Statoil and ConocoPhillips, and building on the success of the first phase of the project which was completed in 2008. Phase 1 used digital outcrop data, particularly from terrestrial LIDAR scanning, to create accurate and high-resolution tectono-stratigraphic and reservoir models of syn-rift strata in the Sinai margin of the Suez Rift, Egypt. The exceptionally well-exposed syn-rift strata of Sinai make excellent analogues for

subtle syn-rift reservoirs in the Jurassic of the Northern North Sea and mid Norway as well as the Gulf of Suez itself. Phase 2 is continuing that approach and focusing on the tectono-stratigraphy of rift climax deposits in the El Qaa fault block of the Suez Rift - in particular the linkage between shallow marine hanging-wall dipslope depositional systems and systems in the immediate hanging-walls of block-bounding normal faults. Dr Martin Muravchik, has joined the research team, with support from PGRA Franklin Rarity. Initial

fieldwork was undertaken in April and October/November 2009. Further fieldwork, including extensive collection of digital outcrop data, will be undertaken during 2010.

For more information go to:

<http://www.seaes.manchester.ac.uk/TRAP/>




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*“TRAP enters Phase II, and two new projects started in NARG-- Source Rock Hunter and FRAC”.*

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*“Manchester builds leading Carbonate Research.”*



Fault/fracture related dolomite in the Lower Carboniferous, Great Orme (MSc student Roozbeh for scale).

## New Carbonate Research Initiatives

Carbonate research was identified as an area of growth and investment in the School in 2007, and is led by Dr Cathy Hollis, previously Carbonate Team Leader for Shell International Exploration and Production. The expertise and research interests of the 10 academic staff within SEAES working on a spectrum of activities -

mean that the group is uniquely placed to undertake leading-edge, interdisciplinary and multi-scale research into carbonate depositional and diagenetic systems.

Current emphasis is upon building a research program within the following inter-related themes: Prediction of fault-and fracture - controlled burial diagenesis on carbonate platforms within syn- and post-rift regimes. Reactive transport modeling to investigate the potential timing and mechanisms for porosity generation during burial diagenesis. Pore system characterization of carbonates,

focusing on developing a relationship between pore geometry and recovery efficiency in carbonate reservoirs. Digital outcrop modelling of carbonate depositional, diagenetic and structural geometries

Dr Mads Huuse is also investigating sedimentology and fluid flow properties of cool-water-carbonates in the Great Australian Bight, using seismic surveys, bathymetry and seafloor sampling.

Mads and co-workers will be submitting an IODP proposal in 2010 aiming to recover deep cores from the GAB.

## PhDs snapped up by industry

The Basins Studies and Petroleum Geoscience and Engineering Group currently has 12 PhDs and 6 PostDocs undertaking a wide range of petroleum related research projects, funded by both NERC and industry.

In 2009 3 students completed their PhDs. Paul Woodman, who worked on the early rift

sequence in the Gulf of Suez supported by BP (and has now joined BP), Dave Foster (NERC Student) working on landscape evolution in the Northern Basin and Range in the US, and Mustafa Enbaya (NARG) who worked in NARG looking at characterizing early rift volcanics in the prolific Nubian sandstone reservoirs in Libya.

Other PhDs who recently completed include Ivan Fabeul-Perez, who joined ExxonMobil, and Joe Martin (who joined Shell)

Oliver Duffy and Xavier Van Lanen undertook 3 month internships in Statoil, and Anne Rowan undertook a placement with Shell.

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*“3 successful PhDs, and 3 new starts for 2009.”*

## MScs deliver the goods!

This year the MSc presentation day was held on September 8<sup>th</sup> and was attended by over 30 guests from industry, with companies represented including ExxonMobil, BP, Shell, Tullow, Statoil, Maersk, Sound Oil, Schlumberger, Western-Geco, Fugro-Robertsons, Getech

All the hard work of the year was demonstrated with very high quality talks and posters. Feedback from industry was very positive, and the day proved again to be a

great way to demonstrate their potential for prospective employers, and provide a showcase for the schools research capability.

Some comments we had back from industry include:

*“really impressed by the range of geoscience subjects covered”*

*“they were a delight to talk to - bright, confident and interested in their subject”*

*“the sort of characters you like to have around you in the office”*



Last year MSc students proudly present their analogue basin models, the serious side to Play-doh! ..on the course taught by Prof Al Fraser, Exploration Manager for BP Libya

## Nubian Sandstone Workshop

This workshop hosted by the North Africa Research Group is to be held in the University between the 20 and 21<sup>st</sup> January 2010. The Jurassic- Early Cretaceous Nubian Sandstone and its lateral equivalent is a prolific reservoir in North Africa that extends across a vast area, from Egypt to

Algeria. Despite its importance, uncertainty remains about stratigraphy, sedimentology and depositional environment.

The aim of this workshop is to bring together industry and academia to address key issues and highlight potential area for

future collaborative research.

We have invited E Klitzsch, one of the pioneering geologists of the 1960's, to open the meeting and give some insight in to early exploration in the region.

See <http://www.narg.org.uk/>

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*“International workshop hosted by NARG in SEAES in 2010.”*



*New industrial consortia research project to start in 2010.”*



Chris Forster (MSc 2007) now with ConocoPhillips, gets wellsite experience in the North Sea as part of his graduate training scheme



This years MScs examining core at the BGS

## Leading the field in Digital Outcrop Research

The collection of digital outcrop data, using our own LiDAR surveying equipment, enables us to map geological outcrop data in 3D and use this data in virtual reality. Linking this to our state of the art stereo visualization systems allows for better analysis of geological outcrops.

“Virtual Reality Geological Studio” or VRGS is our own software for dealing with digital

outcrop data. This software application is unique to Manchester, and has been developed by Dave Hodgetts over the past 7 years.

We continue to develop our digital outcrop research with new field areas in the Gulf of Suez, UK and Canada, and a new industrial consortia research project due to start in 2010. See [www.lidar.manchester.ac.uk](http://www.lidar.manchester.ac.uk) for more information.



## Alumni News

Recent news from alumni includes: Emma Hamblett (MSc in 2005) now working with Statoil, was back in the School in December interviewing MSc students for potential internship places next year and talked about her

exploration activities in the Viking Graben, with two discoveries already made in 2009.

From last year’s MSc, Rachel Harding has gained employment with leading geological consultancy RPS in Henley-on-Thames where she joins another

ex-Manchester MSc. J.B. Harrington (2006). Cristina Puig (MSc in 2004) has just joined ITF as a Senior Technology Analyst. For more MSc news go to the course Facebook site

<http://www.facebook.com/home.php?#/group.php?gid=2573980909>

## BGS Core workshop



On 4<sup>th</sup> and 5<sup>th</sup> November, the BEng Petroleum Engineers and MSc Petroleum Geoscience students each spent a day at the British Geological Survey core store in Keyworth. The aim of the day was to introduce the students to core characterization and give

them all the opportunity to describe and interpret a section of core. They also had to interpret accompanying wireline log and petrophysical data to refine their conceptual models. For many, it was their first opportunity to review core data, and the quality

of the material at the BGS gave them a chance to work on industry-standard data. Our thanks go to Dr Michael Howe, Chief Curator at the BGS core store, and Scott Renshaw, Core Store Facilities Manager, for hosting and facilitating the event.

**Petroleum  
Geoscience and  
Engineering**

**University  
of  
Manchester**

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Environmental Sciences*

[http://www.seaes.  
manchester.ac.uk](http://www.seaes.manchester.ac.uk)

and

*Chemical Engineering*

[http://www.ceas.  
manchester.ac.uk](http://www.ceas.manchester.ac.uk)

## Recent awards and prizes

Congratulations to Dr Mads Huuse, who was awarded the 2009 Wallace E Pratt Memorial Award for best paper in the AAPG Bulletin.

Ambimbola Durogbitam was awarded the prestigious 2008 NAPE International Conference & Exhibition Poster Award.

Oliver Duffy also won 4th place student poster session in the AAPG Annual Meeting in Denver for his poster: Fault Growth and Linkage as Controls from Depocentre Development: The Coffee-Soil Fault Zone, Danish North Sea

Petroleum Geoscience MSc awards this year: best student went to Rachel Harding, best poster to Afifah Ismail and best presentation to Amar Balila. The LPS award to George Thomas for best petrophysical project.

## *About Petroleum Geoscience and Engineering...*

We are one of the largest Petroleum Geoscience and Engineering research and teaching groups in the UK. Our geoscience research incorporates all aspects of the sedimentary basin

system, from source to sink and from micro- to macro-scales. Research projects integrate structural, sedimentological and geomorphic studies and span fundamental petroleum

geosciences and reservoir and petroleum engineering. We use state-of-the-art acquisition, modeling and interpretation tools on a wide range of landscape, outcrop and subsurface datasets.

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