May 2019

SPE Review London

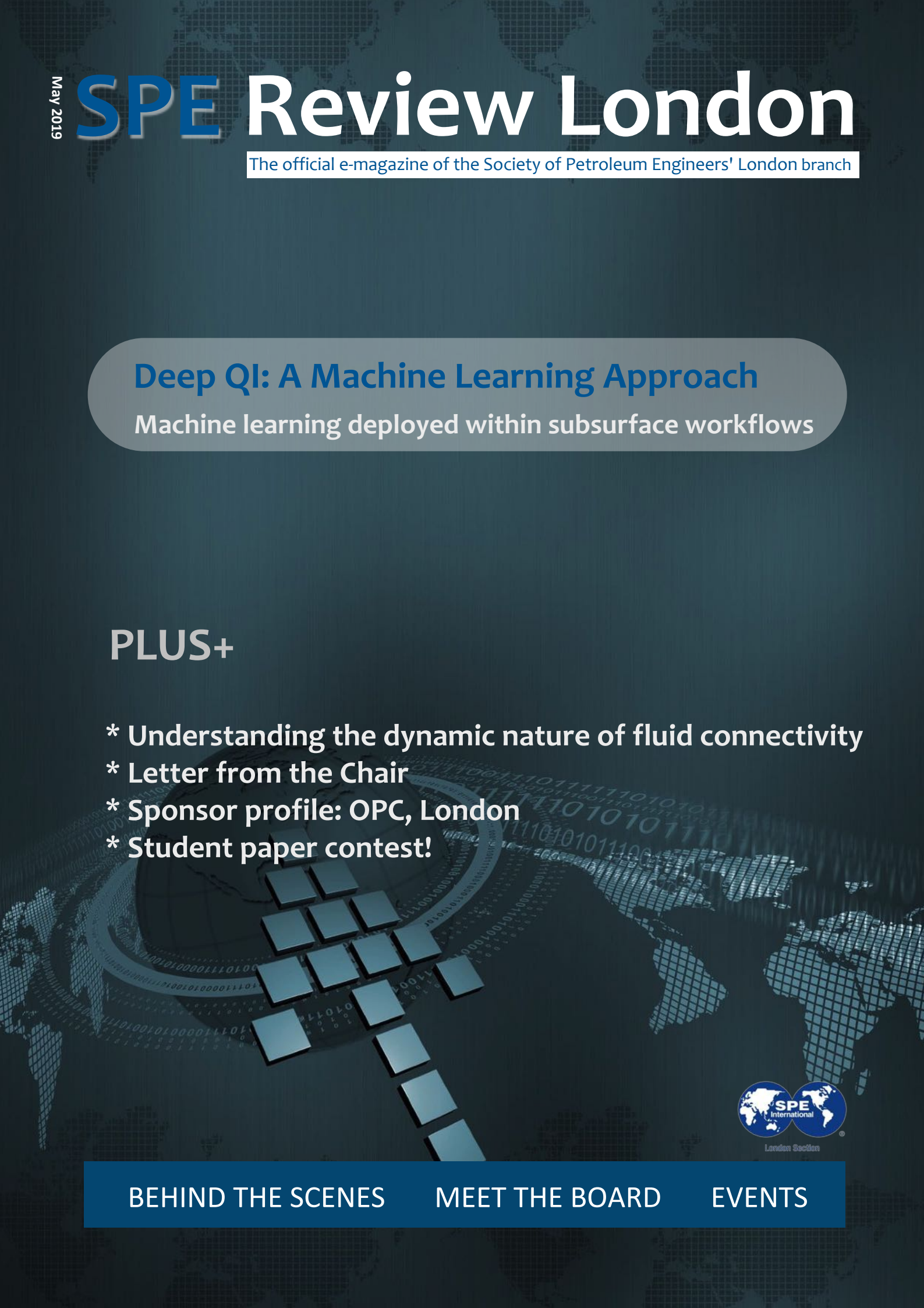
The official e-magazine of the Society of Petroleum Engineers' London branch

Deep QI: A Machine Learning Approach

Machine learning deployed within subsurface workflows

PLUS+

* Understanding the dynamic nature of fluid connectivity
* Letter from the Chair
* Sponsor profile: OPC, London
* Student paper contest!



BEHIND THE SCENES MEET THE BOARD EVENTS

SPE Review London

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ABOUT US

The Society of Petroleum Engineers (SPE) is a not-for-profit professional association whose members are engaged in energy resources, development and production. SPE serves more than 143,000 members in 141 countries worldwide. SPE is a key resource for technical knowledge related to the oil and gas exploration and production industry and provides services through its global events, publications, events, training courses and online resources at www.spe.org. SPE London section publishes SPE Review London, an online newsletter, 10 times a year, which is digitally sent to its 3000+ members. If you have read this issue and would like to join the SPE and receive your own copy of SPE Review London, as well as many other benefits – or you know a friend or colleague who would like to join – please visit www.spe.org for an application form.

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In this issue

Share your experiences and stories online http://london.spe.org/home

Behind the Scenes: SPE Review Editorial Board

Jonathan Ovens

After graduating from Cambridge University with a Ph.D in Physics, Jonathan joined Shell in 1986. Reservoir Engineer – hydraulic fracturing, pressure transient analysis and reservoir simulation.
1997 - 2012: independent consultant: North Sea, North Africa and the Middle East. Experience: Exploration and Development planning to Reserves Evaluation.
2013: Senior Reservoir Engineer at JX Nippon E&P (UK) Ltd.
2009 and 2015 served with SPE Europec Technical Committee.
Member of the SPE London Board.

Josh Beinke

Graduated from University of Adelaide in 2008 with a Petroleum Engineering degree. Worked various roles with Chevron, Origin Energy and Santos, including as a Production Engineer on the Gorgon Field during First Gas. Following move to Europe in 2016, consulted on European and African assets (specialising in data room and field development advisory) before current position working in Amsterdam as a Production/Exploitation Engineer with Vermilion Energy.

Ffion Llwyd-Jones

Editor and business writer, with 15+ years experience in North America/ UK.
Editor for several trade and consumer magazines (print and/online).
Provides industry-related case studies, and detailed, research-driven B2B Designer reports and technical white papers.
Accomplished photographer, and videographer.
Educated in Canada, and in the UK, with BA (Hons) from The Open University.

Letter from the SPE London Chair

Dear colleagues and friends!

Welcome to the May issue of SPE London Review online magazine.

It's always important for us to be engaged with our members, and to know our activities are relevant and of great interest to you.

Therefore, I would like to thank you all for participating in our recent survey where we tried to understand what topics you expect us to deliver in future. In particular, the topics which are useful for both Young Professionals (YPs) and Senior Professionals (SPs).

We have received a good mix of responses between YP and SP, with a representative selection of answers, and we have a good idea on how we will progress. For those who are curious, the three most popular answers were: the modelling pitfalls, business deals and asset valuation, and a career progression.

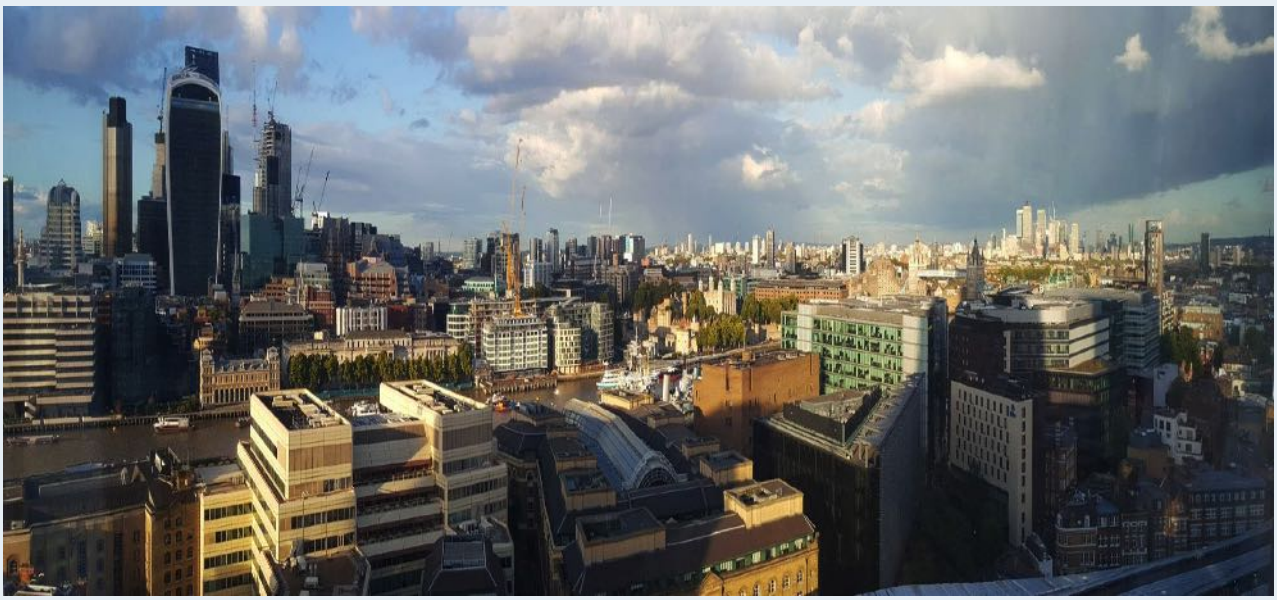
As we have analysed the survey results, we are now in a position of framing our events for the next year. However, if you missed our survey, you are always welcome to communicate with us via our social media channels or get in touch by e-mail: SPELondon@spemail.org.

Of course, you don’t have to wait until the next year to enjoy the variety of our great events. We have many already scheduled, so you can start booking now: 'Mergers and Acquisitions in Oil and Gas' (YP evening talk); 'Public Relations in Upstream Oil and Gas' (Business Development committee evening talk); 'Introduction to Exploration and Production' (one day seminar); and 'Negotiating for a gender-balanced future' (one day seminar – Women in Energy).

For more information and how to book, **please look further in this issue**. And I am looking forward to meeting you at one of them.

Best regards,

Dr Olga Bradulina
SPE Chairperson



Deep QI: A Machine Learning Approach to Quantitative Interpretation of Subsurface Data

Based on the SPE Dinner Evening Presentation on 30 April by Ehsan Zabihi Naeini, Technical Director at Ikon

For the exploitation of both conventional and unconventional plays, lithology classification, petrophysical evaluation, pore pressure prediction and geomechanical analysis play critical roles in accurate reservoir characterisation, safe planning and well execution. More specifically, in unconventional plays, the ability to predict areas of higher productivity and understanding the relationship to overpressure and stress magnitudes are imperative. In general, any pressure-stress property model must be supported by petrophysically conditioned elastic logs and accurate multi-mineral volume sets calibrated to core data. Importantly, given that pressure and stress are critical to safe drilling, along with relevant mineral volumes, they are key drivers to identify areas of high production, i.e. sweet-spot detection. It's important for the industry to develop safe and innovative methods which keep pace with the drilling activity and harnessing all data effectively.

Machine learning can play an important role in making sub-surface interpretation workflows faster, more efficient and more consistent, leading to more confident results and improved decision making. Its adaptability means that machine learning can be deployed in different styles within subsurface workflows as explained below.

One can utilize 1D well data, in which a model is calibrated to targeted stratigraphic data from a relatively small number of wells in the relevant basin or sub-basin. In the application phase, the calibrated model is applied to all other wells in the same region of interest. This workflow is about speed and efficiency, for example, train a supervised model to predict, e.g. porosity, on 10 wells with manual interpretation, and apply to the other 90 wells. Application of this type of machine learning workflow allows personnel to focus on adding value to the interpretation process by fine-tuning the training data by feeding back information from the blind test wells, rather than spending a significant amount of time repeating standard workflows on a large number of wells that may still need to be modified once the results are generated. Inherently this approach can predict missing data, for example where measurement failed or logs were not run.

Machine learning can also be applied to new methods in 3D quantitative seismic interpretation offering spatial prediction inbetween wells. In this case, one utilises well data for training and then in the application phase, the calibrated model is applied in 3D to seismic attributes and/or seismic inversion results (e.g. elastic properties). This workflow is mostly about improving accuracy and confidence, which allows one to define geobodies in 3D and/or use it to populate reservoir models. There is the possibility to extend to 4D dynamic data incorporating time lapse seismic and simulator models to predict saturation and pressure changes due to production. By the integration of well surveillance data, the pressure and fluid rates may be correlated directly with the seismically driven properties to establish direct relationships between 3D/4D seismic and well performance.

The example shown here includes 1D and 3D prediction in which linked chain of deep neural networks are connected such that the output of one is an input to the other. This is summarised as follows:

1. Petrophysical processing of wireline data to create multi-mineral volume and porosity logs. This provides the training data required to design a deep neural for automatic petrophysics analysis.
2. Construct a 1D pore pressure prediction model. This forms the basis for a neural network to predict pore pressure incorporating the petrophysics prediction in the previous step.
3. Construct a 1D geomechanical model and blind test against additional wells. This allows one to train a deep neural network based on compressional velocity (Vp), shear velocity (Vs), density (Rho), and lithofacies. This can then be used to construct 3D earth models which may depict selected properties: pore pressure and geomechanical parameters (SHmin, SHmax), Total Organic Content, allied with and conditioned by facies-based seismic inversion.

Figure 1 (overleaf) shows the result of such a chain of deep neural networks applied to a blind well. Petrophysical properties, including volumes of shale, sand, dolomite, calcite, kerogen and also porosity. These were predicted simultaneously from compressional velocity, Gamma ray, density, resistivity and Neutron logs. Interestingly, the

Deep QI continued

mismatch around 8500 ft between the neural network prediction and manual interpretation, seen in porosity track, highlights where the human made a mistake where the total sum of mineral volumes and porosity are not adding to one as can be observed in the "human error" track. The result of the second cascaded neural network to predict pore pressure and the third network to predict seismically driven properties are shown in the last five tracks in Figure 1. Note the last four tracks exhibit lower resolution as expected due to resolution limits of seismic data compared to well log measurements. Finally, *Figure 2* (second figure, below) shows an example section and depth slice of the corresponding 3D pore pressure model.

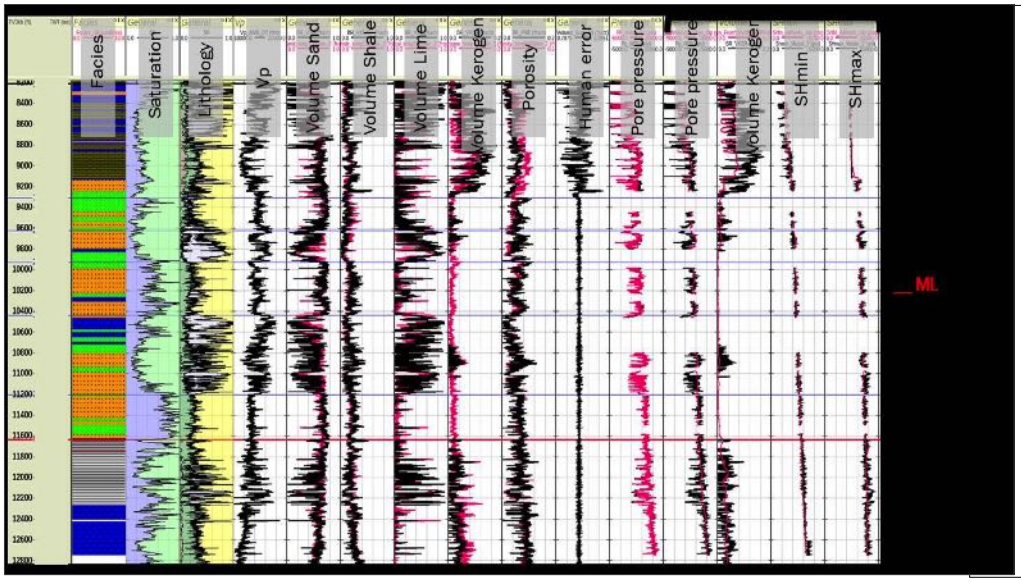


Figure 1:
Example of a blind test well located approximately 50 km from the training data, there is an excellent match between the well-based (black) and machine-learning-based (red) results at most depths. There is a mismatch also shows how machines can help human in identifying the error or inconsistency in the data.

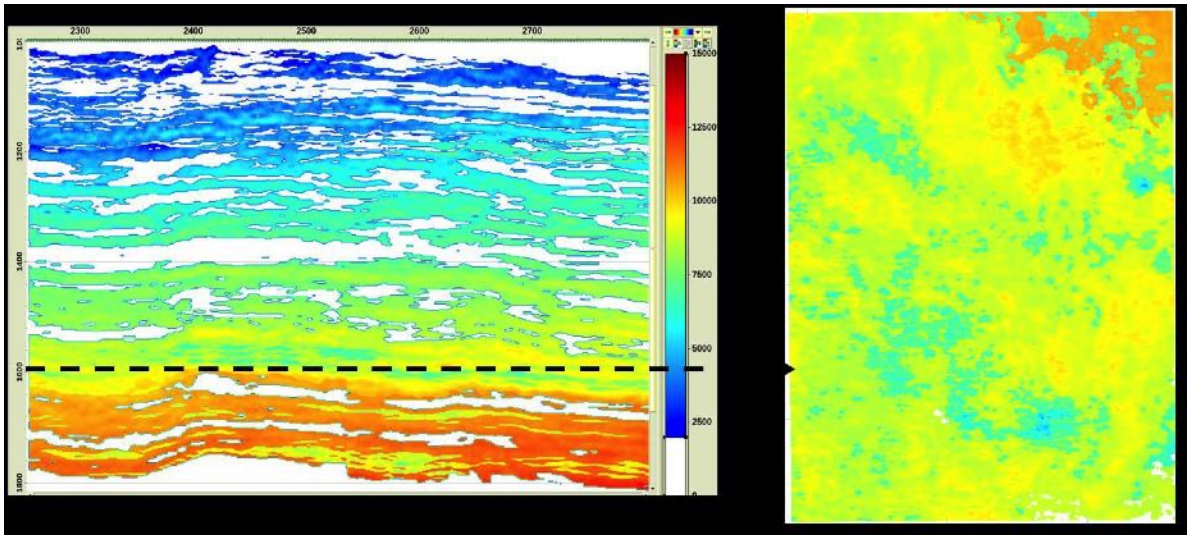


Figure 2: Example of a pore pressure model derived using a deep neural network allied with facies-based seismic inversion.

Conclusions and further readings

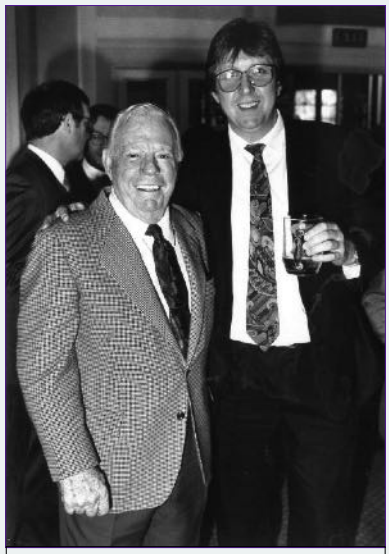
The results shown in this paper demonstrate a promising outlook for the application of deep learning to save valuable turnaround time and potentially improve the accuracy in subsurface workflows. It also shows how differing data classes and disciplines can be integrated to achieve new insights and a common objective.

For more details, see:

Naeini, E., et al., 2019, An integrated deep learning solution for petrophysics, pore pressure, and geomechanics property prediction: TLE, 38(1).
Naeini, E., & Prindle, K., 2018, Machine learning and learning from machines: TLE, 37(12).

Why OPC sponsors London SPE

By Piers Johnson, Managing Director OPC and SPE London Chairman 2000



2000: With Red Adair at SPE London section dinner (as SPE London Chairperson).

I joined the SPE in 1988, the same year in which I founded OPC, and have been a member, chair, sponsor and active participator for the last 30 years. My marketing consultant asks me what 'ROI' we get from this involvement as he wants to use the sponsorship money on SEO or SEA or some other three-letter abbreviation that marketers seem to love these days. Fortunately, as I am both the Managing Director and owner of OPC, I can do what I like. But even if I wasn't, I would still tell him that the return that we get from our relationship with the SPE is immeasurable but also considerable – as a large number of current and past clients of OPC have been developed through the SPE.

We first began sponsoring London SPE in the mid-1990s. We had started to expand the services of OPC from well testing to undertaking reserve audits and CPRs. From the very first event that I attended as a sponsor, I was able to talk to senior decision-makers at large oil businesses (that I'd previously been unable to get in to see). My year as Chairman in 2000 coincided with the boom years and I was lucky to host several large and high profile events. The week after a dinner at which Red Adair was a main guest, I was stopped walking down the street in Aberdeen by a guy who had been to the dinner, recognised me and asked me to come and see him about a new project he was working on. SEO can't get you that.

2012: Receiving Distinguished Support award, SPE North Sea region.

As well as our ongoing sponsorship of the London Section, we have been actively involved in speaking at and sponsoring events such as the Women in Energy and Introduction to E&P events. I am particularly passionate about attracting new talent to our industry, and have sponsored student awards at Nottingham University and Imperial College as well as the SPE student chapter field trips. As OPC has expanded overseas, we have also developed our relationship with the SPE regions including Houston, Aberdeen and Kazakhstan.

Is it all worth it? A hundred times yes. Petroleum Engineering is our business and the members of the SPE are our most loyal customer base. I wish that some of the major oil companies would also see the value of the London section sponsorship – but their loss is our gain. I look forward to continuing our sponsorship for as long as I'm running OPC – and I look forward to meeting many more members at events this year.

Piers
www.opc.co.uk

2014: At the SPE London Summer Ball, with Milton Jones, comedian.

2014: Panelist at At the Women in Energy event.

Fluid Dynamics of multiphase displacement in reservoir rocks

Based on the SPE Dinner Evening Presentation on 30 April, by Catherine Spurin, PhD student, Department of Earth Science & Engineering Imperial College London, and Alessio Scanziani, Energy Analyst and Experimentalist at Imperial Consultants (ICON), London.

Understanding the dynamics of multiphase fluid movement in the subsurface is important due to its presence in hydrocarbon recovery and the geological storage of carbon dioxide. Macroscopic flow in these reservoirs is typically modelled by extending Darcy's law to multiphase flow [1]. This implicitly assumes that fluids flow in connected pathways, and that the interface between phases is stable and unchanging once steady-state has been achieved [2-3].

However, a range of complex interface dynamics have been observed at steady-state, with fluid phase interfaces being able to disconnect and reconnect intermittently in a series of snap-off and reconnection events [4]. This flow regime, termed intermittent pathway flow, deviates from the traditional view of connected pathway flow, where the connectivity of the fluid phases is constant in time. The dynamic nature of fluid connectivity influences the key characteristics of subsurface multiphase flow – energy dissipation during flow and trapping – and so must be understood to model fluid movement in the Earth's crust.

The tool we use to study flow is high-resolution X-ray imaging, where we can take three-dimensional images of the rock and the fluids within it at micron resolution. We aim to understand the controls on intermittent pathway flow and link its role in larger scale manifestations of flow such as relative permeability. This will lead to accurate, physics based, modelling of subsurface fluid flow. We explore the creation of intermittent pathways through the simultaneous injection of two fluid phases into a carbonate rock. The parameter space relevant to the subsurface is varied by changing the total flow rate, the flow rate ratio of both fluid phases and the viscosity of the fluids. We used 3 fluid pairings: nitrogen/brine, decane/brine and hexadecane/brine.

The X-ray images were acquired over a period of 40 minutes to collect enough X-ray counts so that the images could be reconstructed with minimal artefacts. This means that intermittent pathways are not observed directly, and have to be inferred for the time averaged imagery. *Figure 1* shows the sample with both nitrogen and brine

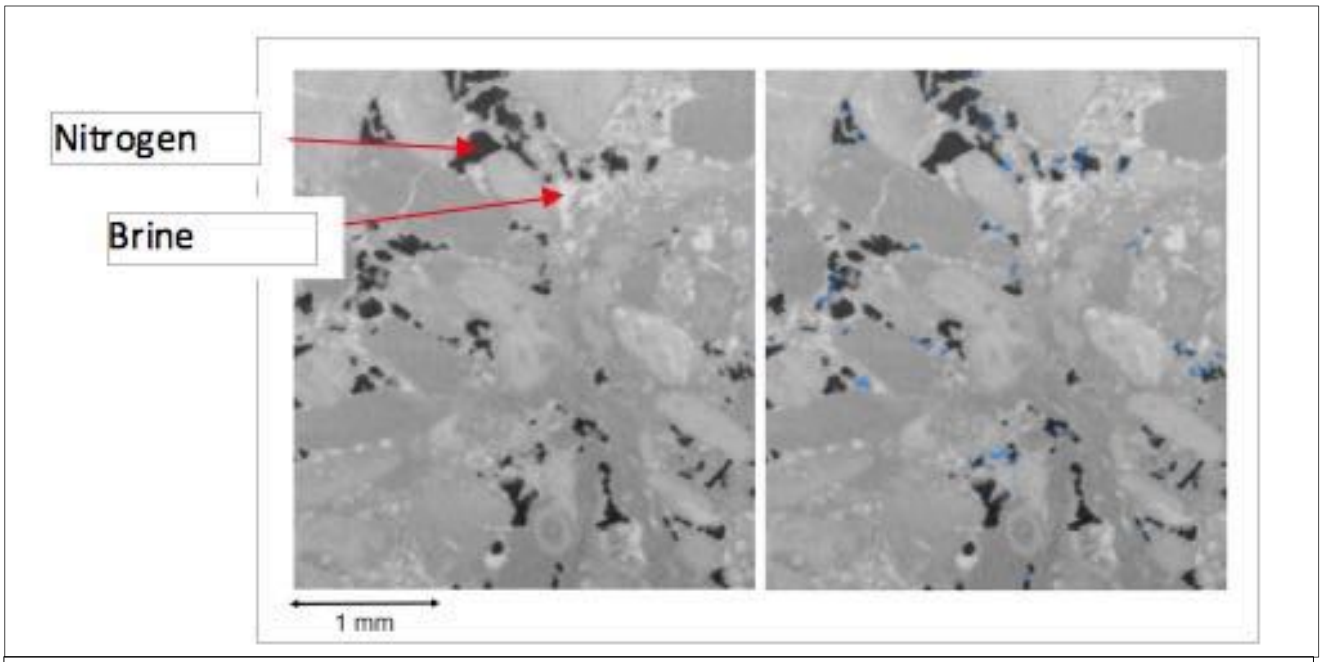


Figure 1: Greyscale image of the carbonate with both nitrogen and brine occupying the pore space. The intermediate greyscale, interpreted as intermittency, is shown in blue on the right.

Fluid Dynamics of multiphase displacement in reservoir rocks continued

occupying the pore space, with brine being the bright phase and nitrogen being the dark phase. There is however, an intermediate greyscale caused by the occupation of both nitrogen and brine in the same pore during a scan – this is segmented out in the RHS of *Figure 1* in blue; these regions are where intermittent pathway flow occurred during a scan.

We observed that the classification of intermittent flow pathways had a huge impact on the connectivity of the non-wetting phase, as demonstrated in *Figure 2*. Without the inclusion of intermittent areas, the non-wetting phase was not connected across the sample for the nitrogen/brine experiments and decane/brine experiments. No intermittent pathway flow was observed in the hexadecane/brine experiments. Capillary forces play an important role in the generation of intermittency, with the non-wetting phase always occupying the largest pores, brine always occupying the smallest pores and intermittency occurring in the intermediate sized pores. As the capillary number of the non-wetting phase increases (by increasing the flow rate), it can invade smaller pores and intermittency then also occurs in smaller pores.

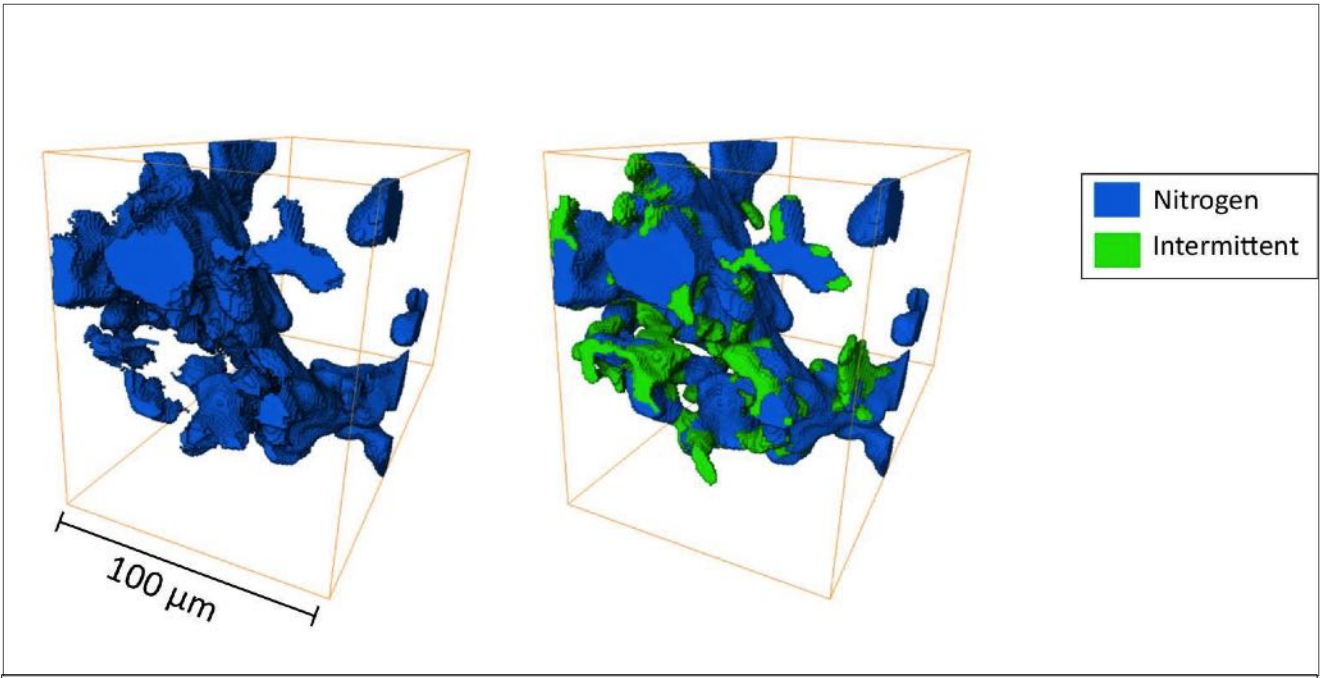


Figure 2: Segmented subvolume showing the importance of intermittent pathways in the connectivity of the NWP.

[1] Muskat, M. (1949), The Physical Principles of Oil Production, McGraw-Hill Book Company.
[2] Armstrong, R. T., J. E. McClure, M. A. Berrill, M. Rücker, S. Schlüter, and S. Berg (2016), Beyond Darcy's law: The role of phase topology and ganglion dynamics for two-uid ow, Physical Review E, 94(4), 043,113.
[3] Blunt, M. J. (2017), Multiphase Flow in Permeable Media: A Pore-Scale Perspective, Cambridge University Press
[4] Reynolds, C. A., H. Menke, M. Andrew, M. J. Blunt, and S. Krevor (2017), Dynamic fluid connectivity during steady-state multiphase ow in a sandstone, Proceedings of the National Academy of Sciences, 114(31), 81878192.

Three phase flow

Three-phase is ubiquitous in many energy-related physical processes such as oil recovery, carbon dioxide geo-sequestration, fuel cells optimisation and contaminant removal (Blunt, 2017). In a world that is continuously requiring more energy due to population increase, and at the same time less emissions of greenhouse gases due to the efforts in mitigating climate change, the combination of gas driven enhanced oil recovery (EOR) with CO2 storage (CCS) is certainly one of the technologies the world has to adopt for its sustainable development (IEA, 2017).

X-ray micro-CT tomography has recently allowed for major improvements in the understanding of two-phase flow (Blunt et al., 2013; Bultreys et al., 2016; Singh et al., 2019). In our studies we apply the techniques developed for two phases to systems where three phases – water, oil and gas, involved in EOR and CCS – are present, also

Fluid Dynamics of multiphase displacement in reservoir rocks continued

developing new methods required by the peculiarities of three-phase flow. We were able to image the flow of the three phases during and after their injection in porous rocks, for different rocks and wettability.
The first experiment consisted of oil injection in a water-wet Ketton sample completely saturated with brine, followed by brine, gas and brine injection. The sample was imaged after each injection step using a laboratory micro computed tomography (µ-CT) scanner. With this experiment, we were able to image the three phases at the end of each injection step and visualise the arrangement of the three phases in the pore space, as shown in *Figure 3*. The wettability has a strong effect on how the three phases occupy the pores and we quantified with pore occupancy analysis that, in water-wet samples, brine occupies the smallest pores, oil the middle and gas the centre of the biggest pores (Scanziani et al., 2018).
The second experiment was similar to the first one, but it was performed at Diamond synchrotron facility, where

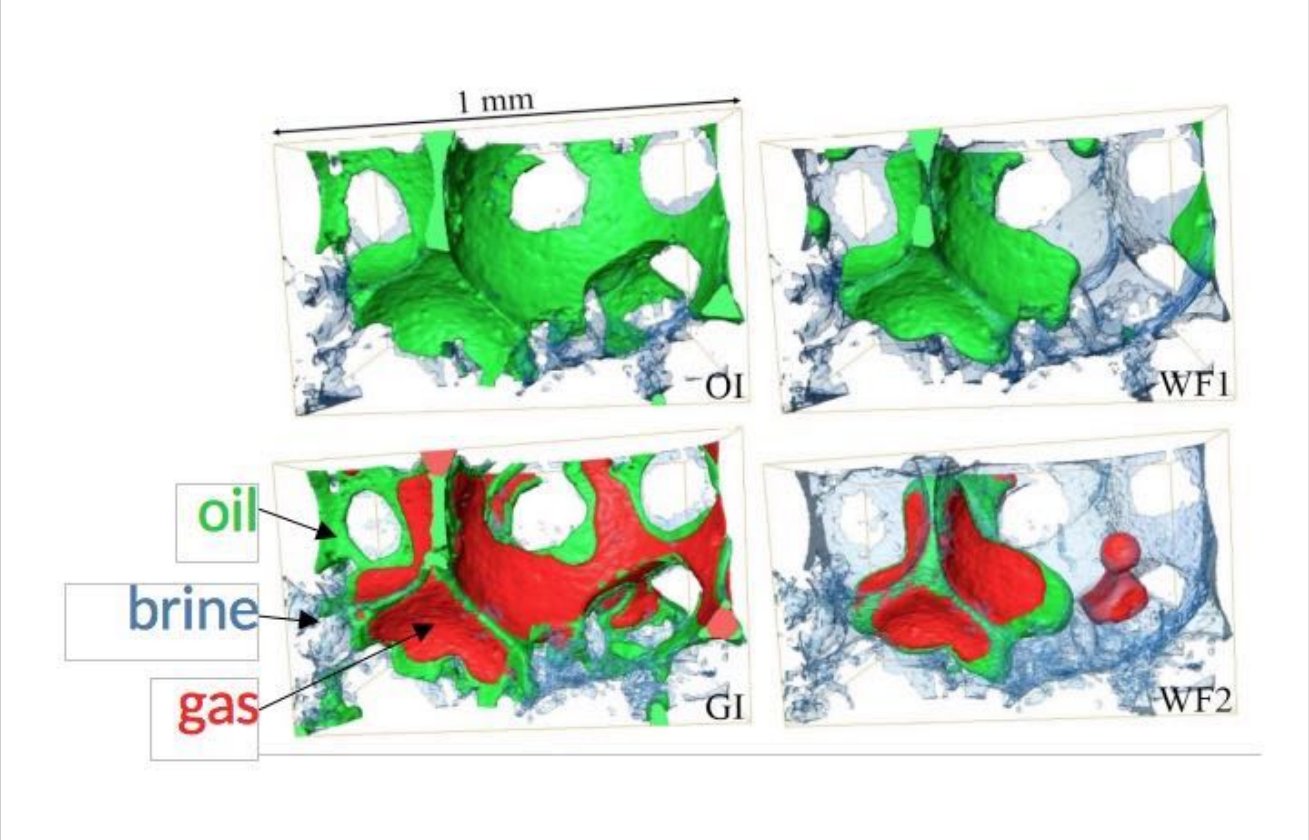


Figure 3: Three-dimensional visualisation of the arrangement of three immiscible phases – brine(blue), oil(green) and gas (red) - in the pore space of a carbonate rock at high pressure and temperature. The four images are obtained at the end of oil injection (OI), first waterflooding (WF1), gas injection (GI) and second waterflooding (WF2).

the higher energy of X-rays allowed dynamic imaging during the injections. We were able to dynamically image the formation of oil layers during gas injection and the lowering in their thickness over time. We also obtained images of the dynamics of double capillary trapping: the mechanism causing the trapping of gas in the centre of the pores during the second waterflooding. We studied this mechanism using four Minkowski functions – volume, connectivity, interfacial area and curvature of interfaces – which can be used to completely characterise multiphase flow (Armstrong et al., 2018).

The third experiment was performed at conditions which better replicate the subsurface at oil reservoirs, as the reservoir carbonate sample, the brine and the crude oil were provided from a producing oil field in the Middle East. This sample was also aged, causing a change of the wettability towards oil-wet conditions, which is believed to be found in carbonate reservoirs. We observed how a change in wettability (measured by in situ contact angle

Fluid Dynamics of multiphase displacement in reservoir rocks continued

(AlRatrout et al., 2017; Scanziani et al., 2017)) affects the wettability order, pore occupancy, recovery and trapping (*Figure 4*).

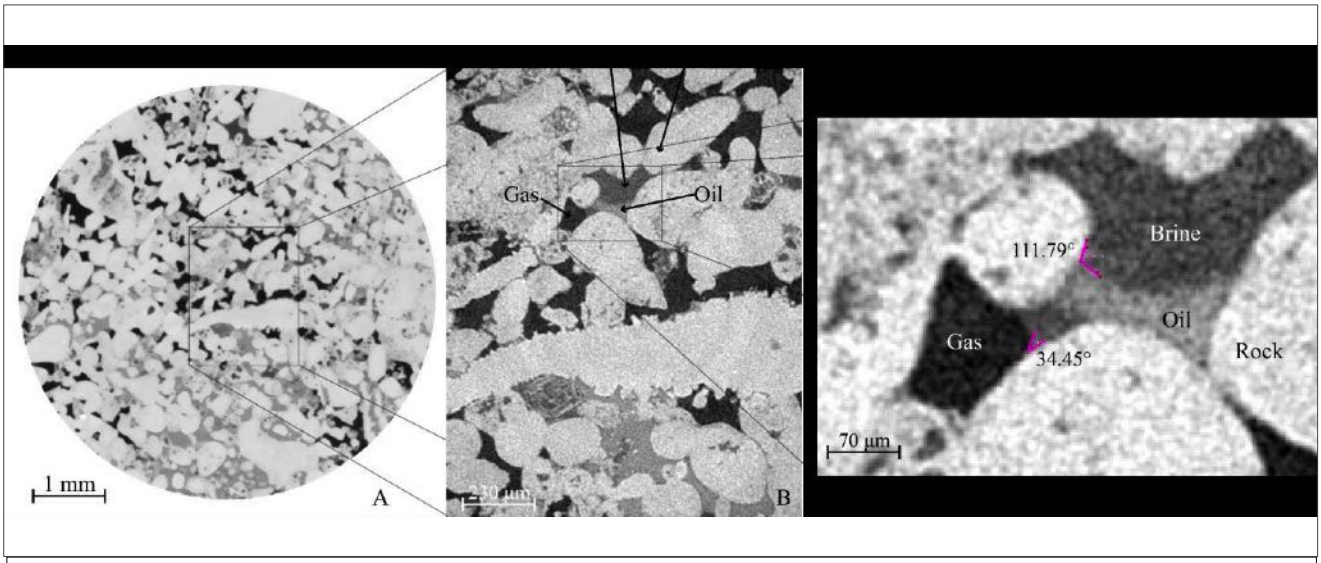


Figure 4: Two dimensional slice of grey scale three dimensional images of the pore space obtained with micro-CT. We show how the change in wettability (quantified by contact angles) affects the arrangement of the fluids in the pore space.

References

AlRatrout, A., Raeini, A.Q., Bijeljic, B., Blunt, M.J., 2017. Automatic measurement of contact angle in pore-space images. Adv. Water Resour. 109, 158–169. https://doi.org/10.1016/J.ADVWATRES.2017.07.018

Armstrong, R.T., McClure, J.E., Robins, V., Liu, Z., Arns, C.H., Schlüter, S., Berg, S., 2018. Porous Media Characterization Using Minkowski Functionals: Theories, Applications and Future Directions. Transp. Porous Media 1–31. https://doi.org/10.1007/s11242-018-1201-4

Blunt, M.J., 2017. Multiphase Flow in Permeable Media. Cambridge University Press. https://doi.org/10.1017/9781316145098

Blunt, M.J., Bijeljic, B., Dong, H., Gharbi, O., Iglauer, S., Mostaghimi, P., Paluszny, A., Pentland, C., 2013. Pore-scale imaging and modelling. Adv. Water Resour. https://doi.org/10.1016/j.advwatres.2012.03.003

Bultreys, T., De Boever, W., Cnudde, V., 2016. Imaging and image-based fluid transport modeling at the pore scale in geological materials: A practical introduction to the current state-of-the-art. Earth-Science Rev. https://doi.org/10.1016/j.earscirev.2016.02.001

IEA, 2017. Energy Technology Perspectives 2017 - Executive Summary, Iea. https://doi.org/10.1787/energy_tech-2014-en

Scanziani, A., Singh, K., Blunt, M.J., Guadagnini, A., 2017. Automatic method for estimation of in situ effective contact angle from X-ray micro tomography images of two-phase flow in porous media. J. Colloid Interface Sci. 496, 51–59. https://doi.org/10.1016/j.jcis.2017.02.005

Scanziani, A., Singh, K., Bultreys, T., Bijeljic, B., Blunt, M.J., 2018. In Situ Pore-Scale Visualization of Immiscible Three-Phase Flow at High Pressure and Temperature. EAGE Annu. https://doi.org/10.3997/2214-4609.201800777

Singh, K., Jung, M., Brinkmann, M., Seemann, R., 2019. Capillary-Dominated Fluid Displacement in Porous Media. Annu. Rev. Fluid Mech. 51, 429–449. https://doi.org/10.1146/annurev-fluid-010518-040342

Negotiating for a Gender-Balanced Future

SPE Women in Energy 13th Annual Conference

Women in Energy (WiE) is an annual seminar organised by volunteers and hosted by the Society of Petroleum Engineers, London Section, where leaders of the industry get together to discuss how to achieve gender balance from a personal level to the corporate and industrial level. It is a full-day event including keynote speakers, workshops, panel discussions and opportunities for networking. The event has historically attracted 150-250 attendees per year, of all levels of seniority in the energy sector from new starters to CEOs.

This year, the conference will have a focus on negotiation skills, themed 'Negotiating for a Gender Balanced Future'. Negotiation skills can't be overestimated. Your role and how you are viewed in your organisation are almost constantly up for negotiation: salary, promotions, responsibilities… practice and preparation is key to presenting your best self in a balanced workplace.

Join us on 14 June at the Keyworth Centre (London Southbank University SE1 6NG) for an action-packed day that will leave you feeling inspired, supported, more connected and ready to take on your personal and professional challenges with fresh energy.

Event: SPE Women in Energy 13th Annual Conference
Date: June 14th 2019
Time: 9am – 5pm
Venue: Keyworth Centre, London Southbank University SE1 6NG
Tickets: **via Eventbrite (LINK)**

Our line-up this year includes a keynote speech from Louise Kingham OBE FEI, Chief Executive of the Energy Institute, as well as panel discussions with Jane Whaley, Editor-in-Chief of GEOEXPRO Magazine and Kahina Abdeli-Galinier, VP Marketing SLB – SIS. Our workshops will include practical sessions in 'Advocating for Change', and 'The Cleopatra Effect'. We continue to add more influential contributors to the day, which promises to be both enriching and exciting.

Hope to see you there!

SPE YPs - UK Student Paper Contest

Abstract Submission deadline: 1 September 2019

The SPE London Section is holding the 1st Annual UK paper contest between Young Professional and Student Chapters.

This new event is aiming to bring together students, researchers and young professionals to share their research experiences providing technological solutions for the oil and gas industry.

The competition is open to young professionals and all students studying an oil and gas BEng, MEng/MSc or PhD program in the UK.

To take part, candidates need to send an abstract of about 350 words that summarize the topic of research, stating the contribution to knowledge, main findings and conclusions by September 1st. The contest will be conducted considering four divisions: Young Professional, PhD, MSc/MEng and BEng students.

The abstracts finalists for each division must present their paper to an industry-academic panel at the special evening event planned for this purpose, during which the winners for each division will be selected and awarded.

The winners of this competition will be better prepared for the regional paper contests and gain more experience with technical presentation and networking.

Please note: the presentation evening will take place in London, and students will have to physically present their paper. While the SPE YP committee does not reimburse travel costs, the student's respective SPE Chapter may grant financial assistance, although this would need to be arranged with the chapter directly.

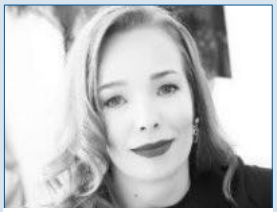
If you are interested in taking part, please send your abstract to **spe.chapters.london@gmail.com** by midnight on Sunday 1 September 2019, with a clear indication of the division in which you are participating, name and university or company affiliation.

Note: The dissertations do not need to be completed, as only the abstracts are required.

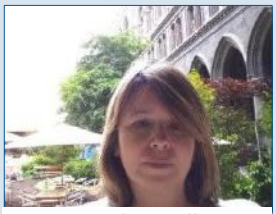
Further details will be released about the presentation evening closer to the date.
It will take place on Wednesday 25 September at London Southbank University, London.

Meet the SPE London Board

SPE is a non-profit professional society with 164,000members in 143 countries. The SPE London Section, with an average 2,000 members and seven associated student chapters, is an active section with an aim to connect, engage and promote the exchange of knowledge within the London energy community of technical and commercial professionals. The SPE London Board is the policy-making and governing body, consisting of volunteers who devote time to overseeing many of SPE London's administrative and operating responsibilites.



Olga Bradulina
Chair



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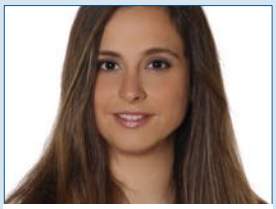
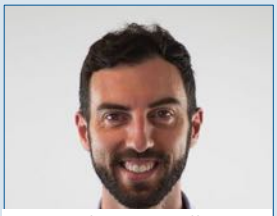


Isabel Asenjo
WiE Chair



John Ciccarelli
Secretary

Adam Borushek
Continuing Education Co-Chair

Patrick Davies
Continuing Education Co-Chair

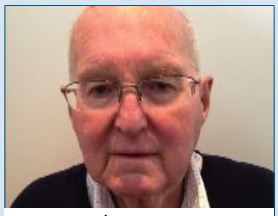
Maxim Kotenev
Communications Chair

Adrian Southworth
Sponsorship Chair

Siamak Bahktiari
Treasurer

Maria Astrid Centeno
Student Chapter Liaison

Abrar Pewekar
Young Professionals Chair



Anthony Perry
Director

Alain Gringarten
Director

Jonathan Ovens
Director/SPE Review Editor

Arnaud Mille
Director

Vincent Penasse
Senior Professionals Liaison

What's happening: Events, June 2019 onwards

SPE International/local events and on-demand webinars

03-06 June **SPE Europec featured at 81st EAGE Conference and Exhibition** London, UK
SPE EUROPEC 2019 at the 81st EAGE Conference & Exhibition is the largest and most comprehensive multi-disciplinary geoscience event in the world. The 2019 theme is Embracing Change - Creativity for the Future.

13 June **SPE YP Evening Technical Talk Series - Mergers & Acquisitions in Oil& Gas** London, UK
The SPE YP London is pleased to announce an Oil and Gas M&A Evening Seminar. This evening event will focus on different aspects of Mergers & Acquisitions in upstream oil and gas.

14 June **2019 Annual SPE Women in Energy Seminar** London, UK
Negotiating for a gender balanced future Negotiation skills can't be overestimated; your role and how you are viewed in your organisation is almost constantly up for negotiation… salary, promotions, responsibilities…Practice and preparation is key to presenting your best self in a balanced workplace.

19-20 June **SPE Gaia Summit: Oil and Gas on the Right Side of History?** Fontainebleau, France
The GAIA Summit and subsequent events are being designed to help the industry be more proactive, even more collaborative, and create a more joined up conversation that mobilises forces and resources not yet in the service of the sustainability challenges we should be in the center of resolving and trusted to do so.

26-27 June **SPE Workshop: Digital Transformation in E&P: What's Next, Ready to Scale-up?** Paris, France
The purpose of this workshop is to provide attendees with insights, inspiration, and lessons about how to make digital transformation work for them.

27 June **SPE Business Development - Public Relations in Upstream Oil and Gas** London, UK
This evening event will focus on Public Relations in Upstream Oil and Gas. We will hear from speakers on a panel discussing how different players in the Upstream industry protect and manage reputations using different communications strategies. This will be followed by a Q&A session, and time for drinks and networking.

06 September **SPE Offshore Europe Conference and Exhibition** Aberdeen, UK
Connecting the Global Upstream Offshore Oil & Gas Community
SPE Offshore Europe is recognised by offshore E&P professionals as Europe's leading E&P event. Attending will ensure you are up to date with the most significant technologies and can connect with a global network of 36,000+ attendees.

05-06 November **SPE Workshop: Production Optimisation in Gas and Oil Assets** The Hague, The Netherlands
The Production Optimisation in Gas and Oil Assets workshop is a high-quality event where experts, operators, and service companies share their latest developments, successes, and failures on late-life production topics. This workshop aims to improve and accelerate the development of activities to optimise late-life production in gas and oil wells and assets.

Recorded: 1.5.2019 **Using Machine Learning to Optimize Completion Design** Online webinar
As the industry moves to more complex multi-pad, multi-well completion designs, intelligent completion optimization will require more sophisticated algorithms to improve the decision-making process.

Recorded: 15.5.2019 **The Future Role of Oil** Online webinar
0.15 credits offered.
Presented by Dr. Iskander Diyashev, SPE Distinguished Lecturer.

Recorded: 5.1.2019 **Does the Oil and Gas Industry Have the Right Organizational Culture for Digital Transformation?** Online webinar
Interview with Helen Gilman.