

# John Crawshaw

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## *Professional Experience*

- ◆ Currently developing extensive experimental facilities for investigating carbon dioxide sequestration in saline carbonate aquifers: rock/fluid chemical reaction, relative permeability and micro-scale transport mechanisms.
- ◆ Lead an industrial research group of up to 8 scientists working on oil-field flow processes.
- ◆ Principal investigator for two Marie-Curie grants and industrial supervisor for two PhD projects and sixteen interns.
- ◆ Wide experience of experimental techniques: X-ray CT, NMR imaging, Core flooding, rheometry (shear and extensional), flow visualisation in micro-models (particularly micro-PIV), environmental- and cryo-SEM.
- ◆ Wide experience of complex fluids: supercritical CO<sub>2</sub>, viscoelastic polymer and surfactant solutions, foams, emulsions and their interaction with porous media.

## *Education*

- **Doctorate, Chemical Engineering**, Nottingham University 1990  
Thesis: Simultaneous Sorption of Ethanol and Water by Starches and Corn.
- **Masters, Chemical Engineering**, Nottingham University 1986

## *Employment History*

- **Imperial College London**  
Research Fellow, QCCSRC 2010 – date
- **Schlumberger Cambridge Research**  
Programme Manager, Flow of Complex Fluids in Porous Media 2001 – 2009  
Research Scientist/Senior Research Scientist, Well Construction 1996 – 2001  
Department 1994 – 1996  
Associate Research Scientist, Drilling Fluids Program
- **Cambridge University**  
Post-Doctoral Research Associate. Transport processes in moving particulate beds 1990 – 1993

## *References*

Available upon request

## ***Granted Patents***

Crawshaw J.P., Way P.W. and Thiercelin M., US 7,013,995 B2, Granted, 2006, Compositions and Processes for Treating Subterranean Formations.

Tardy P., Fadili A., Pearson J.R.A. and Crawshaw J.P. Method for Predicting the Apparent Viscosity of non-Newtonian Fluids in Porous Media Schlumberger Ref. 57.0532 Granted GB 2,399,659B 28 September 2005

Reid P.I., Craster B. T. and Crawshaw J.P. "Drilling Fluid" WO 97/07183 Publication date 27 February 1997. Also GB 2304354, Granted. Also US 6,544,933 B1 Granted Apr 8, 2003.

Ayoub, J., Crawshaw J.P. and Way P.W. Self-Diverting Resin System for Sand Consolidation. Schlumberger ref. 56.0480, US 6,632,778B1 Granted Oct 14, 2003.

Crawshaw J.P., Way P.W and Thiercelin M. "Processes for Treating Subterranean Formations" GB 2363810 Granted 26 March 2003 also WO 01/98627 International Publication Date 27 December 2001.

Crawshaw J.P. and Nijs O.C.J. "Emulsion for Well and Formation Treatment" US 6,264,020 B1 Granted April 2, 2002. Also WO 98/53180.

Crawshaw J.P. "Plug Placement Method" GB 2325479, Granted 24 November 1999. Also US 6,073,694 Granted June 13, 2000.

## ***Peer Reviewed Publications***

- [1] Peng C, Crawshaw JP, Maitland GC, Trusler JPM (2015) Kinetics of calcite dissolution in CO<sub>2</sub>-saturated water at temperatures between (323 and 373)K and pressures up to 13.8MPa *Chemical Geology* **403**:74-85
- [2] Kluge T., John C.M., Jourdan A-L., Davis S. and Crawshaw J. (2015) Laboratory calibration of the calcium carbonate clumped isotope thermometer in the 25-250 C temperature range. *Geochimica et Cosmochimica Acta.* **157**:213-227: 10.1016/j.gca.2015.02.028.
- [3] Hu R., Crawshaw J. Trusler J. P. M, Boek E. (2014) Rheology of Diluted Heavy Crude Oil Saturated with Carbon Dioxide. *Energy & Fuels* DOI: 10.1021/ef5020378.
- [4] Shah S., Crawshaw J. P. and Boek E.S. (2014) Preparation of Micro Porous Rock Samples for Confocal Laser Scanning Microscopy *Petroleum Geoscience* **20**, 369-374; doi 10.1144/petgeo2014-021
- [5] Chapman E.M., Yang J., Crawshaw J.P., Boek E.S. (2013) Pore Scale Models for Imbibition of CO<sub>2</sub> Analogue Fluids in Etched Micro-model Junctions Using Micro-fluidic Experiments and Direct Flow Calculations. *Energy Procedia* **37**, 3680–3686
- [6] Yang J, Crawshaw J, Boek ES (2013) Quantitative determination of molecular propagator distributions for solute transport in homogeneous and heterogeneous porous media using lattice Boltzmann simulations. *Water Resources Research* **49** (12), 8531-8538
- [7] Peng C, Crawshaw J.P., Maitland GC, J.P. Martin Trusler J.P. and Vega-Maza D. (2013) The pH of CO<sub>2</sub>-saturated water at temperatures between 308 K and 423 K at pressures up to 15 MPa. *J. Supercritical Fluids* **82**, 129– 137.
- [8] Seifried C. M., Crawshaw J., and Boek E. S. (2013) Kinetics of Asphaltene Aggregation in Crude Oil Studied by Confocal Laser-Scanning Microscopy. *Energy & Fuels*, **27**, 1865–1872.
- [9] Chapman E.M., Yang J., Crawshaw J.P. and Boek E.S. (2013) Pore scale models for imbibition of CO<sub>2</sub> analogue fluids in etched micro-fluidic junctions from micro-model experiments and direct LBM flow calculations. *Energy Procedia*, **37**, 3680 – 3686
- [10] Lawal KA, Crawshaw JP, Boek ES, Vesovic V (2012) Experimental Investigation of Asphaltene Deposition in Capillary Flow, *Energy & Fuels*, **26** (4), 2145-2153.
- [11] Stukan MR, Ligneul P, Crawshaw JP, Boek ES (2010) Spontaneous imbibition in nanopores of different roughness and wettability. *Langmuir*, **26**, 13342-13352.

- [12] Stukan MR, Boek ES, Padding JT, Crawshaw JP, (2008) Influence of system size and solvent flow on the distribution of wormlike micelles in a contraction-expansion geometry. *Eur Phys J E Soft Matter*, **26**, 63-71.
- [13] Mikhail R. Stukan, Edo S. Boek, Johan T. Padding, Wim J. Briels and John P. Crawshaw (2008) Flow of wormlike micelles in an expansion-contraction geometry, *Soft Matter*, **4**, 870 – 879.
- [14] Boek, E. S.; Ladva, H. K.; Crawshaw, J. P.; Padding, J. T. (2008) Deposition of Colloidal Asphaltene in Capillary Flow: Experiments and Mesoscopic Simulation. *Energy & Fuels*, **22**, 805-813.
- [15] Scheven, U.M., Crawshaw, J.P., Anderson, V.J., Harris, R., Johns, M.L., Gladden, L.F. (2007) A cumulant analysis for non-Gaussian displacement distributions in Newtonian and non-Newtonian flows through porous media. *Magnetic Resonance Imaging*, **25 (4)**, 513-516.
- [16] Boek E.S., Padding J.T., Anderson V.J. Briels W.J. and Crawshaw J.P. (2007) Flow of entangled wormlike micellar fluids: Mesoscopic simulations rheology and micro-PIV experiments. *Journal of Non-Newtonian Fluid Mechanics*, **146 (1-3)**, 11-21.
- [17] Crawshaw J. and Meeten G. H. (2006) Shear-induced changes of electrical conductivity in suspensions. *Rheologica Acta*, **46(2)**, 183-193.
- [18] Perrin, C.L., Tardy, P., Sorbie K. and Crawshaw J. (2006) Experimental and modeling study of Newtonian and non-Newtonian fluid flow in pore network micromodels. *Journal of Colloid and Interface Science*, **295**, 542–550.
- [19] Harris, R.J., Sederman, A.J., Mantle, M.D., Crawshaw J. and Johns M.L. (2005) A comparison of experimental and simulated propagators using confocal laser scanning microscopy, lattice Boltzmann hydrodynamic simulations and nuclear magnetic resonance. *Magnetic Resonance Imaging*, **23**, 355-357.
- [20] Verganelakis, D.A., Crawshaw, J., Johns, M.L., Mantle, M.D., Scheven, U.M., Sederman, A.J., and Gladden, L.F. (2005) Displacement propagators of brine flowing within different types of sedimentary rock. *Magnetic Resonance Imaging* **23(2)**, 349.
- [21] Meller N., Hall C. & Crawshaw J.P. (2004) ESEM evidence for through-solution transport during brownmillerite hydration. *Journal of Materials Science*, **39**, 6611-6614.
- [22] Wamba Fosso S., Tina M., Frigaard, I.A. and Crawshaw J.P. Viscous-Pill Methodology Leads to Increased Cement Plug Success Rates: Application and Case Studies from Southern Algeria. SPE62752.
- [23] Crawshaw, J.P. and Frigaard, I. Cement Plugs: Stability and Failure by Buoyancy Driven-Mechanism. SPE 56959.
- [24] Frigaard I. and Crawshaw J.P. Preventing Buoyancy Driven Flows of Two Bingham Fluids in a Closed Pipe. Fluid Rheology Design for Oilfield Plug Cementing. *J. Eng. Math.* **36**, 327-348, 1999.
- [25] Crawshaw, J.P., Paterson W.R. and Scott D.M (2000), Gas Channelling and Heat Transfer in Moving Beds of Spherical Particles. *Trans IChemE*, **78(A)**: 465-472.
- [26] Crawshaw, J.P., Paterson, W.R. and Scott, D.M. (1993), Gas Residence Time Distribution Studies of Fixed, Moving and Frozen Beds of Spheres. *Chem Eng Res Des.* **71(6)**, 643-648
- [27] Paterson, W.R., Crawshaw, J.P., Hart, G., Parker, S.R., Scott, D.M. and Young, J.P. (1992), Pressure Drop in Counter-current Flow Through Moving Particulate Beds. *Chem Eng Res Des*, **70(A)**: 252-253
- [28] Crawshaw J.P. and Hills J.H. (1992), Experimental Determination of Binary Sorption and Desorption Kinetics for the System Ethanol, Water, and Maize at 90C *Ind. Eng. Chem. Res.* **31**, 887-892.
- [29] Crawshaw J.P., Paterson W.R., Scott D.M. and Hart G. (1992), Transport Properties in Moving Packed Beds. *I. Chem E. Symposium Ser.* 129, pp1093-1098.
- [30] Crawshaw J.P. and Hills J.H. (1990), Sorption of Ethanol and Water by Starch and Corn. *Ind. Eng. Chem. Res.* **29**, 307-309.