

# Lamia Goual

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## EDUCATION

Degree	Major	University	Date
PhD	Petroleum Engineering	Imperial College London, UK	2003
MS	Petroleum Engineering	Imperial College London, UK	1998
BS	Chemical Engineering	Ecole Nationale Polytechnique, Algeria	1993

## EMPLOYMENT

Position	Organization	Dates
Professor	University of Wyoming (Petroleum Eng.)	2021-
Associate Professor	University of Wyoming (Petroleum Eng.)	2014-21
Adjunct Professor	School of Energy Resources	2014-17
Assistant Professor	University of Wyoming (Chem. and Petroleum Eng.)	2007-14
Research Scientist	Enhanced Oil Recovery Institute	2006-07
Postdoc Research Fellow	University of Alberta (Chem. and Materials Eng.)	2004-06
Lab Engineer	Sonatrach R&D Center	1994-97

## HONORS AND AWARDS

A. J. Castagne Professorship, 2016-  
NSF-European Research Council Travel Award, 2017-2018  
NSF CAREER Award, 2014-2020  
Engineering Summer Program Award, 2016, Halliburton  
EPSCoR-Wyoming Women in Science and Engineering Travel Award, 2015  
Gender Diversity Award, 2011, Halliburton  
PhD Scholarship, 1999-2003, Reservoir Engineering Research Institute  
Prize for the Best MS Student, 1998, Institute of Petroleum  
MS Distinction, 1998, Imperial College  
MS Scholarship, 1997-1998, British Petroleum

## PUBLICATIONS

1. Zhang, B., Jiang, L., Rane, K., Goual, L., Piri, M., (2021) "Low-Temperature Graphene Growth and Shrinkage Dynamics from Petroleum Asphaltene on CuO Nanoparticle", *Ind. Eng. Chem. Res.* 2021, 60, 32, 12001-12010.
2. Rane, K., Adams, J., Thode, J. M., Leonard, B. M., Huo, J., Goual, L., (2021) "Multistep Fractionation of Coal and Application for Graphene Synthesis", *ACS Omega*, 6, 16573-16583.
3. Rane, K., Goual, L., Zhang, B., (2021) "Microscale Investigation of DNAPL Displacement by Engineered Graphene Quantum Dots in Heterogeneous Porous Media", *Colloids and Surfaces A*, 625, 126936.
4. Goual, L., Zhang, B., Rahham, Y. (2021) "Nanoscale Characterization of Thin Films at Oil/Water Interfaces and Implications to Emulsion Stability", *Energy Fuels*, 35, 444-455.
5. Rane, K., Goual, L., Zhang, B. (2020) "Graphene Quantum Dots for the Mobilization and Solubilization of Nonaqueous Phase Liquids in Natural Porous Media", *ACS Applied Nano Materials*, 3, 11, 10691-10701.
6. Rahham, Y., Rane, K., Goual, L. (2020) "Characterization of the Interfacial Material in Asphaltenes Responsible for Oil/Water Emulsion Stability", *Energy Fuels*, 34, 11, 13871-13882.
7. Zhang, B., Mohamed, A. I. A., Goual, L., Piri, M. (2020) "Pore-scale Experimental Investigation of Oil Recovery Enhancement in Oil-wet Carbonates using Carbonaceous Nanofluids", *Scientific Reports*, 10, 17539.

8. Zhang, B., Rane, K., Goual, L. (2020) "Coal-derived Nanomaterials for Enhanced NAPL Flow in Porous Media", *Carbon*, 170, 439–451.
9. Geshe, M.; Chaisoontornyotin, W.; Elkhatib, O., Goual, L. (2020), "Auto-Segmentation Technique for SEM Images Using Machine Learning: Asphaltene Deposition Case Study", *Ultramicroscopy*, 217, 113074.
10. Elkhatib, O., Chaisoontornyotin, W.; Geshe, M.; Goual, L. (2020), "Nanoscale Investigation of Asphaltene Deposition under Capillary Flow Conditions", *Energy Fuels*, 34, 5, 5148–5158.
11. Qin, T., Goual, L., Piri, M., Hu, Z., Wen, D. (2020), "Nanoparticle-stabilized Microemulsions for Enhanced Oil Recovery from Heterogeneous Rocks", *Fuel*, 274, August, 117830.
12. Arshadi, M.; Geshe, M.; Qin, T.; Goual, L.; Piri, M., (2020) "Impact of Mineralogy and Wettability on Pore-Scale Displacement of NAPLs in Heterogeneous Porous Media", *Journal of Contaminant Hydrology*, 230, March, 103599.
13. Barsotti, E., Tan, S., Goual, L., Piri, M. (2020), "Amorphization of Carbon Nanotubes in Water by Electron Beam Radiation", *Carbon*, 156, 313-319.
14. Qin, T., Goual, L., Piri, M., Hu, Z., Wen, D. (2020), "Pore-scale Dynamics of Nanofluid-Enhanced NAPL Displacement in Carbonate Rock", *Journal of Contaminant Hydrology*, Volume 230, March 2020, 103598.
15. Qin, T., Goual, L., Piri, M. (2019), "Synergistic Effects of Surfactant Mixtures on the Displacement of Nonaqueous Phase Liquids in Porous Media", *Colloids and Surfaces A.*, 582, 123885.
16. Mirchi, V., Sabti, M., Piri, M., Goual, L. (2019), "Microscale Investigation of the Impact of Surfactant Structure on the Residual Trapping of Non-Wetting Phase in Natural Porous Media", *Ind. Eng. Chem. Res.*, 58, 22, 9397-9411.
17. Qin, T.; Javanbakht, G.; Goual, L. (2019), "Nanoscale Investigation of Surfactant-enhanced Solubilization of Asphaltenes from Silicate-rich Rocks", *Energy Fuels*, 33, 5, 3796-3807.
18. Javanbakht, G.; Sedghi, M.; Welch, W.; Goual, L.; Hoepfner, M., (2018), "Molecular Polydispersity Improves Prediction of Asphaltene Aggregation", *Journal of Molecular Liquids*, 256, 382-394.
19. Mirchi, V., Saraji, S., Akbarabadi, M., Goual, L., Piri, M., (2017), "A Systematic Study on the Impact of Surfactant Chain Length on Dynamic Interfacial Properties: Implications for Enhanced Oil Recovery", *Ind. Eng. Chem. Res.*, 56, 13677-13695.
20. Qin, T., Javanbakht, G., Goual, L., Piri, M., Towler, B., (2017), "Microemulsion-enhanced Displacement of Oil in Porous Media Containing Carbonate Cements", *Colloids and Surfaces A*, 530, 60–71
21. Javanbakht, G., Arshadi, M., Qin, T., Goual, L., (2017), "Micro-scale Displacement of NAPL by Surfactant and Microemulsion in Heterogeneous Porous Media", *Advances in Water Resources*, 105, 173–187.
22. Lowry, E., Sedghi, M., Goual, L., (2017), "Polymers for Asphaltene Dispersion: Interaction Mechanisms and Molecular Design Considerations", *Journal of Molecular Liquids*, 230, 589–599
23. Javanbakht, G., Goual, L., (2016), "Impact of Surfactant Structure on Mobilization and Micellar Solubilization of NAPL in Porous Rocks", *Industrial & Engineering Chemistry Research*, 55 (45), 11736–11746
24. Lowry, E., Sedghi, M., Goual, L., (2016), "Novel Dispersant for Formation Damage Prevention in sc-CO<sub>2</sub>: A Molecular Dynamics Study", *Energy Fuels*, 30 (9), 7187–7195
25. Lowry, E., Sedghi, M., Goual, L., (2016), "Molecular Simulation of NAPL Removal from Mineral Surfaces Using Microemulsions and Surfactants", *Colloids and Surfaces A. Physicochem. Eng. Aspects*, 506, 485–494
26. Sedghi, M., Piri, M., Goual, L., (2016), "Atomistic Molecular Dynamics Simulations of Crude Oil/Brine Displacement Capillary Pressures in Calcite Mesopores", *Langmuir*, 32, 14, 3375–3384
27. Javanbakht, G. Goual, L., (2016), "Mobilization and Micellar Solubilization of NAPL Contaminants in Aquifer Rocks", *Journal of Contaminant Hydrology*, 185–186, 61–73
28. Javanbakht, G., Sedghi, M., Welch, W, Goual, L., (2015), "Molecular Dynamics Simulations of CO<sub>2</sub>/Water/Quartz Interfacial Properties: Impact of CO<sub>2</sub> Dissolution in Water", *Langmuir*, 31, 21, 5812–5819
29. Mirchi, V., Saraji, S, Goual, L., Piri, M. (2015), "Dynamic Interfacial Tension and Wettability of Shale in the Presence of Surfactants at Reservoir Conditions", *Fuel*, 148, 127-138
30. Goual, L., Sedghi, M., (2015), "Role of Ion-Pair Interactions on Asphaltene Stabilization by Alkylbenzenesulfonic Acids", *Journal of Colloid and Interface Science*, 440, 23–31
31. Sedghi, M., Piri, M., Goual, L., (2014), "Molecular Dynamics of Wetting Layer Formation and Forced Water Invasion in Angular Nanopores with Mixed Wettability", *Journal of Chemical Physics*, Nov 21, 141 (19), 194703:1-12
32. Goual, L., Sedghi, M., Mostowfi, F., McFarlane, R., Pomerantz, A., Saraji, S., Mullins, O., (2014), "Cluster of Asphaltene Nanoaggregates by DC-Conductivity and Centrifugation". *Energy Fuels*, 28 (8), 5002–5013

33. Saraji, S., Goual, L., Piri, M., (2014), "Effect of Brine Salinity and CO<sub>2</sub> Co-contaminants on Contact Angle and Interfacial Tension of Sc-CO<sub>2</sub>/Brine/Quartz Systems". *International Journal of Greenhouse Gas Control*, 28, 147-155
34. Goual L., Sedghi, M., Wang, X., Zhu, Z., (2014), "Asphaltene Aggregation and Impact of Alkylphenols". *Langmuir*, 30, 5394–5403
35. Sedghi, M., Goual, L., (2014), "PC-SAFT Modeling of Asphaltene Phase Behavior in the Presence of Nonionic Dispersants". *Fluid Phase Equilibria*, 369, 86–94
36. Saraji, S., Goual, L., Piri, M., (2013), "Dynamic Adsorption of Asphaltenes on Quartz and Calcite Packs in the Presence of Brine Films". *Colloids and Surfaces A: Physicochem. Eng. Aspects*, 434, 260–267.
37. Sedghi, M., Goual, L., Welch, W., Kubelka, J. (2013), "Effect of Asphaltene Structure on Association and Aggregation Using Molecular Dynamics". *Journal of Physical Chemistry B*, 117, 5765–5776.
38. Saraji, S., Goual, L., Piri, M., (2013), "Wettability of Sc-CO<sub>2</sub>/Water/Quartz Systems: Simultaneous Measurement of Contact Angle and Interfacial Tension at Reservoir Conditions". *Langmuir*, 29, 6856–6866.
39. Mullins, O., Sabbah, H., Eyssautier, J., Pomerantz, A., Barre, L., Andrews, B., Ruiz-Morales, Y., Mostowfi, M., McFarlane, R., Goual, L., Lepkowicz, R., Cooper, T., Orbulescu, J., Leblanc, R., Edwards, J., Zare, R., (2012), "Advances in Asphaltene Science and the Yen-Mullins Model". *Energy Fuels*, 26, 3986–4003.
40. Wang, X., Goual, L., Colberg, P., (2012), "Characterization and Treatment of Dissolved Organic Matter from Oilfield Produced Waters". *Journal of Hazardous Materials*, 217–218, 164–170.
41. Goual, L., Sedghi, M., Zeng, H., Mostowfi, F., McFarlane, R., Mullins, O., (2011), "On the Formation and Properties of Asphaltene Nanoaggregates and Clusters by DC-Conductivity and Centrifugation". *Fuel*, 90, 2480–2490.
42. Saraji, S., Goual, L., Piri, M., (2010), "Adsorption of Asphaltenes in Porous Media under Flow Conditions". *Energy Fuels*, 24(11), 6009-6017.
43. Goual, L., Abudu, A., (2010), "Predicting the Adsorption of Asphaltenes from their Electrical Conductivity". *Energy Fuels*, 14(1), 469-474.
44. Sedghi, M., Goual, L., (2010), "Role of Resins on Asphaltene Stability". *Energy Fuels*, 24, 2275-2280.
45. Merino-Garcia, D., Shaw, J., Carrier, H., Yarranton, H., Goual, L., (2010), "The Petrophase 2009 Panel Discussion on Standardization of Petroleum Fractions". *Energy Fuels*, 24, 2175-2177.
46. Abudu, A., Goual, L., (2009), "Adsorption of Crude Oil on Surfaces using Quartz Crystal Microbalance under Flow Conditions". *Energy Fuels*, 23(3), 1237-1248.
47. Goual, L., (2009), "Impedance Spectroscopy of Petroleum Fluids at Low Frequency". *Energy Fuels*, 23(4), 2090-2094.
48. Goual, L., Schabron, J.F., Turner, T.F., Towler, B.F., (2008), "On-column Separation of Wax and Asphaltenes in Petroleum Fluids", *Energy Fuels*, 22(6), 4019-4028.
49. Goual, L., Horvath-Szabo, G., Masliyah, J.H., Xu, Z., (2006), "Characterization of the Charge Carriers in Bitumen". *Energy Fuels*, 20 (5), 2099-2108.
50. Goual, L., Horvath-Szabo, G., Masliyah, J.H., Xu, Z., (2005), "Adsorption of Bituminous Components at Oil/Water Interface by Quartz Crystal Microbalance: Implications to the Stability of Water-in-Oil Emulsions". *Langmuir*, 21(18), 8278-8289.
51. Goual, L., Firoozabadi, A., (2004), "Effect of Resins and DBSA on Asphaltene Precipitation from Petroleum Fluids". *AIChE Journal*, 50(2), 470-479.
52. Goual, L., Firoozabadi, A., (2002), "Measuring Asphaltenes and Resins, and Dipole Moment in Petroleum Fluids". *AIChE Journal*, 48(11), 2646-2663.
53. Nichita, D.V., Goual, L., Firoozabadi, A., (2001), "Wax Precipitation in Gas Condensate Mixtures". *SPE Production & Facilities*, 16(4), 250-259.

## PROCEEDINGS

1. Sedghi, M., Goual, L., (2016), "Molecular Dynamics Simulations of Asphaltene Dispersion by Polymer During CO<sub>2</sub> Flooding", SPE 179040. Proceedings of the SPE International Conference & Exhibition on Formation Damage Control, Lafayette, LA, 24–26 February.
2. Mirchi, V., Saraji, S., Goual, L., Piri, M., (2014), "Dynamic Interfacial Tensions and Contact Angles of Surfactant-in-Brine/Oil/Shale Systems: Implications to Enhanced Oil Recovery in Shale Oil Reservoirs". SPE 169171, Proceedings of the SPE Improved Oil Recovery Symposium, Tulsa, OK, 12-16 April.

3. Saraji, S., Goual, L., Piri, M., (2012), "Wettability in CO<sub>2</sub>/Brine/Quartz Systems: An Experimental Study at Reservoir Conditions". SPE 160208. Proceedings of the SPE Annual Technical Conference and Exhibition, San Antonio, Texas, 8-10 October.
4. Nichita, D.V., Goual, L., Firoozabadi, A., (1999), "Wax Precipitation in Gas Condensate Mixtures". SPE 56488. Proceedings of the SPE Annual Technical Conference and Exhibition, Houston, Texas, 3-6 October.

#### **OTHER ACTIVITIES**

1. Wyoming Summer High School Institute: Laboratory demonstration to students from Wyoming High Schools, June 13, 2018, July 26, 2019, June 9, 2021
2. Cave demonstrations and laboratory hands-on-activities with 33 students from Casper Star Lane Junior High School, May 11, 2017
3. Wyoming State Science Fair: Laboratory demonstrations to students from Wyoming High Schools, March 7, 2016
4. Journey into Underground Rocks: CAVE and laboratory demonstrations to 80-100 students from Laramie Junior High School, May 5-6, 2015 and April 12-13, 2016
5. CAVE demonstration to 12 kids from UW Early Care and Education Center, July 17, 2015
6. Surface Science Days: Laboratory hands-on-activities with 5-15 high school students from the Central Wyoming College Upward Bound program, June 3, 2015 and June 7-8, 2016
7. Engineering Summer Program: Field trips to Halliburton in Brighton (CO) and water treatment plant in Cheyenne (WY) with Junior High School students, June 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019
8. Member: American Chemical Society (ACS), Society of Petroleum Engineers (SPE), and Engineers Without Borders