Dr. Mohammed Abdalla Ayoub's Resume

PERSONAL DETAILS

Name:	Mohammed Abdalla Ayoub Mohammed
Date / Place of Birth:	September 22, 1973 / Sudan
Nationality:	Sudanese
Permanent Address:	University of Khartoum-Department of Petroleum Engineering-Faculty of Engineering and Architecture. University Main Campus-Khartoum P. O. Box: 11111 Khartoum-Sudan
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E-mail:	ayob99@hotmail.com wdayoub@gmail.com
Status:	Married and has two kids

EXECUTIVE SUMMARY:

A highly skilled Petroleum Engineer with proven knowledge in multiphase studies (vertical, horizontal, and inclined), reservoir engineering, reservoir simulation and Field Development Planning. Strategic thinker, forward planner, and efficient problems solver. He has good technical capabilities regarding the field of the latest computing techniques application in petroleum industry (artificial neural networks, genetic algorithm, and abductive networks). Talented at motivating people of different abilities, cultures and backgrounds. He is a fast learner and a devoted and enthusiastic employee and looking forward to face new challenges in different areas of specializations. He doesn't mind being sent abroad to fulfill whatever tasks that he will be responsible for (willing to relocate).

EDUCATION:

October 2011 **PETRONAS University of Technology, Malaysia**

PhD in Petroleum Engineering

- Specialization in: Neural Network and Abductive Networks Applications in Petroleum Industry.

June 2004 **KFUPM, Dhahran, Kingdom of Saudi Arabia**

MS in Petroleum Engineering

- Specialization in: Neural Network Applications in Petroleum Industry.
- Research Assistantship during the period of study.

July 1999 **University of Khartoum, Khartoum, Sudan**

B.Sc. in Mining Engineering.

First Class Distinction honor degree.

Final year project: Design of an Open Pit Mine; Nufyer Er-Rugaig case study.

TEACHING EXPERIENCE (FROM 2004-2016):

- Leader of reservoir Engineering Cluster at University Technology PETRONAS-Malaysia (2015-Now).
- Active member of Enhanced Oil Recovery Group at University Technology PETRONAS-Malaysia (2012-Now).
- Conducted two short courses-training programs for the industry (2016).
- Taught four courses at university of Khartoum – department of Petroleum Engineering (2009–2011)
- Planned several short course-training programs for the industry (2004-2006).
- Developed plans for acquisition of equipment and establishment of undergraduate teaching and graduate research laboratories (financed by the Islamic Development Bank-Jeddah-Saudi Arabia) (2005-2006).

ADMINISTRATIVE EXPERIENCE (12 YEARS):

- Acting Director of the Program during Director's leave periods (2011-2012).
- Revising and upgrading the undergraduate and Master curricula (2011-2012).
- Coordinator of the academic affairs of the Petroleum Engineering Program (2004-2006).
- Provided major administrative and academic support/assistance to the Petroleum Engineering Program Director (2004-2006).
- Helped Develop the undergraduate curriculum of the Petroleum Engineering Program (2004-2006).
- Developed the graduate program and established the admission rules and program regulations (2004-2006).
- Establishing the departmental PC laboratory and acquisition of commercial petroleum engineering software (2005).
- Establishment of the departmental library (2005).

CAREER OBJECTIVE:

Secure & challenging engineering position where in my team player attributes, experience, and communication skills can be utilized in obtaining personal career goals and those of the employer. Main goal is to contribute to the discovery and development of new ideas, which help the company meet the demands of the future and contribute to company profitability.

WORK EXPERIENCE:

Dates of service	Positions	Field and duties of work	Name and address of employers
01/08/2015-present	Senior lecturer	Teaching in Petroleum Engineering Department	Universiti Teknologi PETRONAS (UTP)-Tronoh-Malaysia
31/5/2014-Present	Reservoir Engineering Cluster Leader	Organizing the activities led by reservoir engineering cluster members.	Universiti Teknologi PETRONAS (UTP)-Tronoh-Malaysia
26/9/2012-30/07/2015	Lecturer	Teaching in Petroleum Engineering Department	Universiti Teknologi PETRONAS (UTP)-Tronoh-Malaysia
12/9/2011-15/9/2012	Assistant Professor	Teaching in Petroleum Engineering Department	University of Khartoum-Khartoum, Sudan
17/9/1999-29/6/2004	Research Assistant	Assisting Petroleum Engineering staff in running laboratory experiments.	King Fahd University of Petroleum and Minerals- Dhahran, Saudi Arabia
1/12/2002-31/03/2003	Training Engineer	Was involved in writing technical proposals, in addition to routine daily meeting with companies' representatives. I was also leading one project team during that short	Engineering and Technology Services (ETS)- El-Khobar-Saudi Arabia

		period. I was responsible of training team members a specialized software.	
10/8/1999-29/6/2004	Teaching Assistant	Conducting laboratory experiments, undertaking tutorial sessions for most of department's subjects	University of Khartoum-Khartoum, Sudan

PROJECT ACTIVITIES:

JUNE 2013- DECEMBER 2015 **PROJECT TITLE: UTILIZATION OF LOW SALINE/SMART WATER IN FOAM ASSISTED WATER ALTERNATING GAS PROCESS (INTERNAL UNIVERSITY GRANT: RM49, 961)**

RESEARCH ACTIVITIES

The main objective of this research project is to propose a new hybrid EOR process where the effects of low salinity water injection are combined with FAWAG process.

NOVEMBER, 1ST 2016- OCTOBER 31ST 2016 PROJECT TITLE: A NOVEL HYBRID ENHANCED OIL RECOVERY METHOD BY LOW SALINITY WATER INJECTION AND FOAM FLOODING IN CARBONATE ROCK (Y-UTP FRG GRANT: RM 198,670.00)

RESEARCH ACTIVITIES

The main objective of this research project is to propose a new hybrid EOR process where the effects of low salinity water injection in carbonate reservoirs are taken into consideration with Foam flooding process.

SOFTWARE PROFICIENCY:

OPERATING SYSTEMS	*PROGRAMMING LANGUAGES*	*ENGINEERING SOFTWARE*
DOS, Windows 95/98, NT, Windows 2000, Windows XP, Windows 7, 8, & 10.	MatLab, visual Basic 6.0	❖ Specialized in MATLAB Software (Neural Network, statistics toolboxes) ❖ Eclipse 100 (Schlumberger simulation software) ❖ PETREL (Schlumberger simulation software)-official training certificate. ❖ PIPESIM (Schlumberger Production Optimization Software) ❖ Pathfinder (artificial neural network package software)

- Neuro-Intelligence (Data Mining and Predictor Software)
- EasyNN (ANN Software)
- NETOPT (Field-Wide simulation and optimization of oil & gas production operations software)
- Saphir (Well Testing Software)
- Rockware (Reserve Estimation)
- Surfer (Perfect Knowledge)
- WinGslib (Geostatistics Software)
- NeuraLog (Conversion of Image Logs into Digit Files)
- OFM (Schlumberger production software)

CURRENT EMPLOYMENT:

Researcher, senior lecturer, and cluster leader of reservoir Engineering at the department of Petroleum Engineering, Faculty of Geosciences and Petroleum Engineering, University Technology PETRONAS, Seri Iskandar, Perak, Malaysia.

PREVIOUS RESEARCH WORK:

Worked under supervision of Professor Mohammed Ahmed Aggour; (currently serving as a visiting professor at Texas A & M). We *developed and tested a neural network model for predicting pressure drop in multiphase wells in Saudi Arabian fields (SPE 93832)*. The model has the ability to predict pressure drop in vertical wells carrying multiphase fluids with pronounced accuracy better than the current conventional methods "empirical correlations & mechanistic models". This innovative approach is being used for the first time in literature regarding this field. A technical paper has been presented in the 14th SPE Middle East Oil & Gas Show and Conference held in Bahrain International Exhibition Centre, Bahrain, 12-15 March 2005.

For PhD study I was working under supervision of Professor Birol M. Demiral, head of Center of Excellence for EOR at UTP, (now at Network of Excellence in Training, **NExT, Schlumberger**). Our project was focusing on the application of Artificial Neural Networks and Abductive Networks to generate two universal models for estimating pressure drop at pipelines that accounts for all angles of inclination. The study also utilized models performance to compare them against the best empirical and mechanistic models. Recently I had two PhD students who worked in two smart water projects on different common EOR methods. The smart water is proven to be a very cheap EOR evolving technique. It involves varying the compositions of the water inside the reservoir (in situ- variation) where it results in wettability change towards the more favoring recovery conditions. In consequence, the IFT is gradually reduced and more residual oil can be freed. We are now quite sure what the mechanisms behind this wettability changes are. However, many theoretical aspects are behind this hypothesis. As known, each reservoir contains different and unique fluids. That what makes this prediction process quite difficult and tedious. We are trying at the end of the day to detect all inter-related parameters and come up with models for different fluid types, rock types under different wettability conditions.

CURRENT RESEARCH WORK:

Completed one project supported by UTP to study in laboratory scale the effects of wettability alteration by different low salinity water compositions in Berea sandstone rock through using brine of different ion compositions and salinities. Measurements were performed on a set of 31 sandstone core slices primarily saturated with formation water and then aged in crude oil at 80° C and ambient pressure. All slices were removed from oil and aged with different low salinity water and formation brine at same conditions. The low salinity water consisted of 30 samples of different compositions with concentrations ranging from 500 to 6500 ppm. The formation water contained high concentration of magnesium and calcium divalent ions (i.e., Mg^{+2} and Ca^{+2}) at 130,000ppm. The examination of wettability alteration was performed by using the sessile drop method at specified ranges of time. The results revealed that significant change in wettability was observed with the low salinity water composition of potassium and sodium monovalent ions (i.e., K^{+} and Na^{+}) as compared to the divalent cations of Mg^{+2} and Ca^{+2}. In addition to that, we investigated also the effect of different Total Acid Number (TAN) and Total Base Number (TBN) on wettability alteration during foam flooding. In this work we managed to propose a new mechanism of low salinity water called MIE-RS, which could open the gate to study the wettability alteration using low salinity flooding.

PUBLICATIONS:

Book chapter

1- **Mohammed A. Ayoub** (September 2016). 'Chapter 3. GMDH Multilayered Algorithm in MATLAB" in GMDH Methodology and Implementation in MATLAB" by Godfrey Onwubolu. In press, published by London Press. ISBN: 978-1-78326-612-8 (hardcover) http://www.worldscientific.com/worldscibooks/10.1142/p982

Journal Papers

1- **Abdolmohsen Shabib-Asl, Mohammed Abdalla Ayoub, Khaled Abdalla Elraies, Seyednooroldin Hosseini, and Hamed Hematpour,"**Investigation into the Effects of Crude Oil on Foam Stability by using Different Low Salinity Water", Indian Journal of Science and Technology, Vol. 9(35), September 2016

2- **Moradi, B., Ayoub, M., & Awang, M, "**Modification of Ramey's model for carbon dioxide injection in the vicinity of critical point. Journal of CO2 Utilization, 16, 218-224". (2016).

3- **K. A. Elraies, Kalwar, S.A, Mohammed A. Ayoub and Hadi A. Belhaj** "Experimental investigation of alkali-surfactant-polymer flooding for carbonate reservoirs" International Journal of Applied Engineering Research, Volume 10, Issue 11, 2015, Pages 28401-28410

4- **Shabib-Asl Abdolmohsen, Mohammed A. Ayoub, and Ismail Bin Mohd Saaid,** "Experimental Investigation into effects of Crude oil Acid and Base number on Wettability alteration by using different Low Salinity Water in Sandstone Rock", Journal of the Japan Petroleum Institute. Vol. 58 No. 4 (July issue, 2015) http://doi.org/10.1627/jpi.58.228

5- **Mohammed A. Ayoub, Shabib-Asl Abdolmohsen, AbdellahiZein, K.A. Elraies and I. Bin Mohd Saaid, "**Recovery Optimization of an Oil Reservoir by Water Flooding under Different

Scenarios; a Simulation Approach" Research Journal of Applied Sciences, Engineering and Technology 10(4): 357-372, 2015.

6- **Mohammed A. Ayoub and Ahmed Abdelhafeez Mohamed,** "Estimating the Lengthy Missing Log Interval Using Group Method of Data Handling (GMDH) Technique" Journal of Applied Mechanics & Materials, Volume 695, (850-853). 2015

7- **Shabib-Asl Abdolmohsen, M.A. Ayoub, A. F. Alta'ee, I. Bin Mohd Saaid and P. Paulo Jose Valentim, "**Comprehensive Review of Foam Application during Foam Assisted Water Alternating Gas (FAWAG) Method", Research Journal of Applied Sciences, Engineering and Technology 8(17): 1896-1904, 2014.

8- **Abdolmohsen Shabib-Asl, Mohammed Abdalla Ayoub Mohammed, Massoud Kermanioryani, Pedro Paulo Jose Valentim**, "Effects of Low Salinity Water Ion Composition on Wettability Alteration in Sandstone Reservoir Rock: A Laboratory Investigation", Journal of Natural Sciences Research 4 (13), 34-41, (2014-Special issue).

9- **Mohammed A. Ayoub and K. A. Elraies, "**Development of a Universal Pressure Drop Model in Pipelines Using Group Method of Data Handling-Type Neural Networks Model", Journal of Applied Sciences; 2014, Vol. 14 Issue 23, p3220 – 3227, DOI: 10.3923/jas.2014.3220.3227.

10- **Musaab M. Ahmed and Mohammed A. Ayoub, "**A Comprehensive Study on the Current Pressure Drop Calculation in Multiphase Vertical Wells; Current Trends and Future Prospective" Journal of Applied Sciences; 2014, Vol. 14 Issue 23, p3162 – 3171, DOI: 10.3923/jas.2014.3162.3171.

11- **Mohammed A. Ayoub and Abdollah Esmaeili;** "Multiple Hydraulic Fractured Vertical Wells in Gas Condensate Reservoirs. Platform Journal of Engineering, Science and Society Vol. 10(1), (January-June 2014). ISSN 1511-6794

12- **Mohammed A. Ayoub and Abdollah Esmaeili;** "Application of Artificial Neural Networks Technique for Estimating Permeability from Well Log Data. Platform Journal of Engineering, Science and Society Vol. 10(1), (January-June 2014). ISSN 1511-6794.

13- **Mohammed A. Ayoub and Abdollah Esmaeili;** "Local Thermal Effect on Vapor Extraction (VAPEX) Process for Heavy Oil Enhanced Recovery. Platform Journal of Engineering, Science and Society Vol. 9(2), (July-December 2013). ISSN 1511-6794.

14- **Mohammed A. Ayoub, Abdollah Esmaeili,** "Production Optimization of an Oil Reservoir", Platform Journal of Engineering, Science and Society Vol. 9 Issue 1, pp. 27-35, (January - June 2013). ISSN 1511-6794.

15- **Mohammed A. Ayoub, Abdollah Esmaeili,** "Treating Produced Water from an Oil Reservoir for Re-Injection and Enhanced Oil Recovery", Platform Journal of Engineering, Science and Society Vol. 9 Issue 1, pp. 43-52 (January - June 2013). ISSN 1511-6794.

16- **Mohammed A. Ayoub, Birol M. Demiral**, "Application of Resilient Back-Propagation Neural Networks for Generating a Universal Pressure Drop Model in Pipelines", UofKEJ Vol. 1 Issue 2 pp. 9-21 (October 2011). **Available online at** http://ejournals.uofk.edu

Conference Papers

1. **Shabib-Asl Abdolmohsen, Mohammed A. Ayoub, and K A. Elraies** "Effects of Crude Oil on Foam Stability by Using Different Low Salinity Water ", Proceedings of the 4th International Conference On Integrated Petroleum Engineering and Geosciences (ICIPEG2016).

2. **M. Ayoub and Haifa B. Baldram,"Optimizing Injection Perforated Layers of Lateral Continuous Shale During Secondary Recovery;** A Simulation Approach. Proceedings of the 4th International Conference on Integrated Petroleum Engineering and Geosciences (ICIPEG2016).

3. **T Al-Ghuribi, M Liew, Noor Amila Wan Abdullah Zawawi, M. Ayoub, "**Decommissioning decision criteria for offshore installations and well abandonment: Proceedings of the 3rd International Conference on Civil, Offshore and Environmental Engineering (ICCOEE 2016, Malaysia, 15-17 Aug 2016).

4. **Shabib-Asl Abdolmohsen, Mohammed A. Ayoub, and K A. Elraies, "**Laboratory Investigation into Wettability Alteration by different Low Salinity Water Compositions in Sandstone Rock". SPE176492, presented in SPE Asia Pacific Oil & Gas Conference and Exhibition (APOGCE), held in Bali-Indonesia, 20 -22 October 2015.

5. **Mohammed A. Ayoub and Ahmed Abdelhafeez Mohamed,** "Estimating the Lengthy Missing Log Interval Using Group Method of Data Handling (GMDH) Technique", presented at World Virtual Conference on Advanced Research in Mechanical and Materials Engineering, held in Johor Bahru-Malaysia, 22-26 September 2014.

6. **A. Esmaeili and M. Abdalla Ayoub.,** "Applications of Electromagnetic Measurement Methods in Oil and Gas Industry". Presented at 2014-Sustainable Industrial Processing Summit & Exhibition from 29th June-04 July 2014, Fiesta Americana Condesa Cancun All Inclusive Resort, Cancun, Mexico.

7. **A. Esmaeili, M. Abdalla Ayoub and Maryam Dehghani, "**Predicting Fluid-flow In Naturally Fractured Reservoirs". Presented at 2014-Sustainable Industrial Processing Summit & Exhibition from 29th June-04 July 2014, Fiesta Americana Condesa Cancun All Inclusive Resort, Cancun, Mexico.

8. **A. Esmaeili and M. Abdalla Ayoub,** "Optimization Of Water Injection Well Placement For Water Injection Into An Oil Reservoir To Enhance Oil Recovery". Presented at 2014-Sustainable Industrial Processing Summit & Exhibition from 29th June-04 July 2014, Fiesta Americana Condesa Cancun All Inclusive Resort, Cancun, Mexico.

9. **A. Esmaeili and M. Abdalla Ayoub,** "Gas Lift as an Artificial Lift for Production from an Oil Field". Presented at 2014-Sustainable Industrial Processing Summit & Exhibition from 29th June-04 July 2014, Fiesta Americana Condesa Cancun All Inclusive Resort, Cancun, Mexico.

10. **Mohammed A. Ayoub, K. A. Elraies,** "Development of a Universal Pressure Drop Model in Pipelines Using Group Method of Data Handling-Type Neural Networks Model", presented at IOGSE2013 (International Oil and Gas Conference 2013) held in Kota Kinabalu-Sabah, Malaysia, 9-11 October 2013.

11. **Abdol mohsen Shabib-Asl, Mohammed A. Ayoub and Ali F. Alta'ee,** "Application of Foam during Foam Assisted Water Alternating Gas (FAWAG) Process: A Review", presented at IOGSE2013 (International Oil and Gas Conference 2013) held in Kota Kinabalu-Sabah, Malaysia, 9-11 October 2013.

12. **Musaab Ahmed and Mohammed A. Ayoub, "**A Comprehensive Study on the Current Pressure Drop Estimation Methods in Multiphase Vertical Wells; Current Trends and Future Prospective", presented at IOGSE2013 (International Oil and Gas Conference 2013) held in Kota Kinabalu-Sabah, Malaysia, 9-11 October 2013.

13. **Mohammed A Ayoub; "**Optimization of Smart Water Injections in Sandstone Reservoirs using Different Injected Water Salinities for Enhanced Oil Recovery"., presented at SOGEX 2013, Miri Indoor Stadium, Miri, Sarawak.

14. **Mohammed A. Ayoub.,** "Development of a Universal Artificial Neural Network Model for Pressure Loss Estimation in Pipeline Systems; A comparative Study" paper – Presented at the 1st ICIPEG (International Conference on Integrated Petroleum Engineering and Geosciences) held in Convention Center, Kula Lumpur, Malaysia, 15-17 June 2010.

15. **Mohammed A. Ayoub.,** "The Use of Artificial Neural Networks and Genetic Algorithms for Effectively Optimizing Production from Multiphase Flow Wells" paper, Presented at the 1st National Postgraduate Conference on Engineering Science and Technology, held in UTP, 31 March 2008.

16. **Mohammed A. Ayoub., Raja. D. M., and Al-Marhoun M.A.,** "Evaluation of below bubble point viscosity correlations & Construction of a New Neural Network Model" SPE 108439 –

Presented at the 2007 Asia Pacific Oil & Gas Conference and Exhibition held in Jakarta, Indonesia, 30 October-1 November 2007.

17. **Osman, E.A., Mohammed A. Ayoub., and Aggour, M.A., "**Artificial Neural Network Model for Predicting Bottom-hole Flowing Pressure in Vertical Multiphase Flow" SPE 93632 – presented in the 14th MEOS and conference held in Bahrain International Exhibition Centre, Bahrain, 12-15 March 2005.

In pipelines' journal papers

1- **Mohd H. Farhan and Mohammed A. Ayoub.,** Prediction of Oil Bubble-Point Pressure, P_b and Oil Formation Volume Factor, B_o using Group Method of Data Handling (GMDH) approach and the effect of reducing correlating parameters; a comparative study.

2- **Elhassan M. Abdallah and Mohammed A. Ayoub.,** Experimental and Numerical Study of Wax Deposition in Crude oil.

3- **Harun Ab Rahman and Mohammed A. Ayoub.,** Modelling Viscosity Below Bubble Point Pressure Using Group Method of Data Handling (GMDH): A Comparative Study.

4- **K. A. Elraies and Mohammed A. Ayoub., "**Experimental Investigation of Surfactant Partitioning In Type III Microemulsion during Chemical EOR Process"
(Submitted to Journal of Petroleum Science and Engineering)

5- **Moctar Bebaha and Mohammed A. Ayoub., "**Estimation of solution gas oil ratio at reservoir pressure less than bubble point pressure using group method of data handling; a comprehensive assessment study" submitted to SPE Journal

6- **Poh sieu and Mohammed A. Ayoub.,** Estimating the oil thermal compressibility above the bubble point pressure; a comparative approach.

7- **Mohd Amierul Azhar and Mohammed A. Ayoub.,** Prediction of minimum miscibility pressure using group method of data handling; an empirical approach

8- **Mohammed A. Ayoub and Ahmed A. Hafeez.,** Interpreting lengthy missing log intervals using Back-propagation Artificial Neural Network model; a case study. Submitted to Journal of the Japan Petroleum Institute.

9- **Mohammed A. Ayoub.,** A new correlation to estimate the coefficient of isothermal oil compressibility at saturated reservoirs: a comparative study. (submitted to SPE Formation Evaluation Journal)

10- **Ahmad A. Elhadi and Mohammed A. Ayoub.,** A new correlation for formation volume factors of oil and gas mixtures using group method of data handling: An empirical approach.

11- **Ting C. Siong and Mohammed A. Ayoub**., Optimization of well placement in a green field; A Simulation Approach.

COURSES TAUGHT DURING:

Master degree period

Mathematical Methods, Advanced Production Engineering, Advanced Well Testing, Reservoir Simulation(I), Advanced Reservoir Engineering, Advanced Petroleum Geology, Production Facilities, Numerical Methods in Petroleum Engineering.

Undergraduate degree period

Rock & Fluid properties, Reservoir Engineering, Drilling Engineering, Well Logging, Well Testing, Subsurface Production Engineering.

HONORS AND AWARDS:

- 2000, Research Assistantship at King Fahd University of Petroleum & Minerals.
- 1999, First-Class Honor, University of Khartoum.
- 1999, the best academic performance, Faculty of Eng. University of Khartoum.
- 1998, the best academic performance, Faculty of Eng. University of Khartoum.
- 1996, the best academic performance, Faculty of Eng. University of Khartoum.
- Recognition certificate from student deanship (KFUPM-2003); a MatLab Course Session Coordinator.
- 2008, recognition certificate from UTP; participation in the first National Postgraduate Conference on Engineering Science and Technology.
- Professional American Management Alliance Certificate (Advanced Subsurface Petroleum Production Technology Course. Received on 23rd October 2008.
- 2010, recognition certificate from UTP, participation the 1st ICIPEG (International Conference on Integrated Petroleum Engineering and Geosciences).
- 2014, recognition certificate from UTP, participation the 3rd ICIPEG (International Conference on Integrated Petroleum Engineering and Geosciences).

REFERENCES:

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