

Luis F. Ayala is Assistant Professor of Petroleum and Natural Gas Engineering at the Pennsylvania State University¹, USA. He has also been an Instructor in the Chemical Engineering and Petroleum Engineering Departments at Universidad de Oriente (Venezuela). His research activities focus on the areas of natural gas engineering, hydrocarbon phase behavior, multiphase flow, numerical modeling, and artificial intelligence. He holds PhD and MS degrees in Petroleum and Natural Gas Engineering from the Pennsylvania State University and two engineering degrees with honors, one in Chemical Engineering (summa cum laude) and another in Petroleum Engineering (summa cum laude) from Universidad de Oriente (Venezuela). He is a member of the Society of Petroleum Engineers, American Chemical Society, National Association of Engineers of Venezuela, and the Canadian Petroleum Society of CIM.



Professional Preparation

Universidad de Oriente (UDO), Venezuela
Chemical Engineering Degree, summa cum laude honors, 1997.

Universidad de Oriente (UDO), Venezuela
Petroleum Engineering Degree, summa cum laude honors, 1999.

The Pennsylvania State University (PSU), USA
Master of Science in Petroleum and Natural Gas Engineering, 2001.

The Pennsylvania State University (PSU), USA
Doctor of Philosophy in Petroleum and Natural Gas Engineering, 2004.

Appointments

- 2004– present **Assistant Professor** of Petroleum and Natural Gas Engineering, Penn State U.
Department of Energy and Mineral Engineering. In charge of the graduate and undergraduate courses in natural gas engineering and hydrocarbon thermodynamics, conduction of funded research, supervision of graduate students, and participation in academic administration.
- 2003–2004 **Instructor** of Petroleum and Natural Gas Engineering, Penn State U.
Department of Energy and Geo-Environmental Engineering. In charge of petroleum surface design undergraduate courses and support of the on-line program in Oil and Gas Engineering Management.
- 2000–2003 **Graduate Assistant/Assistant Lecturer**, Penn State U.
Assisted in the delivery and grading of graduate courses in phase behavior of petroleum fluids, natural gas engineering, and freshman seminars.
- 1997–1999 **Instructor**, joint appointment in the Petroleum Engineering Department and Chemical Engineering Department, Universidad de Oriente, Venezuela.
In charge of undergraduate courses (Natural Gas Engineering, Petroleum Processing, and Process Control) and faculty advisor of the student organization.

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Selected Publications

- Mann, A. and **Ayala H., L.F.**, Intelligent Design of Natural Gas Underground Storage Facilities, *Int. J. of Modeling and Simulation*, v. 129, n. 2, p. 214-223, 2009.
- **Ayala H., L.F.**, Redespiel, E., and Ertekin, T., Numerical Analysis of Condensate-Flow Impairment in Retrograde-Gas Naturally Fractured Reservoirs and Its Interplay with the Estimation of Diffusion Coefficients, *SPE Journal*, v. 14, n.1, pp. 95-100, March 2009.
- Farías, M., **Ayala H., L. F.**, Watson, R., Experimental and Zero Dimensional Analysis of CO₂-N₂ Gas Cyclic Injection Processes, *Petroleum Science and Technology*, v. 27:1, 2009.
- Kouassi, J.P. and **Ayala H., L.F.**, An Analysis of the Pressure Transient Behavior of Gas-Condensate Reservoirs, *Energy Sources – Part A*, v. 31, p. 449-461, March 2009.
- Silpngarmert, S., Ertekin T., and **Ayala H., L.F.**. Numerical Modeling of Methane Hydrate Reservoirs, in press, *Int. J. of Modeling and Simulation*.
- **Ayala H., L. F.** and Fernández L., J.E., Evaluating Crystallization Risks in LNG Production, in press, *SPE Projects Facilities and Construction J.*
- **Ayala H., L. F.**, Alp, D., and Al-Timimy, M. Intelligent Design and Selection of Natural Gas Two-Phase Separators, in press, *Journal of Natural Gas Science and Engineering*.
- **Ayala H., L.F.** Carving your Own Path: The Technical vs. Managerial Career Dilemma, Editorial, *The Way Ahead- SPE Publications*, v. 5, n. 2, p. 2-3, SPE Publications, 2009.
- **Ayala H., L.F.** The Oil Roller Coaster, Editorial, *The Way Ahead- SPE Publications*, v. 5, n. 1, p. 3-4, 2009.
- **Ayala H., L.F.** and Alp, D., Limitations of Marching Algorithms in the Analysis of Multiphase Flow in Pipelines, *Journal of Energy Resources Technology*, v. 130, n.4, p. 4300301-4300310, Dec. 2008.
- Ertekin, T. and **Ayala H., L.F.** Numerical Analysis of Retrograde Behavior in Fissured Systems: The Single-Block Model, *Petroleum Science and Technology*, v. 26, n. 10-11, p. 1141-1160, July 2008.
- **Ayala H., L.F.** and Karpyn, Z., On the Calculation of Static Bottom-Hole Pressures in Gas Wells, *Petroleum Science and Technology*, v. 25, n. 8, p. 1099-1104, August 2007.
- **Ayala H., L.F.**, and Ertekin, T. Neuro-Simulation Analysis of Pressure Maintenance Operations in Gas-Condensate Reservoirs, *J. Pet. Science and Engineering*, v. 58, n. 1-2, p. 207-226, August 2007.
- **Ayala H., L.F.**, Ertekin, T., and Adewumi, M., Numerical Analysis of Multi-mechanistic Flow Effects in Naturally Fractured Gas-Condensate Systems, *J. Petroleum Science and Engineering*, v. 58, n. 1-2, p. 13-29, August 2007.
- Ayala, O. F., **Ayala H., L.F.**, and Ayala, O.M., Multi-phase Flow Analysis in Oil and Gas Engineering Systems and its Modeling, *Hydrocarbon World 2007* ISSN: 1753-3899, p. 57-61, Touch Briefings Ltd., London, UK, July 2007.
- Kelner, E., **Ayala H., L.F.**, and Garcia, A., Model Improves Measurement and Control; Helps Locate Liquids, *Pipeline & Gas J.*, v. 234, n. 7, p. 28-42, July 2007.
- Urquidi-Macdonald, M., Ashutosh, T., and **Ayala H., L. F.**, A Neuro-Fuzzy Knowledge-based Model for the Risk Assessment of Microbiologically Influenced Corrosion (MIC) in Crude-Oil Pipelines, *2007 International Conference on Biocorrosion of Materials (BIOCORTS)*, EFC Event No. 293, Paris, France, June 12-13, 2007.
- **Ayala H., L.F.** and Koaussi, J.P., The Similarity Theory Applied to the Analysis of Multiphase Flow in Gas Condensate Reservoirs, *Energy and Fuels*, v. 21, n. 3, p. 1592-1600, May/June 2007.
- **Ayala H., L.F.**, Ertekin, T., and Adewumi, M., Study of Gas-Condensate Reservoir Exploitation Using Neuro-Simulation, *SPE Reservoir Eng. and Evaluation J.*, v. 10, n. 2, p. 140-149, April 2007.
- Baris, O., **Ayala, L.**, Watson, R., Numerical Modeling of Foam Drilling Hydraulics, *The Journal of Engineering Research*, v. 4, n. 1, pp. 103-119, Jan. 2007.
- **Ayala H., L.F.**, Ertekin, T., and Adewumi, M., Compositional Modeling of Gas-Condensate Reservoirs in Multimechanistic Flow Domains, *SPE Journal*, v. 11, n. 4, p. 480-487, Dec. 2006.
- **Ayala H., L.F.** The Role of Fluid Thermodynamic Behavior in Natural Gas Handling and Transportation, *Business Briefing: Hydrocarbon World 2006*, ISSN: 1753-3902, p. 61-66, Touch Briefings Ltd., London, UK, Dec. 2006.

- **Ayala H., L.F.,** On the Non-Ideality of Hydrocarbon Fluids: Implications for Natural Gas Engineering – Part A, *Petroleum J. Online*, e-journal of reservoir engineering, v.1, n. 1, Nov. 2006.
- **Ayala H., L.F.,** On the Non-Ideality of Hydrocarbon Fluids: Implications for Natural Gas Engineering – Part B, *Petroleum J. Online*, e-journal of reservoir engineering, v.1, n. 1, Nov. 2006.
- Al-Farhan, F. and **Ayala H., L.F.:** Optimization of Surface Condensate Production from Natural Gases Using Artificial Intelligence, *J. Pet. Science and Engineering*, v. 53, pp. 135-147, August 2006.
- **Ayala H., L.F.,** Phase Behavior of Hydrocarbon Fluids: The Key to Understanding Oil and Gas Engineering Systems, *Business Briefing: Oil & Gas Processing Review 2006*, ISBN: 1-905052-47-2, p. 16-18, Touch Briefings Ltd., London, UK, Feb. 2006.
- **Ayala H., L.F.,** and Adewumi, M., Low-Liquid Loading Multiphase Flow in Natural Gas Pipelines, *Journal of Energy Resources and Technology, Trans. ASME*, v. 125, p. 284-293, December 2003.
- **Ayala, L.F.,** Eltohami, E., and Adewumi, M., A Unified Two-Fluid Model for Multiphase Flow in Natural Gas Pipelines, paper presented in the 25th Engineering Technology Conference on Energy of ASME, Feb. 4-5, Houston, TX, 2002.
- **Ayala, L.F.,** Eltohami, E., and Adewumi, M., Avoiding Pitfalls in Multiphase Thermo-hydrodynamic Coupling, paper presented in the 25th Engineering Technology Conference on Energy of ASME, Feb. 4-5, Houston, TX, 2002.
- Eltohami, E., Erdogmus, M., **Ayala, L.F.,** and Adewumi, M., PCB Migration and Cleanup Scenarios in Natural Gas Pipelines, paper presented in the 25th Engineering Technology Conference on Energy of ASME, Feb. 4-5, Houston, TX, 2002.

Synergistic Activities

Editor-in-Chief of *The Way Ahead*, Society of Petroleum Engineers (SPE) Magazine; Member, *SPE Reservoir Description and Dynamics* Advisory Committee, Society of Petroleum Engineers (SPE); Associate Editor, *Journal of Natural Gas Science and Engineering* (JNGSE); Member of Editorial Review Board of the Society of Petroleum Engineering Journals (SPERE J.); Member of Editorial Board of *Petroleum Science and Technology J. (PST)*; Member of Editorial Team, e-journals of Reservoir Engineering and Production Engineering of Petroleum Journals Online (PJO), Member Reservoir Engineering Program Subcommittee, 2010 SPE Annual Technical Conference and Exhibition, Florence, Tuscany, Italy; Session Chair, 2007 ASME International Conference on Offshore Mechanics and Arctic Engineering in San Diego, California; Member of Technical Committee, 2007 SPE Latin American & Caribbean Petroleum Engineering Conference in Buenos Aires, Argentina; Faculty Contact Person of the on-line Master of Engineering in Oil and Gas Eng. Management (OGEM), Member of the Society of Petroleum Engineers (SPE), American Chemical Society (ACS), National Association of Engineers of Venezuela, Canadian Petroleum Society, and the Society of Hispanic Professional Engineers (SHPE).

Honors and Awards

2008 Wilson Award for Excellence in Teaching; 2007 SPE Outstanding Technical Editor Award; 2002 PNGE Graduate Merit Award; 1999 Presidential Distinction for Academic Excellence “*José Félix Ribas*” awarded by the President of the Republic of Venezuela, *Summa Cum Laude* distinction in Petroleum Engineering, UDO, 1999; Diploma of Recognition for Outstanding Academic Accomplishment granted by the Board of Trustees of Universidad de Oriente (UDO, Venezuela) for obtaining the highest academic distinction (*summa cum laude*) in two engineering majors studied simultaneously (UDO, 1999); *Summa Cum Laude* distinction in Chemical Engineering, UDO, 1997; Merit Medal “21st of November” granted by the Board of Trustees of Universidad de Oriente for outstanding academic achievement, UDO, 1997.