

Fred Aminzadeh

3436 Campanil Dr., Santa Barbara, CA 93109

Cell 805-570-6108, fred.aminzadeh@FACT-Corp.com

SUMMARY

Fred Aminzadeh is currently president and CEO of FACT. He also is on the Technical Advisory Board of SMART Initiative of DOE's National Energy Technology Laboratory (<https://edx.netl.doe.gov/smart>.) Previously, he was Professor of Petroleum Engineering at the university of Houston and University of Southern California. He served as president of Society of Exploration Geophysicists (SEG) and worked as a professor of petroleum engineering at the University of Southern California. His consistent history of outstanding performance and visionary leadership in the areas of geophysics, machine learning, data analytic, artificial intelligence, reservoir characterization, 3D/4D seismic, hydraulic fracturing, smart oil field technologies signal processing/pattern recognition and soft computing has earned him a number of acclaims. He received 2018 Honorary membership of SEG and many awards from Society of Petroleum Engineers (SPE). He led a \$30 million SEG/EAGE Subsalt/Overthrust Modeling and was appointed by the US Secretary of Energy to DOE's Unconventional Resources Technology Advisory Committee or URTAC. He received a \$2 million DOE funding for characterizing fracture network. Dr. Aminzadeh was the editor in Chief of the Journal of Sustainable Energy Engineering for 6 years. He provides advice on exploration and production technology for geothermal and fossil oil energy as well as carbon capture and sequestration issues. Some of the areas of expertise include:

AI/Machine Learning	3D/4D Seismic	Geosteering/ Drilling kick
Pattern Recognition	Hydrocarbon Seep Detection	Neural Networks, Fuzzy logic
Geothermal Energy	Data Analytic and Big Data	Shale / Hydraulic Fracturing
Reserves Certification	Reservoir Characterization	CO ₂ Sequestration

PROFESSIONAL EXPERIENCE

Fact Corporation, President 1988-Present,

Founded FACT is a technology firm involved in consulting, software development, training and service work for oil and gas companies and government agencies. Its many past and current clients include Saudi Aramco, Schlumberger, Eni, LBNL, LLNL and NETL (<http://www.fact-corp.com/>.) FACT began the Machine Learning in Oil and gas initiative in 2019: <http://www.fact-corp.com/mlog>. This was followed by the successful Machine Learning in Unconventional Resources (MLUR2019), in collaboration with the University of Houston: <https://www.fact-corp.com/mlur2019-call-for-papers>. FACT has recently launched its AID-ET research initiative, focusing on AI - Data analytics for Energy Transformation. FACT is also one of the organizations involved in DOE's Phase II SMART Initiative with its primary goal as using machine learning techniques for carbon sequestration.

University of Houston, Houston, TX, Petroleum Engineering Dept.

AIM-DEEP- Advisor, January 2022-present

Research Professor, September 2020- December 2021,

Designed and taught a course on Data Analytics and Machine Learning for E&P at the Petroleum Engineering Department of UH (PETR5397)

Artificial Intelligence, Machine Learning and Data Analytic for Energy Exploration (AIM-DEEP), Director, 2020-2021

University of Southern California, Los Angeles, CA, Petroleum Engineering Dept.

Research Professor, 2009-2018, Adjunct Professor, 2018-2020

Teaches two of the four required courses for the Center for Integrated Smart Oil Fields (CiSOFT) option. The courses are:

- Intelligent and Collaborative Oilfield Systems Characterization & Management (PTE586)
- Advanced Oilfield Operations with Remote Visualization and Control (PTE589)

Global Energy Network (GEN), Managing Director, 2009-present

Leads a comprehensive energy related think-tank, covering a wide variety of programs on research, policy and training at USC: (www.gen.usc.edu.)

Reservoir Monitoring Consortium (RMC), Executive Director, 2011-present

Leads the industry supported reservoir monitoring consortium dealing with reservoir characterization, and monitoring of different types of reservoirs (conventional, and unconventional) at USC (www.rmc.usc.edu.)

Induced Seismicity Consortium (ISC), Executive Director, 2012-present

Leads the industry supported induced seismicity consortium dealing with potential risks associated with hydraulic fracturing and fluid displacement of shale reservoirs, as well as quantification and mitigation of the risk factors.) at USC: (www.isc.usc.edu.)

dGB-USA, Houston, Texas, President and CEO, 1999-2008.

Established and helped grow dGB-USA the South/North America part of dGB-Earth Sciences. dGB is a software and service company providing services on reservoir characterization and E&P applications of neural networks using Opentect software (www.opentect.org) to energy companies: www.dgbes.com

Unocal Corporation, Houston, Texas (now part of Chevron)

Director of external technology alliance, 1996-1999

Directed Unocal's external technology activities including those with other industry partners, academia and national laboratories

Unocal Corporation, Brea California

Manager, Geophysical Technology / Seismic Acquisition, (and other positions) 1986-1995

Led different Geophysical technology teams including those in formation evaluation, seismic data acquisition and reservoir description. Participated in various business development activities in South Caspian, especially in Azerbaijan and Uzbekistan. Reviewed many E&P and business development initiatives including the Azeri, Chirag and Gunashli development plan.

Unocal Corporation, Brea California

Supervisor, Seismic Methods Group, (and other positions) 1983-1986

Supervised and contributed to a team focusing on oil and gas E&P seismic technologies.

Bell Laboratories, Murray Hill, NJ, Member of Technical Staff, 1979-1982

Contributed to important projects on acoustic signal processing, time series analysis, data compression, uncertainties associated with on demand modeling and forecasting, and parameter identification. Introduced the novel "generalized Kalman filtering" with many applications including, strategic multi-stage planning and seismic data analysis and reservoir simulation.

DOE/ NATIONAL LABORATORIES ADVISEMENT

National Energy Technology Laboratory, 2019-present

Providing technical advice to NETL's Science informed Machine Learning for Accelerating Real Time Decisions in Subsurface Applications (SMART) Initiative and serving as one of the four technical advisory board members of SMART.

National Energy Technology Laboratory (ORISE Fellow), 2013-2020

Providing technical advice to NETL, leading to a joint patent on data compression and MWD data signal processing for drilling kick detection,
Oak Ridge National Laboratories, Oak Ridge, Tennessee, 1996-2001
Member of Scientific Advisory Board, CESAR)
Department of Energy, 2007-2008
Member of Unconventional Resources Technical Advisory Committee (**URTAC**)
(Appointed by the Secretary of Energy)
Los Alamos National Laboratories, 1996-1998
Consultant on geophysical imaging and signal processing
Lawrence Berkeley National Laboratories, 1997-1999
Consultant on seismic attributes and geophysical signal processing

EDUCATION

PhD, Electrical Engineering with Minor on Geophysics, 1979

University of Southern California, Los Angeles, California

The PhD work emphasized on the geophysical and seismic signal processing. The dissertation was on **Non-Normal Incidence State Space Model for Layered Earth Media**. This work was the foundation for a subsequent patent for elastic modeling and reservoir fluid saturation (AVO) analysis, with a number of commercial licensing.

MS, EE, 1977

University of Southern California, Los Angeles, California,

BS/MS, EE, 1973

University of Tehran, Iran

AFFILIATIONS & AWARDS

- SEG Honorary Membership, 2018, Citation: (... **significant contributions to the field of exploration geophysics and seismic signal processing.....pioneering work on seismic elastic modeling, seismic pattern recognition, artificial intelligence, reservoir monitoring, and induced seismicity.**)
- SPE Western North America Region Formation Evaluation Award 2015
- GRC Best Paper award titled: Fracture Network Interpretation, 2012
- SPE Western North America Region Faculty award 2012
- SPE Western North America Region award for Reservoir Description and Analysis, 2011
- OCEC Distinguished Educator of the Year, 2010
- World Oil Innovative Thinkers award finalist, 2005 and 2006
- Recipient of SEG Special Commendation Award, 1998, Citation:
“**In recognition of Meritorious Service Rendered the Scientific Community the Earth Sciences and Exploration Geophysics**”
- Fellow of IEEE, 1995, Citation:
“**For Contributions to the Application of Modeling, Signal Processing, Pattern Recognition and Expert Systems in the Analysis of Seismic and Acoustic Data**”.
- Member of Russian Academy of Natural Sciences, 1995
- Honorary member of Azerbaijan Oil Academy, 1992
- Recipient of four US patents and four pending
 - **Guided Oscillatory Well Path Drilling by Seismic Imaging, patent # 5242025**, 1993
 - **Seismic Ray Tracing Method and Apparatus, patent # 5, 079, 749**, 1992
 - **Hybrid Reservoir Characterization (with Xu) # 6,236, 943**, 2001
 - **System for Kick Detection During A Drilling Operation (with Rose and Tost of NETL), patent # 10253620**, 2019

- **A Novel Approach for Measuring Reservoir Monitoring Properties and Well Testing Using Active and Controlled Pressure Pulses** (with Alharbi of Aramco) Provisional Patent USC File No. 2016-211), 2016
- **Optimization of Foam (and CO₂-Foam) Injection into Porous Media through Resistivity Measurements, U.S. Prov. Serial No. 62/511,547** (with Karakas), 2017
- **Cyclic Neuro-Fuzzy Water-Steam Flooding with Neuro-Fuzzy Bang-Bang Control, U. S. Provisional 62/540,270, 2017**
- **DNA Fingerprinting to Optimize Reservoir Characterization and Hydraulic Fracturing Using Machine Learning Based Integration of Geophysics, Geochemistry and Geomechanics, Provisional Patent D2018-0109, 2017**

PROFESSIONAL ACTIVITIES

- Editor in Chief, Journal of Sustainable Energy Engineering: JSEE, 2014- 2021
- President, Society of Exploration Geophysicists, 2007-2008
- Guest Editor, IEEE Magazine on Signal Processing, 2010
- Vice President of SEG, 2001-2002
- Member of National Research Council, (NSF) Committee on Seismology, 1998-2000
- Chairman of Society of Exploration Geophysicists (SEG) Research Committee, 94-96
- Associate Editor, Society of Petroleum Engineering Reservoir Management, 1998-2006.
- Associate Editor, Journal of Science and Petroleum Engineering, 1996-pres.
- Associate Editor, Journal of Seismic Exploration, 1994-pres.
- Associate Editor, Computers and Electrical Engineering, 1989-1998

HIGHLIGHTED ACCOMPLISHMENTS

A- SELECTED ACADEMIC AND EDUCATIONAL ACCOMPLISHMENTS

- Started University of Houston “Artificial Intelligence, Machine Learning and Data Analytics for Energy Exploration and Production” (AIM-DEEP) program and received funding from industry: <https://aim-deep.petro.uh.edu>.
- Created a new course on Big Data for the Petroleum Engineering Department of UH with new focus on AI-DA for E&P. (2020-2021)
- Gave two CiSOFT courses, established USC Global Energy Center, Establishing USC Center for Geothermal Studies, launched USC Reservoir Monitoring Consortium, and launched Induced Seismicity Consortium,
- Many accomplishment during 8 years with USC since March 2009: Giving two CiSOFT courses, establishing USC Global Energy Center, Establishing USC Center for Geothermal Studies, launching USC Reservoir Monitoring Consortium, launching Induced Seismicity Consortium, launching Center for Reservoir Development and Modeling Systems and Advising many PhD Students.
- Helped expand the geoscience component of USC Petroleum Engineering program leading to a new degree option with geoscience focus (starting in 2013)
- Received an \$850K USAID grant to work with the Indonesian University, ITB to help develop and enhance their training requirements for the geothermal industry.
- Designed and conducted many courses including those on seismic attributes & geostatistical and neural network based reservoir characterization and conducted over 40 short courses in over 20 countries.
- Designed and conducted a course on Geophysics for Petroleum Engineers thought from my own book by others as well.

- Introduced the concept of "Geo-Engineer" the model that was used by many academic institutions, including the Harriot-Watts of the UK for multi-disciplinary training. (1996).
- Served as adjunct professor or instructor in many universities including University of Tabriz, University of California, and Rice University

B- TECHNICAL ACCOMPLISHMENTS

- Was named to the DOE / National Energy Technology Laboratory's SMART Initiative technical advisory board. <https://edx.netl.doe.gov/smart>
- Introduced a new idea for geothermal AI applications, winning a SBIR contract (with Petroleum), titled: "Dynamic Fracture Network Evolution Monitoring and Characterizing using a Geomechanically Constrained Time-lapsed Windowed Microseismic Imaging.
- Did pioneering work on signal processing, pattern recognition, expert systems, AI, soft computing and machine learning for many different oil and gas applications, evidenced by numerous books, technical papers and patents.
- Co-invented and patented a System for Kick Detection during drilling patent #10,253,620 B1, 2019
- Co-invented and received a provisional patent (No. 62/511,547), Optimization of CO₂-Foam Injection into Porous Media through Resistivity Measurements, 2017
- Invented and received a provisional patent (No. 62/540,270) on Cyclic Neuro-Fuzzy Water-Steam Flooding with Neuro-Fuzzy Bang-Bang Control, 2017
- Co-invented and received a provisional patent (No. D2018-0109) on DNA Fingerprinting to Optimize Reservoir Characterization and Hydraulic Fracturing Using Machine Learning Integrating Geophysics, Geochemistry and Geomechanics, 2017.
- Co-invented and received a provisional patent (No. 2016-211), for Reservoir Monitoring and Well Testing with controlled pressure pulses, 2016.
- Made a significant contribution to the application of gas chimney technology in the oil industry and its impact on reducing seal and charge risk by applying it to over 100 fields around the world. Won the top paper award in AAPG 2008.
- Was first to introduce elastic impedance concept, USC Ph D Dissertation, 1979, Geophysical Prospecting, 1982. Based on this, invented a novel modeling and AVO analysis method that has been applied to over 100 fields and exploration projects with outstanding success. The superior results of this method has created interest outside Unocal, leading to licensing of the technology to others (1990-1998), patent #5,079,749
- Introduced new attributes for quantifying attenuation of seismic waves in the subsurface as part of meta- attributes and used it for modeling of seismic data.
- Invented a hybrid reservoir characterization method, combining physics-based and statistics-based concepts, **patent # 6,236, 943**. Applied the method to many practical problems including one to distinguish the tight and pay zone in the Norphlet formation. Results presented in an international conference won best paper award.
- Introduced a new method for pattern recognition and clustering seismic data to identify hydrocarbon bearing reservoirs from seismic features. Combined with other geostatistical and neural network approaches, among many other successful applications, was a GOM project producing a \$9MM saving (1995)
- Introduced advanced seismic signal processing, pattern recognition, artificial intelligence, and expert systems leading to major discoveries and induction to the **Fellow of IEEE**.
- Pioneered a generalized Kalman filter, originally for multi-stage planning and economic applications that was subsequently used by large number of researchers for reservoir simulation, seismic data analysis, environmental, remote sensing, marine science and sonar applications. (1980-1998)
- Introduced clustering of seismic attributes for the first time and published the first paper on seismic clustering. (1985)

- Invented a novel modeling and AVO analysis method for assess in reservoir fluid saturation that has been applied to over 100 Unocal fields and exploration projects with outstanding success. The superior results has created interest outside Unocal, leading to licensing of the technology to other companies for commercialization.
- Invented and patented a technique for horizontal drilling Geosteering using seismic technology. This patent has contributed to major recent advances in drilling and imaging technologies. **patent # 5,242,025**, 1992.

C-SELECTED LEADERSHIP ACCOMPLISHMENTS

- Served as the President-elect and President of Society of Exploration Geophysicists. The presidency marked many first time ever accomplishments including opening China Office, Inter-Society Relations, Geoscientists without Borders, Geo-Mentoring and Reserves Committees, and New SEG online and General Assembly (2006-2008)
- Founded and directed two successful technical service companies: dGB-USA, and FACT Inc. Among clients have been over 100 oil companies including many super majors, majors, NOC's, independents and small oil companies as well as different size service companies (1999-2017). This included offering short course in over 20 countries, the last one being a course on Reserves Evaluation at Saudi Aramco in 2017.
- Introduced E-Cubed concept of Energy, Economy and Environment. Serving as the Editor in Chief of Journal of Sustainable Energy Engineering with the E-Cubed Focus.
- Led a large team of professionals from oil companies and national laboratories to carry out a \$25 MM 3D seismic project to model salt and overthrust structures. The results continue to be extensively used to reduce exploration risk and development cost, for which received the 1998 SEG Special Commendation Award for this accomplishment. (1989-1995)
- Master-minded a large-scale technical study agreement with Azerbaijan. Managed and completed the project, paving the way for company's entry to the country and capturing 10% interest in the Azeri-Chirag and Gunashly "mega-structure" valued at over \$900 MM. Received many stock awards for this accomplishment. (1990-1993)

PUBLICATIONS

A- Partial List of Journal Publications,

1. Karakas, M.; Alcorn, Z.P.; Aminzadeh, F.; Graue, A., 2022, Pressure Measurements for Monitoring CO2 Foam Pilots. *Energies*, 15, 3035, <https://doi.org/10.3390/en15093035>
2. Ashena, R.; Aminzadeh, F.; Khoramchehr, A. 2022, Production Improvement via Optimization of Hydraulic Acid Fracturing Design Parameters in a Tight Carbonate Reservoir. *Energies*, 15, 1947. <https://doi.org/10.3390/en15051947>
3. Karakas, M.; Aminzadeh, F.; and Graue, A., 2022, CO2-Foam Monitoring using Resistivity and Pressure Measurements. *Global Journal of Research in Engineering: JGeneral Engineering*, Volume 22 Issue 2 Version 1.0 Year 2022
4. Rezaei, A. and Aminzadeh, 2022, A Data-Driven Reduced-Order Model for Estimating the Stimulated Reservoir Volume (SRV). *Energies*, 16166626.
5. Aminzadeh, F., 2021, Reservoir Characterization: Combining Machine Intelligence with Human Intelligence, *E&P Plus*, April 2021, Vol. 96 Issue 4, *E&P Plus*, Hart Energy,
6. Zhao, X, Popa, A.S., Ershaghi, I, Aminzadeh, F., Li, Y., and Cassidy, S., 2020, Reservoir Geostatistical Estimation of Imprecise Information Using Fuzzy Kriging Approach, *SPE's*

- Reservoir Evaluation & Engineering, Vol. 23 (01): 001–012.,
<https://doi.org/10.2118/190051-PA>
7. Aminzadeh, F., 2018, Hydraulic Fracturing, An Overview, *Journal of Sustainable Energy Engineering*, Vol. 6, Issue 4, pp204-228
 8. Hosseini, M., Goebel, T., and Aminzadeh, F., 2018, A Probabilistic Approach to Injection-Induced Seismicity Assessment in the Presence and Absence of Flow Boundaries, *Geophysical Research Letters*, DOI: 10.1029/2018GL077552
 9. Thimmisetty, C., Aminzadeh, F., Rose, K. and Ghanem, R., 2017 Multiscale Stochastic Representations using Polynomial Chaos Expansions with Gaussian Process Coefficients, Submitted to *Data-Enabled Discovery and Applications*
 10. Hough, S., Tsai, VC, Walker, R, and Aminzadeh, F., 2017, Was the Mw 7.5 1952 Kern County, California, Earthquake Induced (or Triggered)? *Journal of Seismology (JOSE)*. *J Seismology*, DOI 10.1007/s10950-017-9685-x
 11. Katz, S., Aminzadeh, F., Chilingar, 2017, Permeability prediction using machine learning, exponential, multiplicative, and hybrid models, *Journal of Sustainable Energy Engineering*, Vol. 5, Issue 3,
 12. Long, W., Chai, D., & Aminzadeh, F. (2016, May 23). Pseudo Density Log Generation Using Artificial Neural Network. *Society of Petroleum Engineers*. doi:10.2118/180439-MS
 13. Desi, K., Aminzadeh, F., 2016, Flowback of Fracturing Fluids with upgraded visualization of hydraulic Fracturing and its Implication of on Overall Well Performance, *Journal of Sustainable Energy Engineering*, Vol. 4, Issue 3-4, pp 250-261.
 14. Katz, S., Aminzadeh, F., Chilingar, G., Long, W. Khylyuk, L. and Lackpour, M., 2016, Rock Permeability Forecast Using Machine Learning and Monte Carlo Committee Machines, *Journal of Sustainable Energy Engineering*, Vol. 4, Issue 2, pp 182-200.
 15. Jabbari, N., Aminzadeh, F., de Barros, F., 2016, Hydraulic Fracturing and the Environment, Risk Assessment for Groundwater Contamination *Stochastic Environmental Research and Risk Assessment*, Vol.30, doi:10.1007/s00477-016-1280-0
 16. Goebel, T., H. W., Hosseini, S. M., Cappa, F. Hauksson, E., Ampuero; J. P., Aminzadeh; F. and Saleeby, J. B. 2016, Wastewater disposal and earthquake swarm activity at the southern end of the Central Valley, California, *Geophysical Research Letter*, 43, doi:10.1002/2015GL066948.
 17. Jabbari, N., Aminzadeh, F., de Barros, F., 2015, Assessing the Groundwater Contamination Potential from a Well in a Hydraulic Fracturing Operation, *Journal of Sustainable Energy Engineering*, Vol.3, Issue 1, pp 66-79
 18. Katz, S., Aminzadeh, F., Chilingar, G., and Khylyuk, L., 2015, Anomaly Detection within Homogeneous Geologic Area, *Journal of Sustainable Energy Engineering*, Vol. 3, Issue 2, pp 169-186.
 19. Goebel, T. H. W., Hauksson, E. Aminzadeh, F. Ampuero, J. P., 2015, An objective method for the assessment of wastewater injection induced seismicity in tectonically active regions in central California, *Journal of Geophysical Research (AGU)* 101002/2015JB011895
 20. Maity, D., Aminzadeh, F., 2015. Novel Fracture Zone Identifier Attribute using Geophysical and Well Log Data for Unconventional Reservoirs, *Interpretation Journal*, Vol.3, No. 3, p.T155-T167
 21. Tiwari, A., Walker R., Aminzadeh, F., 2014 Hydraulic Fracturing and Induced Seismicity in California, *Hydraulic Fracturing (HF) Journal*, August 2014.
 22. Katz, S., Aminzadeh, F., Chilingar, G., and Khylyuk, L., 2014, Dissimilarity Analysis of Petrophysical Parameters as Gas-Sand Predictors, *Journal of Sustainable Energy Engineering*, Vol. 2, pp 114-122.
 23. White, L., Aminzadeh, F. and Rose, A., 2014, A Post-Audit of Geothermal Development in California's Imperial Valley, *Journal of Sustainable Energy Engineering*, Vol. 2, pp 166-191

24. Al-Yateem, K. S., Al-Amri, M. A., Aminzadeh, F., Ahyed R. A. Al-Khelaiwi, F. T., 2014, Effective Utilization of Smart Oil Fields Infrastructure toward Optimal Production and Real-Time Reservoir Surveillance, Saudi Aramco Journal of Technology, Fall 2014 issue
25. Maity, D., Aminzadeh, F., Karrenbach, M., 2014. Novel Hybrid Artificial Neural Network Based Autopicking Workflow for Passive Seismic Data, Geophysical Prospecting, Vol. 62, Issue 4, pp 834-847
26. Aminzadeh, F., Tafti, T. A. and Maity, D. 2013, An Integrated Methodology for Sub-surface Fracture Characterization using Microseismic data: A Case Study at the NW Geysers, Computer and Geosciences journal, Vol. 39, Issue 2.
27. Tafti, T. A., Sahimi, M., Aminzadeh, F. and Sammis, C. G., 2013, Use of Microseismicity for Determining the Structure of the Fracture Network of Large-Scale Porous Media, Physical Review Letter E, Vol. 87, 032152-1-10.
28. Al-Yateem, K., Aminzadeh, F. and Dasgupta, S., 2011, The Implication of Using State-of-the-Art Technologies in Oil Fields, Saudi Aramco's Journal of Technology (JOT), Spring 2011 issue
29. Aminzadeh, F., Lines, L., 2009, The Growing Role of Geophysics, GeoExpro, February 2009.
30. de Groot, P., Aminzadeh, F., Hemstra, N., de Bruin, G. 2008, Advanced seismic interpretation techniques in OpendTect. Drilling & Exploration World, Vol. 17 No. 03, January 2008.
31. Aminzadeh, F., Lines, L., 2008, Increased global demand, energy supply challenges drive geophysical advances, The American Oil and Gas Reporter, July 2008.
32. Thomson, L., Aminzadeh, F., 2007, Advances Push Geophysics Beyond 3D Methods, the American Oil and Gas Reporter, February 2007.
33. Aminzadeh, F., 1996, Future geophysical technology trends, The Leading Edge 15, 739-742
34. Aminzadeh, F., 2005, Applications of AI and Soft Computing for Challenging Problems in the Oil Industry, Journal of Petroleum Science and Engineering, Vol. 47, pp 5-14 (Runner up, the Eni award for the New Frontiers in Hydrocarbon, 2010)
35. Aminzadeh, F., de Groot, P., 2004, Soft Computing for qualitative and quantitative seismic object and reservoir property prediction, Part 1, Neural Network Applications, First Break, EAGE, Volume 22, pp 49-54.
36. Aminzadeh, F., Wilkinson, D., 2004, Soft Computing for qualitative and quantitative seismic object and reservoir property prediction, Part 2, Fuzzy logic applications, First Break, EAGE, Volume 22, pp 69-78.
37. Aminzadeh, F., 2004, Soft Computing for qualitative and quantitative seismic object and reservoir property prediction, Part 3, Evolutionary computing and other aspects of soft computing.
38. Tamhane, D., Wong, P. M., Aminzadeh, F., 2002, Integrating Linguistic Descriptions and Digital Signals in Petroleum Reservoirs, International Journal of Fuzzy Systems, Vol 4, No. 1, pp585-591.
39. Aminzadeh, F., Connolly, D., Heggland. R., Meldahl, P., and de Groot, P., 2002, Geohazard detection and other applications of chimney cubes, The Leading Edge, **21**, no. 7, 681-685.
40. Berge, T.B., F. Aminzadeh, P. De groot, T. Oldenziel, 2002, Seismic Inversion Successfully Predicts Reservoir Porosity, and Gas Content in Ibhubesi Field, Orange Basin, South Africa: The Leading Edge, **21**, no. 4, 338-348.
41. Aminzadeh, F., and Connolly, D. 2002, Looking for Gas Chimneys and Faults, AAPG Explorer, Vol. 23, No. 2, pp 20-21.
42. Nikravesh, M. and Aminzadeh, F., 2001, Mining and Fusion of Petroleum Data with Fuzzy Logic and Neural Network Agents, Journal of Petroleum Science and Engineering, Vol. 29, pp 221-238.

43. Aminzadeh, F., de Groot, P., Berge, T. and Valenti, G. 2001. Using gas chimneys as an exploration tool (part I & II). World Oil magazine, May 2001, p.50-56 (part I) and June 2001, p.69-72 (part II).
44. Aminzadeh, F., Barhen, J., Glover, C.W. and Toomanian, N. B. 2000, Reservoir Parameter Estimation Using a Hybrid Neural Network, Computers and Geosciences, Vol 26, pp 869-875,
45. Shatilo, A., Aminzadeh, F., 2000, Constant Normal Moveout (CNMO) Correction: A technique and Test Results, Geophysical Prospecting, Vol. 48, No. 3, pp 473-488.
46. Dasgupta, S., Kim, J., AlMousa, A., AlMustafa, H., Aminzadeh, F. and Lunen, E., 2000, From seismic character and seismic attributes to reservoir properties: Case study in Arab-D reservoir of Saudi Arabia, 70th Ann. Internat. Mtg: Soc. of Expl. Geophys., 597-599.
47. Heggland, R., Meldahl, P., de Groot, P. and Aminzadeh, F., 2000. Seismic Chimney Cube Reveals Oil & Gas Accumulations. American Oil & Gas Reporter, 43, 2, p. 78-83.
48. Aminzadeh, F., 2000, Challenges Direct Future of Geophysics, American Oil and Gas Reporter (Invited Paper for the Special Millennium Edition), Vol. 43, No. 1, pp 123-132,
49. Aminzadeh, F., Barhen, J., Glover, N., and Toomanian, N. B., 1999, Estimation of Reservoir Parameters Using a Hybrid Neural Network, Journal of Science and Petroleum Engineering, Vol. 24, pp 49-56, 1999.
50. Sherasta, R., Xu, W., Aminzadeh, F., Sengupta, M., 1997, Utilization of Seismic Modeling and Geostatistics for Prediction of Tight Zone in the Norphlet Formation, Journal of Geophysics, Vol. XVIII, No. 1, pp. 27-33. 1997, with *best paper citation*,
51. Aminzadeh, F., 1996, Future Geophysical Technology Trends, The Leading Edge of Geophysics, Vol. 15, N0. 6, pp 739-742.
52. de Fuguerido, R., Aminzadeh, F., 1996, A Visualization Tool for Well-Log Blocking, Journal of Seismic Exploration, Vol. 5, pp. 79-92.
53. House, L., Fehler, M., Barhen, J., Aminzadeh, F., Larsen, S., 1996 A national laboratory-industry collaboration to use SEG/EAEG model data sets, The Leading Edge Feb 1996, Vol. 15, No. 2, pp. 135-136
54. Aminzadeh, F., 1996 "Geo-Engineer", The Wave of the Future, Journal of Petroleum Science and Eng., Vol. 15, No. 1.
55. Aminzadeh, F., Katz, S., Aki, K., 1994, Adaptive Neural Nets for Generation of Artificial Earthquake Precursors, IEEE Transactions on Geoscience and Remote Sensing, Vol. 32, No. 6, 1994.
56. Aminzadeh, F., Burkhard, N., Nicoletis, L., Rocca, F., Wyatt, K., 1994, SEG/EAEG 3-D modeling project: 2nd update, The Leading Edge Sep 1994, Vol. 13, No. 9, pp. 949-952
57. Khilyuk, K., Katz, S., Chilingarian, G., Aminzadeh, F., 1994, Numerical Criterion and Sensitivity Analysis for Time-Dependent Formation Pressure in a Sealed Layer, Journal of Petroleum Science and Engineering, Vol. 12, pp 137-145, 1994
58. Gurevich, A. E., Chilingarian, G. V, Aminzadeh, F., 1994, Origin of Formation Fluid Pressure Distribution and Ways of Improving Pressure Prediction Methods, Journal of Petroleum Science and Engineering, Vol. 12, pp 67-77, 1994.
59. Katz, S., Chilingarian, G. V, Aminzadeh, F., Khilyuk, K., Gurevich, A. E., 1994, Bi-Linear Models for Simultaneous Estimation of a Formation Pressure and Lithological Characteristics in Interbedded Sands and Shales, Journal of Petroleum Science and Engineering, Vol. 12, pp 37-48, 1994.
60. Kim, K. Y., Wrolstad, K. H. and Aminzadeh, F., 1993, Effects of transverse isotropy on P-wave AVO for gas sands: GEOPHYSICS, Soc. of Expl. Geophys., 58, 883-888.
61. El-Hawary, F., Aminzadeh, F., and G. Mbamalu, 1992, "The Generalized Kalman Filter Approach to Adaptive Underwater Target Tracking", IEEE Oceanic Engineering Journal, Vol. 17, pp. 129-137.

62. Aminzadeh, F., 1989, Application of Elastic Modeling in Processing and Interpretation of VSP Data--A Case History, *Geophysical Prospecting*, Vol. 37, pp. 893-906.
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B- Partial List of Books (in bold) and Books Book Chapters and Key Reports

1. **Aminzadeh, F., 2021, Reservoir Characterization, Fundamentals and Applications, ISBN 9781119556213, Wiley & Sons.**
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4. Aminzadeh, F. 2019 Hydraulic Fracturing, in Encyclopedia of Sustainability Science and Technology, R. A. Meyers (ed), Springer Science+Business Media, LLC, part of Springer Nature 2019, https://doi.org/10.1007/978-1-4939-2493-6_1052-1
5. **Aminzadeh, F., 2019, Hydraulic Fracturing and Well Stimulation: 330 pages, Wiley & Sons Ltd, ISBN: 978-1-119-55569-**
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7. **Aminzadeh, F. Berge, T., Connolly, D., 2013 Hydrocarbon Seepage: From Source to Surface, SEG/AAPG, ISBN, 978-1-56080-310-2**
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D- Partial List of Conference Papers

1. Cappello, M. A., and Aminzadeh, F. 2022, Optimizing decision-making processes in Sustainability and ESG: How a digital approach transforms a strategic area of oil and gas, Annual SEG meeting extended abstract, August 28-September 1, 2022, Houston.
2. Aminzadeh, F. and Ikuta, M., HPC Value Addition in Exploration & Production of Oil and Gas, Rice University HPC Workshop, March 3-5, 2021
3. Tost, B., Rose, K., Carney, J., Aminzadeh, F., and Suhag, A., 2020, Early Kick Detection from Downhole Measurements: A Novel Method for Reducing the Frequency and Magnitude of Loss-of-Well-Control Events, OTC-30831-MS, May 4-7, 2020, Houston, TX

4. Aminzadeh, F. 2019, Is Machine Learning the next transformative change for oil and gas in general and unconventional resources in particular? MLUR2019, November 18-19, 2019, Houston, TX.
5. Aminzadeh, F. 2019, Deploying a Futuristic Machine Learning Project in a 100-Year-Old Industry, MACHINE LEARNING IN OIL & GAS, April 17-18, 2019, Houston, TX.
6. Aminzadeh, F. 2019, Machine Learning and Data Analytic for Energy Applications, GAS, Oil and Petroleum Engineering (GOPE), February 18-19, San Francisco, CA
7. Aminzadeh, F. and Shahkarami, A. 2018, A Fast-track Reservoir Model Updating Approach Using Artificial Intelligence and Data Mining, Invited talk at NETL- Carnegie Mellon Workshop on "Real-Time Decision-Making for the Subsurface", Pittsburgh, PA, July 17-18, 2018
8. Aminzadeh, F. 2018, Recursive Modeling for Fast Model Updating in Reservoir Surveillance, SPE Workshop: Improve Business Impact and Value with Advanced Data-Driven Analytics 19 - 20 Feb 2018, Houston, TX.
9. Zhao, X, Popa, A., Ershaghi, I., Aminzadeh, F. and Cassidy, S.D., 2018, Reservoir Geostatistical Estimation of Imprecise Information Using Fuzzy Kriging Approach. SPE-190051-MS, to be presented at the SPE Western Regional Meeting, April 2018.
10. Zhao, X, Popa, A., Ershaghi, I., Aminzadeh, F. and Cassidy, S.D., 2018, Permeability Prediction in a Heterogeneous Reservoir Using Soft Computing Technologies, SPE-190078-MS, SPE Western Regional Meeting, April 2018.
11. Mollanouri-Shams, M. M., Aminzadeh, F., 2018, Proppant Shape Effect on Dynamic Conductivity of A Fracture Filled With Proppant, SPE-190024-MS, to be presented at the SPE Western Regional Meeting, April 2018.
12. Karakas, M. and Aminzadeh, F., Optimization of CO2-Foam Injection through Resistivity and Pressure Measurements. SPE-190061-MS, to be presented at the SPE Western Regional Meeting, April 2018.
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14. Suhag, S., Ranjith, R., and Aminzadeh, F. 2017, Comparison of Shale Oil Production Forecasting using Empirical Methods and Artificial Neural Networks, SPE-187112-MS, ATCE Conference in San Antonio, 9-11 October 2017
15. Bubshait, A., Aminzadeh, F. and Jha, B. 2017, Fracture Modeling in Naturally Fractured Reservoir Using Damage Mechanics Coupled With Poromechanics, SPE-188744-MS, Abu Dhabi International Petroleum Exhibition & Conference (ADIPEC,), 13-16 November 2017
16. Haroun, M., Mohammed, A.M., Somra, B., Punjabi, S., Temitope, A., 1, Yim, Y. Stavroula, A., Abu Baker, J 1, Haoge, L.Al Kobaisi1, M., Karakas, M., Aminzadeh, F. Corova, F., 2017, Real-Time Resistivity Monitoring Tool for in-situ Foam Front Tracking, SPE-188391-MS, Abu Dhabi International Petroleum Exhibition & Conference (ADIPEC,), 13-16 November 2017
17. Goebel T.H.W., Aminzadeh, F., Haffener, J. and Chen X., 2016, Statistical seismicity analyses methods for the detection of fault activation during fluid injection, the SEG Annual Meeting, Dallas, TX.
18. Temizel, C., Aktas, S., Kirmaci, H., Susuz, O., Zhu, , Balaji, K., Ranjith, R., Tahir, S., Aminzadeh, F., and Yegin, S., 2016, Turning Data into Knowledge: Data-Driven Surveillance and Optimization in Mature Fields, SPE-181881-MS, SPE Annual Technical Conference and Exhibition, 26-28 September, Dubai, UAE
19. Tost, B.; Rose, K.; Aminzadeh, F.; Ante, M., 2016, Kick Detection at the Bit: Early Detection using Borehole Geophysics, Symposium on Applications of Geophysics to Engineering and Environmental Problems (SAGEEP), March 20-24, 2016.

20. Khush, D., Aminzadeh, F. 2016, Characterization of Flow-back of Fracturing Fluids with Upgraded Visualization of Hydraulic Fracturing Treatment and its Implications on Overall Well Performance accepted for oral presentation at 251st American Chemical Society National Meeting in San Diego, California March 13-17, 2016
21. Aminzadeh, F., 2016, Improving Reserves Evaluation and Identifying Sweet Spots Through Advanced Geophysical Techniques, Unconventionals, (REU) , Houston, August 10-11
22. Aminzadeh, F., 2016, Identifying and Overcoming Uncertainties in Reserves Reporting, Reserve Estimation, Unconventionals, (REU) , Houston, August 10-11
23. Xue, C., Aminzadeh, F., 2016 Analysis of SEAM Phase I Data and Related Challenges, SPE-180412-MS, Western Regional Meeting of SPE, Alaska, May 23-26, 2016
24. Walker, R., Aminzadeh, F. 2016, Dynamic Stress Considerations for Induced Seismicity, Western Regional Meeting of SPE, Alaska, May 23-26, 2016
25. Hosseini, M., Aminzadeh, F. 2016, Effects of the Earth Characteristics on Induced Seismicity Potential, accepted for oral presentation at the Western Regional Meeting of SPE, Alaska, May 23-26, 2016
26. Long W., Chai, D., Aminzadeh, F. 2016, Pseudo Density Log Generation Using Artificial Neural Network, SPE-180439-MS Western Regional Meeting of SPE, Alaska, May 23-26, 2016
27. Aminzadeh, F. and Iovenitti, J.2015, Use of Microseismicity to Predict Permeability in Geothermal Systems, 4th International Geothermal Workshop Bandung, Indonesia, March 16-20, 2015.
28. Hosseini, M. S., and Aminzadeh, F. Effect of the Earth Characteristics on Induced Seismicity Potential by Hydraulic Fracturing: Controlling Parameters and Interpretations" Annual Meeting of the Seismological Society of America, April 21-23, 2015.
29. Aminzadeh, F., 2015 Induced Seismicity and Hydraulic Fracturing, Invited Paper, Western Regional Meeting of SPE, Anaheim, CA, April 27-30, 2015,
30. Walker, R. Okaya, D., Sumy, D., and Aminzadeh, F., 2015, Shedding Light on Complex Fault Structure with Improved Earthquake Catalog Resolution near the San Andreas Fault Observatory at Depth Borehole Array, Annual Meeting of the Seismological Society of America, April 21-23, 2015.
31. Smillie. A., Satar, S., Saptadji, N., Aminzadeh, F., and Setianingsih, R, 2015, Capacity Building in the Geothermal Sector in Indonesia, a Unique Collaboration, World Geothermal Congress, Australia, April 19-24, 2015
32. Aminzadeh, F., Tiwari, A., Walker, R., 2014, Seismic Events and Hydraulic Fracturing Activities, AGU meeting in San Francisco, December 2014.
33. Aminzadeh, F., Yateem, K. Al-Amri, M. et al, 2014, Effective Utilization of Smart Oil Fields Infrastructure towards Optimal Production and Real Time Reservoir Surveillance, International Petroleum Technology Conference, January 19-22, 2014
34. Chen, Q., Hurricane, A., Aminzadeh, F., 2014, Application of Induced Seismicity Mapping (ISM) Software - in Wilmington Oil Field, Pacific Coast American Association of Petroleum Geologists (PSAAPG) Annual Meeting, Bakersfield, CA, April 27-30 2014
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36. Goebel, T.H.W., Aminzadeh, F., Hauksson, E., Cappa, F., Ampuero J.-P., and Saleeby, J.B. 2014 Fluid injection induced earthquakes in naturally active, seismogenic regions in central California, Banff Induced Seismicity Workshop, 2014
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41. Khodabakhshnejad, A. and Aminzadeh, F. 2014, An Extended Finite Element Method Based Modeling of Hydraulic Fracturing, AAPG/SEG/SPWLA HEDBERG CONFERENCE, "FUNDAMENTAL PARAMETERS ASSOCIATED WITH SUCCESSFUL HYDRAULIC FRACTURING – MEANS AND METHODS FOR A BETTER UNDERSTANDING", DECEMBER 7-11, 2014 – AUSTIN, TEXAS.
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45. Yong, A., Aminzadeh, F., 2014, Azimuthal Attenuation Attributes Applied To Integrated Fractured Reservoir Characterization By Using 3-D Prestack Seismic Data, Pacific Coast American Association of Petroleum Geologists (PSAAPG) Annual Meeting, Bakersfield, CA, April 27-30 2014
46. Aminzadeh, F. 2013, Monterey Shale Potential, Interstate Oil and Gas Compact Commission (IOGCC) Annual Meeting, Long Beach, CA, November 5, 2013 http://iogcc.ok.gov/Websites/iogcc/images/Monterrey_shale_Potential-f.pdf
47. Aminzadeh, F., Goebel, T. H. W. 2013, Identifying induced seismicity in active tectonic regions: A case study of the San Joaquin Basin, California. AGU Fall Meeting, Abstract: S31F-06, San Francisco, California.
48. Aminzadeh, F., 2013, Dynamic Characterization of Fracture Network Using Seismic, Microseismic & Well Log Data, AAPG workshop on Fracture Monitoring using Passive Seismic, Dubai, UAE, January 28-30, 2013
49. Maity, D., Aminzadeh, F., 2013. Fracture Characterization in Unconventional Reservoirs Using Active and Passive Seismic Data with Uncertainty Analysis Through Geostatistical Simulation, Annual Technical Conference and Exhibition, New Orleans, LA, September 18-October 2, 2013,
50. Maity, D., Aminzadeh, F., 2013. A new approach towards optimized passive seismic survey design with simultaneous borehole and surface measurements, Joint PSAAPG/SPE/PSSEPM /PCS-SEG Conference, Monterey, CA, April 19-25, 2013.
51. Maity, D., Chen, Q., Aminzadeh, F., Integrated fracture characterization and associated error evaluation using geophysical data for unconventional reservoirs, Joint PSAAPG / SPE / PSSEPM / PCS-SEG Conference, Monterey, CA, April 19-25, 2013.
52. Tafti, T. A., Malek, M., Aminzadeh, F., 2013. Study of Interaction between Hydraulic Fracturing Induced and Natural Fracture by Applying Fractal Analysis, and Reservoir Simulation to Microseismic Data, Annual Technical Conference and Exhibition, New Orleans,

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53. Purohit, A. D., Aminzadeh, F., 2013, Optimal Wireless Sensor Network (Fiber Optics) for Reliable Low Cost Smart Oilfields, Society of Petroleum Engineers Digital Energy Conference, Woodlands, TX, SPE 163707-MS, March 5-7, 2013
 54. Cannon, R. T. and Aminzadeh, F., 2013, Distributed Acoustic (Passive Fiber Optics) Sensors in the Petroleum Industry: State of the Art, Society of Petroleum Engineers Digital Energy Conference, Woodlands, TX March 5-7, 2013.
 55. Tayeb A. Tafti and Fred Aminzadeh, 2012, Fracture Network Interpretation Through High Resolution Velocity Models: Application to The Geysers Geothermal Field, Geothermal Resources Council Transactions, Vol. 36, pp. 550-560. (Recipient of best paper award)
 56. Aminzadeh, F., 2012, Fracture Characterization and Monitoring Using Seismic and Microseismic Data. China Oil and Gas Forum, Beijing, October 19-20, 2012.
 57. Aminzadeh, F. and Jafarpour, B., 2012, Integrated Workflow for 4D Reservoir Characterization Using Geophysical and Production Data to Optimize Field Operations, Joint SEG/SPE/AAPG Summer Research Workshop on New Advances in Integrated Reservoir Surveillance, June 24-29, 2012, La Jolla, Ca.
 58. Rahimi Zeynal, A., Aminzadeh, F. Clifford, A., 2012, Combining Absorption and AVO Seismic Attributes Using Neural Networks to High-Grade Gas Prospects, SPE Western Regional Meeting, March 2012, Bakersfield, California
 59. Maity, D., Aminzadeh, F., 2012, Reservoir Characterization of an Unconventional Reservoir by Integrating, Microseismic, Seismic, and Well Log Data, SPE Western Regional Meeting, March 2012, Bakersfield, California, SPE154339 (Second best paper award)
 60. Tayeb A. Tafti and Fred Aminzadeh, 2012, Time Lapse Stress and Rock Property Profiling using Microseismic Data: A Case Study at NW Geysers, AGU Fall Meeting, San Francisco, CA
 61. Maity, D., Aminzadeh, F., Karrenbach, M. 2012 A novel hybrid ANN autopicker for hydrofrac data: a comparative study, Extended Abstracts of 82st SEG Annual Meeting, Las Vegas, November 4-8, 2012.
 62. Paul, D., Aminzadeh, F., 2012, Managing Induced Seismicity in an Energy System Context , AAPG Workshop on Shale Gas, Cleveland, Ohio, September 22, 2012
 63. Aminzadeh, F., 2012, Induced Seismicity Aspects of Hydraulic Fracturing , AQMD Symposium, Diamond Bar, California, September 18, 2012
 64. Maity, D., Aminzadeh, F., 2012 Framework for time lapse fracture characterization using seismic, microseismic & well log data, Extended Abstracts of 82st SEG Annual Meeting, Las Vegas, November 4-8, 2012.
 65. Aminzadeh, F., 2012, Hydraulic Fracturing and Induced Seismicity, Current State of the Art, RPSEA Unconventional Gas Conference 2012: Geology, the Environment, Hydraulic Fracturing, April 17-18, 2012, Canonsburg, PA
 66. Aminzadeh, F., Maity, D., Tafti, T. A. and Brouwer, F., 2011, Artificial neural network based autopicker for micro-earthquake data, In: SEG Annual Meeting. pp. 1623-1626.
 67. Al-Yateem, K., Aminzadeh, F. and Dasgupta, S. , 2012, The Implication of Using State-of-the-Art Technologies in Oil Fields, SPE Annual Technical Symposium & Exhibition (ATS&E) of Saudi Arabia Section (SAS)
 68. Tafti T. A. and Aminzadeh, F., 2012, Characterizing fracture network in shale reservoir using microseismic data, SPE-153814-PP, Western Regional meeting, Bakersfield, CA
 69. Aminzadeh, F., Al Yateem, K., Puecher, L., 2011, Sensors and the Way Forward for Sensing Efficiently and Effectively, SPE Digital Energy Conference and Exhibition, SPE 143869-MS, 19-21 April 2011, The Woodlands, Texas, USA

70. Tafti, T. A., and Aminzadeh, F., 2011, Application of high-resolution passive seismic tomographic inversion and estimating reservoir properties, AGU Fall Meeting, San Francisco, CA
71. Tafti T. A., and Aminzadeh, F., 2011, Fracture characterization at the geysers geothermal field using time lapse velocity modeling, fractal analysis and microseismic monitoring, Geothermal Resources Council Transactions, Vol. 35, pp. 547-551.
72. Clifford, A.C. and Aminzadeh, F., 2011, Gas detection from absorption attributes and amplitude versus offset with artificial neural networks in Grand Bay Field [Gas detection from absorption and AVO with ANN]. Extended Abstracts of 81st SEG Annual Meeting, San Antonio, September 18-23, 2011 (**Top 10 Paper Award**)
73. Aminzadeh, F., Maity, D., Tafti, T. A. and Brouwer, F., 2011, Artificial neural network based autopicker for micro-earthquake data, In: SEG Annual Meeting, pp. 1623-1626.
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More complete publication list including those before 1995 could be provided upon request.

