

Amirhossein Mardan

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RESEARCH INTEREST

- Full waveform inversion
- Geophysical monitoring
- Numerical modeling
- Seismic data interpretation
- Reservoir characterization
- Machine learning

EDUCATION

INRS (Québec, Canada)
Ph.D. Geoscience

Sep./2018 - Dec./2022

Amirkabir University of Technology (Tehran, Iran)
M.Sc. Petroleum engineering (Exploration seismology)

Sep./2014 - Sep./2016

Science and Research Branch of Islamic Azad University (Tehran, Iran)
B.Sc. Petroleum engineering (Exploration)

Sep./2009 - Sep./2013

RESEARCH EXPERIENCE

Processing and inversion of near-surface seismic data using deep learning

Industrial postdoctoral fellowship (Polytechnique Montréal, Géostack)

Jan./2023 - present

Supervisor: *Dr. Gabriel Fabien-Ouellet*

Co-supervisor: *Dr. Bernard Giroux*

Industrial supervisor: *Dr. Martin Blouin*

Monitoring CO₂ saturation using time-lapse seismic FWI

INRS-ETE

Sep./2018 - Dec./2022

Supervisor: *Dr. Bernard Giroux*

Co-supervisor: *Dr. Gabriel Fabien-Ouellet*

Application of pattern recognition in detecting buried channels in seismic data

Amirkabir University of Technology

July/2015 - Sep./2016

Supervisor: *Dr. Abdolrahim Javaherian*

Porosity measurement using NMR well logging

Science and Research Branch of Islamic Azad University of Tehran

July/2012 - July/2013

Supervisor: *Dr. Kamyar Ahmadi*

TEACHING EXPERIENCE

- Autumn 2017, "Software in exploration seismology such as Petrel, OpendTect, and VISTA"
- Autumn 2017, "Reservoir Engineering, Well logging, Geomechanics, and Drilling Engineering"
BSc. students, Islamic Azad University
- Autumn 2016, "Evaluation and estimation of petroleum reservoirs"
BSc. students, Islamic Azad University
- Autumn 2015, "MATLAB and its application in seismology"
MSc. students, Amirkabir University of Technology

WORK EXPERIENCE AND INTERNSHIP

- **Mitacs Elevate Postdoctoral Researcher**
Polytechnique Montréal - Géostack
Québec, Canada *Jan./2023 - present*
- **Geophysical Technician**
Géostack (part-time collaboration)
Québec, QC, Canada *Nov./2021 - Dec./2022*
- **Lecturer**
Islamic Azad University
Tehran, Iran *Sep./2016 - Jan./2018*
- **NIOC Exploration Directorate (Internship)**
Tehran, Iran *June/2013 - Sep/2013*

TECHNICAL SKILLS

- **Programming language:** Python, C++, HTML, JavaScript, MATLAB
- **Machine-learning:** Pandas, PyTorch, TensorFlow, Scikit-learn
- **Version control:** Git, GitHub
- **Software:** Petrel, OpendTect, HampsonRussell, VISTA

PYTHON COMPETENCE

Python Package

- Numerical analysis:
 - NumPy
 - SciPy
- Data analysis and machine learning
 - Pandas
 - Scikit-learn
 - PyTorch
 - TensorFlow
- OpenCL (GPU programming)

Open source contribution

- **PyFWI** (documentation under development)
PyFWI is a Python package I developed for seismic full-waveform inversion (FWI) and reservoir monitoring (TL-FWI).

PUBLICATIONS

- **Mardan, A.**, B. Giroux, G. Fabien-Ouellet, and M. R. Saberi, **Accepted**, Monitoring fluid saturation in reservoirs using time-lapse full-waveform inversion, Geophysical Prospecting.
- **Mardan, A.**, B. Giroux, and G. Fabien-Ouellet, 2023, PyFWI: A Python package for full-waveform inversion and reservoir monitoring, SoftwareX, doi:[10.1016/j.softx.2023.101384](https://doi.org/10.1016/j.softx.2023.101384).
- **Mardan, A.**, B. Giroux, and G. Fabien-Ouellet, 2023, Weighted-average time-lapse seismic full-waveform inversion, Geophysics, doi:[10.1190/geo2022-0090.1](https://doi.org/10.1190/geo2022-0090.1).
- **Mardan, A.**, B. Giroux, G. Fabien-Ouellet, and M. R. Saberi, 2022, Direct monitoring of fluid saturation using time-lapse full-waveform inversion, International Meeting for Applied Geoscience & Energy (IMAGE), Houston, Texas, doi:[10.1190/image2022-3746685.1](https://doi.org/10.1190/image2022-3746685.1).
- **Mardan, A.**, B. Giroux, and G. Fabien-Ouellet, 2022, Effects of nonrepeatability on time-lapse full-waveform inversion, 83rd EAGE Conference and Exhibition 2022, Madrid, doi:[10.3997/2214-4609.202211009](https://doi.org/10.3997/2214-4609.202211009).

- **Mardan, A.**, B. Giroux, and G. Fabien-Ouellet, 2022, Time-lapse full-waveform inversion for monitoring the fluid saturation, 83rd EAGE Conference and Exhibition 2022, Madrid, doi:[10.3997/2214-4609.202210635](https://doi.org/10.3997/2214-4609.202210635).
- **Mardan, A.**, B. Giroux, and G. Fabien-Ouellet, 2022, Time-lapse seismic full-waveform inversion using improved cascaded method, 2nd EAGE Conference On Seismic Inversion, Porto, doi:[10.3997/2214-4609.202229003](https://doi.org/10.3997/2214-4609.202229003).
- **Mardan, A.**, A. Javaherian, and M. Mirzakhani, 2018, Channel detection using unsupervised learning techniques, 80th EAGE Conference and Exhibition 2018, Copenhagen, doi:[10.3997/2214-4609.201800924](https://doi.org/10.3997/2214-4609.201800924).
- **Mardan, A.**, A. Javaherian, and M. Mirzakhani, 2017, The use of self-organizing maps to identify channel facies in one of the Iranian oilfields, Journal of Exploration and Production, 146, 46-51.
- **Mardan, A.**, A. Javaherian, and M. Mirzakhani, 2017, Channel characterization using support vector machine, 79th EAGE Conference and Exhibition 2017, Paris, doi:[10.3997/2214-4609.201701665](https://doi.org/10.3997/2214-4609.201701665).
- **Mardan, A.**, A. Javaherian, and M. Mirzakhani, 2017, Principal and independent components analysis for channel detecting, 3rd Seminar of Petroleum Geophysical Exploration, Tehran.
- **Mardan, A.**, A. Javaherian, and M. Mirzakhani, 2016, Channel detection using unsupervised learning algorithms, The 17th Iranian Geophysical Conference, Tehran.
- **Mardan, A.**, A. Javaherian, and M. Mirzakhani, 2015, A comparison of unsupervised learning techniques for channel detection in 3D seismic data acquired over the Strait of Hormuz, Journal of Research on Applied Geophysics, 1, 2, 90-102, doi:[10.22044/JRAG.2015.649](https://doi.org/10.22044/JRAG.2015.649)
- **Mardan, A.**, and A. Javaherian, 2015, Improvement of k-means clustering algorithm for fault detection in seismic data, The 3rd National Iranian Petroleum Conference, University of Kerman.

AWARDS

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| • Mitacs Elevate postdoctoral fellowship, CAD\$160,000.00 | <i>2023</i> |
| • High-rank presentation at 83 rd EAGE Conference and Exhibition | <i>2022</i> |
| • SEG/Landmark Scholarship for US\$9,465.9 | <i>2022</i> |
| • SEG Foundation Scholarship for US\$534.1 | <i>2022</i> |
| • IEAGHG International CCS Summer School | <i>2020</i> |
| • Ranked 4 th in MSc Entrance Exam of Petroleum Exploration Engineering in Iran | <i>2014</i> |

OTHER SCIENTIFIC ACTIVITIES

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|---|---------------|
| • Journal reviewer, Geophysical Prospecting | <i>2023 -</i> |
| • EAGE, extended abstract reviewer | <i>2017 -</i> |
| • Member, EAGE | <i>2016 -</i> |
| • Member, SEG | <i>2014 -</i> |