Curriculum Vitae

Hossein Jodeiri Akbari Fam

Geophysicist and Geodata scientist

Webpage: www.hjodeiri.com
Email: info@hjodeiri.com
Phone: +1 (647) 467-1400

Work Experience

- **Adjunct Research Professor |** Department of Earth Sciences, Carleton University | 2024 – Present
  - *Co-supervising graduate students working on the development of novel geophysical methods,*
  - *Developing a joint anisotropic teleseismic travel-time tomography for lithospheric studies,*
  - *Extracting and transforming geoscientific knowledge embedded in text corpora into predictive features for mineral prospectivity mapping using natural language processing techniques,*
  - *Fine-tuning a large language model (BERT) and evaluating using geology-related inquiries,*
  - *Extracting geospatial information from geoscience text data and identifying locations that are geologically unfavorable for hosting positive class labels (negative class labels),*
  - *Developing a transformer-based model using a self-supervised learning approach that integrates diverse geophysical, geochronological, and textual data and eliminates the dependency on labeled training samples,*
  - *Developing a map-based analytic tool using large language models,*
  - *Using seismic foundation models for denoising seismic field records and geobody modelling.*

- **Post-doctoral Research Fellow |** Université du Québec à Montréal | 2025 – Present
  - *Developing seismic imaging and full-waveform inversion of conventional and DAS data with conventional and unconventional sources,*
  - *Developing a full-waveform inversion method coupled with petrophysical and geomechanical characterization using seismic while drilling data in carbon sequestration storage,*
  - *Developing large-scale ML/AI techniques with GPUs for geophysical interpretation and drilling optimization.*
  - *Modeling and inversion of DAS data for carbon capture and storage, geothermal, and mining reservoirs,*
  - *Developing a DAS denoising method using a guided unsupervised deep learning network.*

- **Post-doctoral Research Scientist |** Natural Resources Canada, Geological Survey of Canada | 2022 – Present
  - *Scientific and technical lead of a fully funded sub-activity entitled "3D structural characterization and anisotropy modelling using multidisciplinary geophysical and geological data" within the Critical Mineral Geoscience and Data program,*
  - *Developing innovative 3D multi-scale geophysical imaging and inversion methodologies for 3D structural characterization and anisotropy modelling with an aim for critical mineral prospecting and monitoring CO_2 sequestration,*
  - *Developing a high-performance 3D multifocusing seismic imaging and 3D structural characterization package using the Cuda-OpenMP paradigm, accelerated and parallelized on a hybrid cluster comprised of multiple GPUs and CPUs on the AWS cloud platform,*
  - *Developing a joint implicit inversion of geophysical parameters and scalar field from geophysical data and structural measurements using the implicit neural representations algorithm,*
  - *Developing new methodologies in processing satellite images for mapping/prospecting critical minerals,*
  - *Applying 3D structural characterization using the 3D multifocusing algorithm on crooked seismic profiles (~500 km) to build a regional-scale synthesis of deep crustal structures in the central Trans-Hudson Orogen,*
  - *Processing and analyzing 2D land near-surface seismic data and high-resolution imaging of landslides, performed for the Public Safety Geoscience program,*
  - *Building a 3D model and a digital georeferenced rock surface map of geological outcrops using the close-range aerial photogrammetry technique with a drone,*
  - *Applying generative adversarial networks, natural language processing, and convolutional neural networks to generate mineral prospectivity models for Canadian lithium-cesium-tantalum (LCT) pegmatites,*
  - *Geophysical data compilation and integration for "Multiscale prospectivity modeling of Canada's priority critical minerals" project,*
  - *Compiling the multiyear (1965-2023) national-scale earthquake travel-time dataset (more than 2.5 million reviewed travel-times for both P- and S-waves from ~120,000 local events and ~8,000 teleseismic events recorded by 3,270 seismograph stations across Canada),*
  - *Supervising graduate students under the FSWAP program,*

- *Metadata standardization and managing data storage and FAIR-compliant archival in repositories,*
- *Managing finances, including contracting and procurement practices related to a research sub-activity,*
- *Overseeing financial aspects of a research sub-activity using Microsoft Excel, including budget planning and tracking expenses,*
- *Preparing and contributing to scientific publications,*
- *Communicating complex technical information internally and externally, and engaging regularly with stakeholders.*

Collaborations:
- *Collaborating with the Geological Survey of Saskatchewan on studying the Flin Flon complex,*
- *Collaborating with the Geological Survey of Canada - Calgary division and Explor Geophysical Ltd. on studying the MacKenzie Mountains foreland western Cordillera,*
- *Collaborating with Dr. Oz Yilmaz, the Chief Technology Officer of GeoTomo LLC and the founder of Anatolian Geophysical, on investigating fundamental principles of seismic wavefield propagation.*

Fieldworks:
- *Collecting structural field measurements and close-range aerial photogrammetry using a drone in Ottawa (October 2023),*
- *Conducting installation and maintenance of seismic monitoring equipment, including seismograph and GPS stations in the Aquistore site (Estevan, Saskatchewan) and acquiring new cell modems and charge controllers, performed for the Carbon Capture & Storage program (September 2023),*
- *Acquiring 2D land seismic data in Algonquin Trail, located in Renfrew (west of Ottawa) to study landslides and provide indicators for dating earthquakes, performed for Nuclear Waste management under the Public Safety Geoscience program (July 2023).*

Administrative tasks:
- *Recruiting two graduate students and reviewing applications for a position under the Research Affiliate and Federal Student Work Experience programs,*
- *Evaluating technical aspects of bids for the procurement of fibre-optic cable for seismic monitoring tests.*

- **Geophysical Specialist |** GeoTriangle Consulting Inc. **|** 2020 – 2021

  - *Collecting and compiling electromagnetic data for mapping and modelling groundwater seepage and flow path,*
  - *Conducting geotechnical inspection, soil sample collection, and field tests for environmental studies,*
  - *Quality control of field data,*
  - *Preparing data deliveries and technical reports,*
  - *Advising management on technical operations,*
  - *Developing detailed project schedules for geophysical surveys,*
  - *Managing resource allocation and tracking, including personnel, equipment, and materials, to ensure efficient use of resources.*

- **Research and Teaching Assistant |** Metal Earth Research Initiative at Laurentian University **|** 2018 – 2022

  - *Developing novel multifocusing seismic imaging methods for three-dimensional and crooked-line surveys,*
  - *Developing a processing workflow based on multiparameter stacking operators to separate wavefields,*
  - *Developing software packages for the efficient implementation of the newly introduced imaging methods,*
  - *Incorporating non-linear global optimization algorithms to implement multifocusing methods,*
  - *Simulating seismic wavefields for different scenarios using the finite difference and ray-tracing methods,*
  - *Developing individual and joint inversion methods for potential field data with unstructured meshes,*
  - *Developing an improved cross-gradient joint 3D inversion of gravity and magnetic data with regular meshes,*
  - *Applying and evaluating proposed algorithms on different complex synthetic models and real data sets.*

  Teaching assistant for courses:
  • Advanced Geophysics • Seismic Methods • Exploration Geophysics (4 semesters)
  • Computer Applications in Earth Sciences • Structural Geology • Introduction to Geology
  • Introduction to Soil Science • Research Seminar in Geology • Physics Lab

Fieldworks:

- *3C vertical seismic profiling in Rouyn-Noranda, Quebec (2019),*
- *Passive seismic data acquisition in northern Ontario, Metal Earth project, Laurentian University (Sep 2018) (Collaborating with SeisProbe in deploying 3C broadband seismographs, evaluating the sensitivity of the sensors, and calibrating them).*

- **Research Assistant |** Amirkabir University of Technology **|** 2017 – 2018

  - *3D geomechanical and geostatistical modelling of the South Pars gas field,*
  - *Reservoir static modelling integrated with multiphase fluid flow simulations in an oil reservoir,*
  - *Multiphase fluid flow and reactive/non-reactive transport modelling in hypothetical fractured and porous media to simulate CO_2 injection and assess its effectiveness under varying injection rates,*
  - *Studying the reflector curvature and fluid factor for AVO analysis,*
  - *Studying the stiffness tensor for a homogeneous orthorhombic system,*
  - *Studying Christoffel equation and phase velocities,*
  - *Studying the distribution of seismic amplitudes recorded on real and synthetic data sets.*

- **Science secretary |** Exploration Geophysics Research Core at Sahand University of Technology **|** 2015 – 2017

  - *Coordinating scientific and extracurricular activities,*
  - *Preparing and contributing to scientific and technical reports,*
  - *Advising management on scientific and technical operations,*
  - *Compiling information and data using spreadsheets like Microsoft Excel,*
  - *Managing finances, including contracting and procurement practices,*
  - *Analyzing data and managing information with advanced MS Excel functionality.*

- **Research and Teaching Assistant |** Sahand University of Technology **|** 2015 – 2017

  - *Studying the feasibility of extracting shear wave information from conventional seismic data,*
  - *Developing a theoretical approach to estimate the travel time of primary shear wave reflections,*
  - *Adapting the asymptomatic and common conversion point methods for imaging S-P reflections,*
  - *Developing a processing workflow to separate seismic wavefields recorded on conventional field records,*
  - *Modelling seismic source radiation patterns and analyzing reflectivity in isotropic and anisotropic media,*
  - *Simulating seismic converted waves and multiples for different scenarios using the ray-tracing method,*
  - *Numerical and analytical seismic modelling to investigate the effect of unconsolidated overburden on the propagation of different seismic wave modes,*
  - *Implementing input- and output-driven moveout corrections,*
  - *Signal processing using MATLAB.*

  Instructor of courses:
  • Signal Processing in MATLAB • Geophysics • Petrophysics • Structural Geology (2 semesters)
  • Mineral Deposit Evaluation (2 semesters)

  Fieldwork:
  - *Acquiring 3D land seismic data for reservoir characterization in southern Iran (2016).*

- **Research Intern |** Sahand University of Technology **|** 2014 – 2015

  - *Building a near-surface velocity model using nonlinear travel-time tomography,*
  - *Conducting borehole image log processing and lithology studies using Geolog,*
  - *Developing an experimental setup to investigate the effect of in situ stress fields and stress regimes on hydraulic fracturing tests under true triaxial loading conditions.*

  Fieldwork:
  - *Acquiring seismic refraction data.*

- **Internship |** Tabriz Urban & Suburban Railway Organization **|** Gueno Consulting Engineers Inc. **|** Summer 2014

  - *Mechanized tunnel boring, tunnel segment production, and concrete testing and analysis.*

- **Software Developer |** Freelance **|** 2013 – 2018
  - *Designing and developing web-based applications,*
  - *Developing website architectures, designing the templates, planning the flow of the websites, analyzing marketing data, and optimizing websites for search engines,*
  - *Implementing reinforcement learning algorithms to enhance product recommendations for an e-commerce platform.*

- **Teaching Assistant |** Sahand University of Technology **|** 2012 – 2015

  Teaching assistant for courses:
  • Geophysics • Petrophysics • Structural Geology • Mineral Deposit Evaluation

Leadership Experience

- **President |** Society of Exploration Geophysics Student Chapter **|** Laurentian University **|** 2021 – 2022
  - *Certificate of Excellence for completing the SEG/Chevron Student Leadership Symposium, 2021*
- **Chief Steward |** Canadian Union of Public Employees **|** Laurentian University **|** 2021 – 2022
- **Vice-president |** Canadian Union of Public Employees **|** Laurentian University **|** 2020 – 2021
- **President |** Student Scientific Society of Mining Engineering **|** Sahand University of Technology **|** 2013 –2014

Education

Ph.D. Mineral Deposits/Precambrian Geology | Laurentian University | 2018–2022
Specialization: Exploration Geophysics
Thesis: Multifocusing seismic imaging of complex geological structures
Supervisors: Dr. Mostafa Naghizadeh and Prof. Richard Smith
Advisor: Prof. Öz Yilmaz
GPA: 10.0 (of 10.0)

Ph.D. Petroleum Exploration Engineering | Amirkabir University of Technology | 2017–2018
GPA: 19.69 (of 20)

M.Sc. Petroleum Exploration Engineering | Sahand University of Technology | 2015–2017
Thesis: Extraction of converted wave reflections from conventional seismic data
Supervisors: Dr. Navid Shad Manaman and Prof. Öz Yilmaz
GPA: 19.72 (of 20)

B.Sc. Mining Exploration Engineering | Sahand University of Technology | 2011–2015
Thesis: Experimental study of the effect of in situ stress field and stress regime on hydraulic fracturing test of true triaxial loading conditions
Supervisor: Mr. Hadi Shakeri
GPA: 18.51 (of 20)

Honours & Awards

- Best paper award in The Leading Edge by the Society of Exploration Geophysicists, 2023
- Best student poster in the Mining Sessions at the International Meeting for Applied Geoscience & Energy, 2023
- Best student poster by the American Institute of Professional Geologists, 2023
- Society of Exploration Geophysicists award for four consecutive years, 2018 – 2021
- Ontario Graduate Scholarship (OGS), 2020
- Laurentian University summer fellowship, 2020
- Iranian National Elite Foundation Superior Talent award for M.Sc., 2016
- Biennial award, among all B.Sc. students at Sahand University of Technology, 2015
- Iranian National Elite Foundation Academic Superior Graduates award for B.Sc., 2016
- Ranked **1st** among **all Ph.D.** students, Petroleum Engineering Dept., Amirkabir University of Technology, 2018
- Ranked **1st** among **all M.Sc.** students at Sahand University of Technology, 2017
- Ranked **1st** among **60 B.Sc.** students, Mining Engineering Dept., Sahand University of Technology, 2015

Technical Skills & Professional Development

- Programming languages: C, CUDA, OpenMP, Bash, Python, MATLAB, CSS, HTML
- Artificial intelligence, machine learning, and optimization theory
- High-performance cloud computation using heterogeneous clusters
- Data mining, management, and analysis
- Generative AI and large language models
- Prompt engineering, natural language processing, and sentiment analysis
- Inverse theory and uncertainty quantification
- Advanced signal and image processing
- Seismic and potential field data acquisition, processing, and individual/joint inversion
- Seismic imaging, tomography, and multi-parameter full-waveform inversion
- Anisotropic local earthquake and teleseismic travel-time tomography
- Computational interpretation and attributes analysis of geophysical data
- Computational wave propagation and potential field numerical modelling
- Multidisciplinary geoscience data integration and analytics
- Geospatial data analytics using GIS software and satellite image processing
- 2D/3D geostatistical reservoir modelling
- 2D/3D geomechanical reservoir modelling
- 2D/3D implicit and explicit geological modelling
- Reactive transport and multiphase fluid flow simulation in fractured and porous media
- Borehole image and wireline logs processing and petrophysical studies
- 3D active and passive scanning (multispectral, laser-based, structured light, and photogrammetry)
- Image- and geometry-based 3D surface reconstruction using computational and AI-enhanced algorithms
- Optimized augmented reality (AR) and virtual reality (VR) modelling for interactive iOS/Android applications
- Professional visual aids production, such as animations and video graphics, to support engagement efforts
- Interactive web applications development for sharing and presenting scientific results

Selected Peer-Reviewed Journal Publications

- Parsa, M., Lawley, C., Cawood, T., Martins, T., Cumani, R., Zhang, S., Thompson, A., Schetselaar, E., Beyer, S., Lentz, D., Harris, J., **Jodeiri, H.**, and A. Voinet, 2024, Pan-Canadian predictive modeling of lithium–cesium–tantalum pegmatites with deep learning and natural language processing: Natural Resources Research, 34, 639–668, doi: 10.1007/s11053-024-10438-x.

- **Jodeiri, H.**, Naghizadeh, M., Yilmaz, Ö., and R. Smith, 2023, 3D generalized spherical multifocusing seismic imaging: Geophysics, 88, no. 1, T13–T31, doi: 10.1190/geo2022-0154.1.

  - *Nominated by the Geophysics editors and highlighted in **"Geophysics Bright Spots"** in The Leading Edge, 42, no. 2. doi: 10.1190/tle42020133.1.*

- **Jodeiri, H.**, Naghizadeh, M., Smith, R., Yilmaz, Ö., Cheraghi, S., and K. Rubingh, 2023, High-resolution 2.5D multifocusing imaging of crooked seismic profile in a crystalline rock environment: results from the Larder Lake area, Ontario, Canada: Geophysical prospecting, Special Issue: Mineral Exploration and Mining Geophysics, 71, no. 7, 1152–1180, doi: 10.1111/1365-2478.13285.

- Smith, R., Naghizadeh, M., Cheragi, S., Adetunji, A., Vayavur, R., Eshaghi, E., Hill, G., Snyder, D., Roots, E., Justina, F., **Jodeiri, H.**, Mancuso, C., McNeice, W., Maleki, A., Haugaard, R., Jørgensen, T., Wannamaker, P., and V. Maris, 2023, Geophysical transects in the Abitibi greenstone belt of Canada from the mineral-exploration-oriented Metal Earth project: The Leading Edge, 42, no. 4, 245255. doi: 10.1190/tle42040245.1.

- Danaei, K., Moradzadeh, A., Norouzi, G., Smith, R., Abedi, M., and **H. Jodeiri**, 2022, 3D inversion of gravity data with unstructured mesh and least-squares QR-factorization (LSQR): Journal of Applied Geophysics, p.104781, doi: 10.1016/j.jappgeo.2022.104781.

- **Jodeiri, H.**, Naghizadeh, M., and Ö. Yilmaz, 2021, 2.5D multifocusing imaging of crooked-line seismic surveys: Geophysics, 86, no. 6, S355–S369, doi: 10.1190/geo2020-0660.1.

- *Nominated by the Geophysics editors and highlighted in "**Geophysics Bright Spots**" in The Leading Edge*, 41, no. 1, 62, doi: *10.1190/tle41010062.1*.

- Yilmaz, Ö., Gao, K., Delic, M., Xia, J., Huang, L., **Jodeiri, H.**, and A. Pugin, 2021, A reality check on full-wave inversion applied to land seismic data for near-surface modeling: The Leading Edge, 41, no. 1, 40-46, doi: 10.1190/tle41010040.1.

  - *Selected as the "**Best Paper**" in The Leading Edge for 2022 by the Society of Exploration Geophysicists.*

- Yilmaz, Ö., Mavko, G., and **H. Jodeiri**, 2018, Seismic response of soft water-bottom sediments: The Leading Edge, 37, no. 10, 746–751, doi: 10.1190/tle37100746.1.

- **Jodeiri, H.** and N. Shad Manaman, 2018, Modeling of amplitude and phase variations of converted waves versus offset and V_P/V_S ratio: Iranian Journal of Geophysics, 11, no. 4, 67–62.

Under review:

- **Jodeiri, H.**, Schetselaar, E., Bellefleur, G., White, D., de Kemp, E., Ashoori, A., E. Maxeiner, R., Bosman, S., and K. Reid, 2025, Enhanced subsurface seismic imaging and structural characterization using the 3D multifocusing approach: Regional-scale geological synthesis of crustal structures in the central Trans-Hudson orogen, Canada: Journal of Geophysical Research: Solid Earth.

- **Jodeiri, H.**, Schetselaar, E., Bellefleur, G., White, D., de Kemp, E., and A. Ashoori, 2024, Enhanced subsurface imaging with the 3D multifocusing algorithm: 3D geological insights from crooked seismic profiles of the Flin Flon Domain, Reindeer Zone, Saskatchewan – Manitoba: Geological Survey of Canada, TGI Synthesis Volume.

- Parsa, M., Cumani, R., **Jodeiri, H.**, and B. Tawbe, 2025, Transformers for prospectivity mapping of Canadian critical minerals: Natural Resources Research.

- Lee, B., Schetselaar, E., Craven, J., and **H. Jodeiri**, 2024, Regional-scale 3D modelling and interpretation of magnetotelluric data in the western Flin Flon Domain, Reindeer Zone, Saskatchewan: Geological Survey of Canada, TGI Synthesis Volume.

In preparation:

- Parsa, M., Cumani, R., **Jodeiri, H.**, and B. Tawbe, 2025, Large language models for class labeling in data-driven mineral prospectivity mapping

- **Jodeiri, H.**, de Kemp, E., Hillier, M., Bellefleur, G., and D. White, 2025, A high-performance seismic wavefield analysis using a multiparameter stacking algorithm: An accelerated and parallelized program executed on a hybrid cluster with an integrated architecture formed multiple graphical and central processing units on a cloud

- **Jodeiri, H.**, Hillier, M., and E. de Kemp, 2025, Joint implicit inversion of elastic properties and scalar field from geophysical data and structural measurements using the implicit neural representations algorithm

- **Jodeiri, H.**, Bellefleur, G., White, D., de Kemp, E., and M. Hillier, 2025, 3D generalized ellipsoidal multifocusing seismic imaging method: Enhanced resolution and accuracy in complex geological settings

Selected Conference Publications

- **Jodeiri, H.**, Schetselaar, E., Bellefleur, G., White, D., de Kemp, and A. Ashoori, 2025, Revisiting legacy crooked seismic profiles with 3D multifocusing for enhanced subsurface imaging and structural characterization: GeoConvention, Extended Abstracts.

- **Jodeiri, H.**, Schetselaar, E., Bellefleur, G., White, D., Ashoori, A., de Kemp, E., Maxeiner, R., Bosman, S., and K. Reid, 2024, Revisiting seismic interpretations of the Western Flin Flon greenstone belt, Saskatchewan: Improved imaging and structural characterization using the 3D multifocusing technique: Saskatchewan Geological Open House, Canada.

- **Jodeiri, H.**, Naghizadeh, M., Yilmaz, Ö., Smith, R., and N. Esmaeilzadeh, 2023, 3D spherical multifocusing stack over an irregular topography: A data-driven approach for high-resolution seismic imaging in complex geological settings: International Meeting for Applied Geoscience & Energy.

- Esmaeilzadeh, N., Gani, N., Beiranvand Pour, A., Safari, M., and **H. Jodeiri**, 2023, Hydrothermal alteration and lithological mapping using Landsat-9 and ASTER remote sensing spectral imagery in the northeast Mojave Desert, California: IEEE IGARSS 2023, Extended Abstracts.

- Esmaeilzadeh, N., and **H. Jodeiri**, 2023, Assessing the effectiveness of Landsat-9 and ASTER satellite remote sensing imagery integration for uncertainty reduction in critical minerals prospecting in Mountain Pass, California: International Meeting for Applied Geoscience & Energy.

  - *Selected as the "**Best Student Poster**" in the Mining Sessions at the International Meeting for Applied Geoscience & Energy in Houston, TX, 2023, by the Society of Exploration Geophysicists.*

- Esmaeilzadeh, N., Gani, N., Beiranvand Pour, M., and **H. Jodeiri**, 2023, Application of multi-sensor satellite imagery to identify hydrothermal alterations in Mountain Pass District, San Bernardino County, California: Insights for critical minerals exploration: AIPG 60th Anniversary National Conference.

  - *Selected as the "**Best Student Poster**" by the American Institute of Professional Geologists.*

- Esmaeilzadeh, N., Gani, N., Beiranvand Pour, M., and **H. Jodeiri**, 2023, Application of principal component analysis and band ratios for critical minerals prospecting using multi-sensor remote sensing data in the Mountain Pass Mining District, California: Prospectors & Developers Association of Canada International Convention.

- Smith, R., Naghizadeh, M., Cheragi, S., Adetunji, A., Vayavur, R., Eshaghi, E., Hill, G., Snyder, D., Roots, E., Justina, F., **Jodeiri, H.**, Mancuso, C., McNeice, W., Maleki, A., Haugaard, R., Jørgensen, T., Wannamaker, P., and V. Maris, 2022, Geophysical results after five years of the Metal Earth project: CSIRO Deep Earth Imaging Future Science Platform's Biennial Subsurface Symposium.

- **Jodeiri, H.**, Naghizadeh, M., and Ö. Yilmaz, 2021, Application of 2.5D multifocusing seismic imaging in a crystalline rock environment: Results from Larder Lake area, Ontario, Canada: First International Meeting for Applied Geoscience & Energy, Extended Abstracts, 2639–2643, doi: 10.1190/segam2021-3594582.1.

- **Jodeiri, H.** and M. Naghizadeh, 2020, 2.5D multi-focusing imaging of crooked-line seismic surveys: 82nd Conference and Exhibition, EAGE, Extended Abstracts, 1–5, doi: 10.3997/2214-4609.202011662.

- Danaei, K., Moradzadeh, A., Norouzi, G., Smith, R., Abedi, M., and **H. Jodeiri**, 2020, 3D Inversion of gravity data with Lanczos bidiagonalization and unstructured mesh: 82nd Conference and Exhibition, EAGE, Extended Abstracts, 1–5, doi: 10.3997/2214-4609.202012002.

- **Jodeiri, H.**, Naghizadeh, M., and N. Shad Manaman, 2020, Optimum offset range and source-receiver orientations for detecting the Sv-P converted waves in anisotropic media: GeoConvention, Extended Abstracts.

- **Jodeiri, H.** and M. Naghizadeh, 2020, High-resolution multi-focusing seismic imaging of Metal Earth's Larder Lake transect: Prospectors & Developers Association of Canada International Convention.

- **Jodeiri, H.** and M. Naghizadeh, 2019, Multi-focusing stacking using the very fast simulated annealing global optimization algorithm: GeoConvention, Extended Abstracts.

- **Jodeiri, H.** and M. Naghizadeh, 2019, Multi-Focusing stacking technique: A robust method of improving subsurface seismic imaging: Prospectors & Developers Association of Canada International Convention.

- Yilmaz, Ö., Mavko, G., and **H. Jodeiri**, 2018, Seismic response of soft water-bottom sediments: 88th Annual International Meeting, SEG, Expanded Abstracts, 4753–4757, doi: 10.1190/segam2018-2996835.1.

- **Jodeiri, H.** and N. Shad Manaman, 2018, PP+SP=SS: 18th Iranian Geophysical Conference, Extended Abstracts, 304–308.
- **Jodeiri, H.** and N. Shad Manaman, 2017, Outlook of importance and applications of seismic converted waves in the oil exploration industry: 3rd National Seminar on Applied Geophysics in Petroleum Exploration, Extended Abstracts.
- Ebrahimi, B., Sahraei, E., Shakeri, H., and **H. Jodeiri**, 2015, Experimental study of the effect of in situ stress field and stress regime on hydraulic fracturing test of true triaxial loading conditions: 1st National Conference on Petroleum Geomechanics, Extended Abstracts.

Computer Skills

Commercial/Open-Source Software Packages

- **Earthquake Seismology:** ObsPy, SAC, Lindu Software, SIMUL, FMTOMO, Velest, StDb, SPECFEM, Seisbench, Seismosoft, EikonalSolvers, PyWEED, Telewavesim, QuakeLabeler, RfPy, SplitPy, PyRaysum, OrientPy, OBStools, Blockly Earthquake Transformer
- **Exploration Seismology:** GeoThrust 2D/3D, Norsar 2D/3D, ProMax, Petrel, HampsonRussell, OpendTect, Vista, SOFI 2D/3D, Seismic Unix, Tesseral 2D/Pro, Seisimager
- **Non-seismic Geophysics:** Geoscience Analyst Pro, Geosoft-oasis-montaj, pyGIMLi, SIMPEG, UBC-GIF, MARE2DEM, Fatiando
- **Multiphysics Modelling Software:** OpenGeoSys, PFLOTRAN, TOUGHREACT
- **Machine Learning Libraries and Tools:** PyTorch, TensorFlow, Comet, Weights & Biases, Google AI Studio
- **Data Analysis & Manipulation:** Pandas, NumPy, SciPy, Matplotlib, Seaborn
- **Geospatial Python Libraries:** Geopandas, Arcpy, Rasterio, Seaborn, GDAL, Folium, Pyproj, Shapely
- **3D Visualization:** GOCAD, Geoscience Analyst, ParaView, CloudCompare
- **Geological Modelling**: Leapfrog, Noddy
- **Petrophysics:** Geolog
- **Geostatistics:** WinGslib, SgeMS
- **GIS**: ArcGIS, QGIS, Generic Mapping Tools (GMT), ExpertGPS
- **Engineering:** AutoCAD, MeshLab, RockLab
- **Programming:** Visual Studio Code, PyCharm, MATLAB, Maple, Dreamweaver
- **Text Editor and Reference Management:** Microsoft Office, Overleaf, Texmaker (LaTex), EndNote, Zotero
- **Vector-based Graphics**: Illustrator, Inkscape, CorelDRAW
- **Pixel-based Graphic:** Photoshop, GIMP
- **Operating Systems:** Linux, Windows

My Developed Software Packages

Python:

- IFWI+GeoINR: Joint implicit inversion of geophysical parameters and scalar field from geophysical data and structural measurements using the implicit neural representations algorithm
- Randomly decimating a specific portion of seismic field records to perform prestack time migration efficiently using the compressive sensing concept
- 2D seismic wavefield simulation using the recursive neural network method
- Geophysical and geological data interpolation/compilation for prospectivity mapping
- End-to-end package for seismic earthquake data (e.g., QuakeML or CSV) analysis

CUDA:

- High-performance seismic imaging and 3D structural characterization on Amazon Web Services cloud – optimized, accelerated, and parallelized on multiple graphical and central processing units (The prototype demonstrated significantly improved accuracy and achieved processing speeds over 850 times faster.)

C and Bash Script in the Seismic Unix framework:

- SUMF Package: Seismic wavefield analysis and imaging of primary and converted waves using the 2D/2.5D/3D planar/spherical/ellipsoidal multifocusing methods with the differential evolution algorithm (This package is parallelized using the serial farming technique and executed using the facilities of the Shared Hierarchical Academic Research Computing Network and Compute Canada.)
- SUGCDMODE: Generalized cross-dip moveout correction using differential evolution algorithm

C and MATLAB:

- 2D/3D active/passive land/borehole seismic monitoring simulation using the finite difference method
- Potential field monitoring simulation using structured and unstructured meshes

C and Bash Script:

- Automatic 3D scanning of rock samples using a programmable 360 turntable and single/multiple digital camera(s) with full remote control on photography and lighting adjustments

JavaScript and HTML:

- Web-based augmented reality (AR) model visualization on iOS and Android
- Web-based 3D model visualization using real-time photorealistic rendering engines

MATLAB:

- Estimation of the rock formations from petrophysical properties and geophysical borehole logs using an artificial neural network
- 2D image enhancement of satellite images for mapping/prospecting critical minerals using the F-K filter
- 2D/3D spherical/ellipsoidal multifocusing seismic imaging of P-P/S-S and P-S/S-P waves
- 2.5D multifocusing seismic imaging of crooked-line seismic surveys
- 2D multifocusing seismic imaging using the differential evolution and the very fast simulated annealing algorithms
- 3D inversion of gravity and magnetic data using the Lanczos bidiagonalization method and an unstructured mesh
- 3D inversion of gravity and magnetic data using the CG method and regular meshing
- 3D joint cross-gradient inversion of gravity and magnetic data using CG and LSQR methods
- Sv-P converted wave extraction using wavefield separation
- Super common midpoint gather enhancement using cross-correlation and interpolation methods
- 2D/3D explicit synthetic velocity model builder
- Extracting S-S shear wave information from conventional seismic data (PP+SP=SS)
- Numerical modelling of P-P and Sv-P waves partitioning in isotropic and VTI media
- 2D/3D numerical modelling of the vertical source radiation pattern in isotropic and VTI media
- Recursive and generalized linear inversion
- Time-variant wavelet estimation using Kurtosis maximization
- Short-time homomorphic wavelet estimation

Certifications

- Standard first aid & CPR/AED level C – Intermediate, Certificate number: 104264924, 2023
- Security Awareness (COR310), Canada School of Public Service, 2023
- Harassment and Violence Prevention for Employees (WMT101), Canada School of Public Service, 2023
- Canada Labour Code, Part II – An Overview (WMT110), Canada School of Public Service, 2022
- Worker Health and Safety Awareness in 4 Steps, Ministry of Labour, Ontario, 2020
- Workplace Hazardous Materials Information System (WHMIS 2015), Canada, 2020

Workshops & Training

- Deep Neural Networks with PyTorch, by Joseph Santarcangelo, IBM, Coursera (in progress)
- 5-Day generative AI intensive course with Google, 2025
- Public Geoscience and Machine Learning for Mineral Exploration, Geological Survey of Canada, 2024
- Passive Surface Wave Methods Using Ambient Noise: From 1D Sounding to 3D High-resolution imaging, by Dr. Koichi Hayashi, Society of Exploration Geophysics, 2024
- Distributed acoustic sensing for seismic measurements – what geophysicists and engineers need to know, by Dr. Mark E. Willis, Halliburton, Society of Exploration Geophysics, 2024

- Climate Change: Carbon Capture and Storage, University of Edinburgh, edX, 2022
- Leveraging Deep Learning in Extracting Features of Interest from Seismic Data, by Dr. Tao Zhao, Geophysical Insights, 2022
- Deep Learning and Reinforcement Learning, IBM, Coursera, 2022
- Deep Learning for Seismic Processing and Interpretation, by Prof. Xinming Wu, Society of Exploration Geophysics, 2022
- Automating Seismic Data Analysis and Interpretation, by Prof. Sergey Fomel, Society of Exploration Geophysics, 2022
- Machine learning, Summer 2020, by Prof. Andrew Ng, Stanford University Online Courses
- Advanced MATLAB for scientific computing, Fall 2017, Stanford University Online Courses
- MOOC oil and gas - from exploration to distribution, Fall 2017, Total and IFP Training
- Reservoir Geomechanics, Spring 2017, by Prof. Zoback, Stanford University Online Courses
- Technology day on HampsonRussell: A fully integrated suite of geophysical advanced interpretation tools, Nov 2017, CGG
- Modelling of gold mine deposits, Sep 2015, Iranian Mining Engineering Organization
- Measurement while drilling (MWD), directional drilling, casing tools, fishing in wells, well control, Mar 2015, Amirkabir University of Technology
- Applied subsurface geological mapping, by Siamak Agah, Tarbiat Modares University, Fall 2017
- The near-surface and the subsurface: Image-based velocity estimation and seismic imaging, by Prof. Öz Yilmaz, 17th Iranian Geophysical Conference, May 2016
- Engineering seismology with applications to geotechnical engineering, by Prof. Öz Yilmaz, 17th Iranian Geophysical Conference, May 2016
- Reservoir modelling in oil and gas studies (Seismic to Simulation), Sahand University of Technology, 2015

Professional Affiliations & Activities

- Reviewer of scientific journals:

  Geophysics (SEG), Journal of Applied Geophysics (Elsevier), Applied Computing and Geosciences (Elsevier), Journal of Geophysics and Engineering (Oxford Academic), Solid Earth (EGU-Copernicus), and Acta Geophysica (Springer)

- Active member of the SEG, CSEG, EAGE, SPE, and CSPG

References

Available upon request