LILIANA VARGAS-MELEZA

Geophysicist, PhD

Den Haag, The Netherlands | Work permit Valid for NL | +31 6 5765 3940
liliana.vargas@redtalentos.nl | lvargasmeleza

SUMMARY

- Goal-oriented geophysicist with nine years of experience in subsurface exploration and reservoir characterisation.
- Collaboratively worked within geoscience teams for integrated solutions to operational problems, including pore-pressure prediction for borehole stability from seismic data, well logs, and rock physics.
- Research experience in laboratory measurement of petrophysical and geomechanical properties for subsurface modelling.
- Communicates effectively across disciplines and among stakeholders. Exposure to research and business-to-business projects.

WORK EXPERIENCE

Exploration Geophysicist, Applied Geosciences

Mexican Petroleum Institute, Mexico City, Mexico

2004–2007 | 2009–2011 | 2015–2019

- Worked in multidisciplinary teams to analyse data, make rock property predictions, communicate results, and enable decisions.
- Coordinated team of four geoscientists to predict lithofacies distribution from seismic data assisted by machine learning.
- Managed two projects and acted as contact person with clients during project setup, service quotation, and time completion.
- Estimated spatial distribution of properties (facies, porosity, mineral volumes and fluid) derived from inverted elastic models.
- Improved coherency between measured subsurface rock properties and estimated elastic properties using rock physics models.
- Predicted pore pressure and provided mud weight estimates along proposed drilling paths by integrating borehole measurements, seismic and sonic velocities, and geomechanical models.
- Analysed stress distribution and deformation structures in salt tectonic settings for geomechanical studies prior subsalt drilling.
- Characterised unconventional shale plays by interpreting folding and fracturing from seismic attributes such as curvature.
- Built 3D subsurface models honouring borehole properties and seismic structural and stratigraphic features.
- Upscaling and downscaling analysis to integrate data exhibiting different spatial and temporal resolutions and sampling rates.
- Used neural networks and multilinear regression to identify properties of interest and their relationships, as well as anomalies.
- Collaborated in multidisciplinary geomechanical studies which integrated laboratory measurements at reservoir conditions, computarised tomography models, and seismic reservoir models.
- Performed key seismic interpretation and characterisation tasks such as seismic-to-well calibration, fluid substitution, AVO analysis, seismic inversion, time-to-depth conversion

EDUCATION

Ph.D. in Geology (2015)

University of Aberdeen, UK

Characterisation of salt diapir flanks constrained by field data.

M.Sc. in Applied Geophysics (2009)

Joint Programme: TU Delft (NL) & ETH Zurich (CH) & RWTH Aachen (DE)

Waveform inversion for near surface characterisation using land seismic data.

B.Sc. Geophysical Engineering (2003)

UNAM, Mexico

Petrophysical properties from AVO, impedance inversion and neural networks.

ADDITIONAL SKILLS

Computational

- OS: Linux, Windows.
- Scientific scripting in Python and Matlab.
- Python libraries & frameworks: Numpy, GeoPandas, Scikit-learn, TensorFlow.

Organisational

- Prioritise and balance concurrent tasks.
- Representative to research consortium.
- Internal consultant loaned out to teams.

Communication

- Technical and executive report writing.
- Result presentation among stakeholders.
- Proposal writing and peer review revision.
- Strong commercial focus.

LANGUAGES

Spanish
English
German
Dutch

WORK EXPERIENCE (CONT.)

Research Postgraduate – University of Aberdeen

2011 – 2015 UK

- Investigated faulting and deformation in clastic rocks caused by salt tectonics to build subsurface models based on outcrop analogues.
- Measured axial and radial P- and S-velocities at ultrasonic (1 MHz) frequencies on dry samples to quantify velocity anisotropy using piezoelectric transducers in unconfined conditions.
- Quantified crystallographic preferred orientation in evaporite rock samples from data measured with scanning electron microscope to find relationships between fabric and velocity anisotropy.
- Applied facies-dependent rock physics models to predict upper and lower bounds of seismic velocities of evaporite rock samples.
- Implemented a multiscale approach to characterise subsalt reservoirs from ultrasonic, sonic, and seismic velocities.
- Investigated the differential stress surrounding the wellbore for drilling through salt in deepwater settings.
- Contributed to the proposal writing seeking for funding to equip the rock mechanics laboratory with a HP/HT rock deformation apparatus; funding was obtained and the equipment delivered one year after finishing my PhD.

Research Intern – Schlumberger Cambridge Research

Jan – Aug 2009 UK

- Analysed seismic amplitude and waveform variations produced by lithological heterogeneities associated with permafrost.
- Applied full waveform inversion to estimate the distribution of seismic velocities in presence of strong velocity variations, including forward seismic modelling and data processing.

BUSINESS-TO-BUSINESS PROJECTS

Evaluation of natural resources offshore Gulf of Mexico

Client: PEMEX Exploration & Production, New Ventures

2017-2019 Mexico

Position held: Geophysics Team Leader. **Activities**: Implemented seismic processing workflows enhanced by machine learning methods to identify spatial distribution of rock properties with few control wells.

Mapping Shale Gas Resources in Northern Mexico

Client: PEMEX Exploration & Production, Unconventional Resources

2015-2017 Mexico

Position held: Quantitative interpreter. **Activities**: Estimated total organic carbon and its spatial distribution from seismically derived elastic properties (brittleness, fracture density and orientation).

JOINT RESEARCH PROJECTS

3D imaging of geological structures

Partnership: IFP Energies Nouvelles

2018–2019 Mexico, France

Position held: Researcher & Project Lead. **Activities**: Writing joint research proposal with peer researchers, setting scope, budget, research stages, and applying for funding.

PUBLICATIONS

- Vargas-Meleza, L., Healy, D. and Alsop, I., Timms, N.E., 2015, Exploring the relative contribution of mineralogy and CPO to the seismic velocity anisotropy of evaporitesJournal of Structural Geology, vol. 70, pp. 39-55.
- Vargas-Meleza, L. and Valle-Molina, C., 2012, Advances and Applications of Rock Physics for Hydrocarbon Exploration: *Ingeniería Investigación y Tecnología*, vol. XIII no. 4, pp. 439-450.
- Chávez-Pérez, S. and Vargas-Meleza, L., 2008, Enhanced imaging workflow of seismic data from Chicontepec basin Mexico: *The Leading Edge*, vol. 27 no. 3, pp. 352-359.

CONFERENCES

- Vargas-Meleza, L., Espinoza-Carrasco, E., and Chávez-Pérez, S., 2016, Implications of seismic attribute computations from depth-migrated data: AAPG/SEG International Conference & Exhibition, MX.
- Vargas-Meleza, L. and Farrell, N., 2013, Laboratory-based characterisation of field samples: Implications for geomechanics. Petroleum Exploration Society of Great Britain (PESGB), Aberdeen Evening Lecture, UK.
- Vargas-Meleza, L. and Healy, D., 2013, Laboratory measurements of seismic velocity anisotropy of salt diapirs - Implications for wellbore stability and seismic processing: Geophysical Research Abstracts, vol. 15, EGU General Assembly, Vienna, Austria.

REFEREES

Prof. Dr. Evert Slob
@ E.C.Slob@tudelft.nl
TU Delft (NL), Civil Engineering and Geosciences, Applied Geophysics and Petrophysics

Dr. David Healy
@ d.healy@abdn.ac.uk
Reader at University of Aberdeen, (UK), Geosciences, Rock Physics & Geomechanics Laboratory

Dr. Sergio Chavez-Perez
@ sergio.chavezp@gmail.com
Mexican Petroleum Institute (MX), Exploration & Production, Seismic Imaging