



# Next Generation Geomechanics and Fracturing

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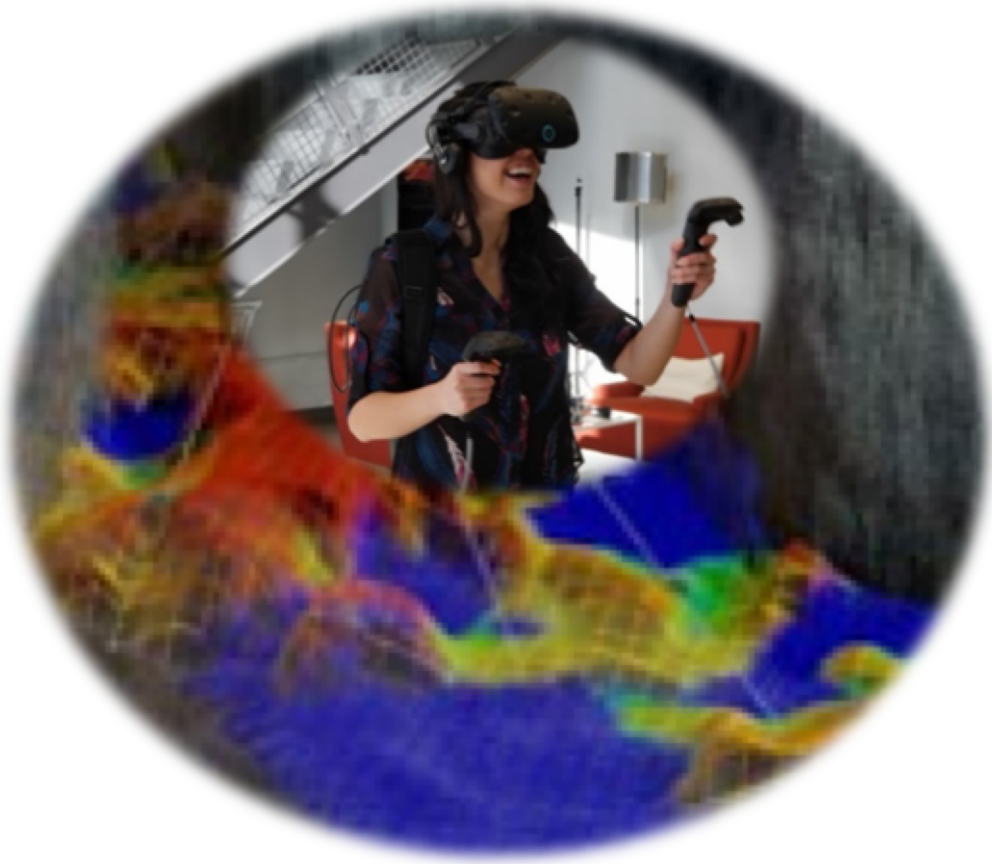


Engineering & Geosciences Advisors (P E G A Ltd.)

# Next Generation Geomechanics

“THERE IS NOTHING LIKE A DREAM TO CREATE THE FUTURE”

VICTOR HUGO



- 3D geomechanical models have been around for more than a decade.
- It is time for geomechanics to be taken to a higher technology level.

**“Augmented Reality Geomechanics (ARG)”**  
is about starting a new era in geomechanics and fracturing.

# This is who we are

- Research, consulting and training company
- Subsurface engineering and geosciences for energy sector
- Established in 2014 in Georgia
- Completed more than 50 international projects

- Geomechanics and applications
- Completion and fracturing design
- Reservoir engineering and EOR/IOR
- Signal processing and data analytics
- Technology development:
  - Design and simulation of downhole tools and sensors

**Knowledge  
transfer is  
our mission**

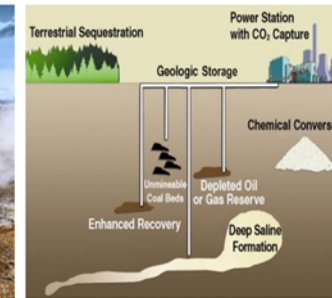
Unconventional Resources Deep-water & HPHT Fields



Geothermal Energy



CO2 Sequestration



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- Rock Properties Estimation from Resistivity Logs using ML
- Drilling Optimization using Combined Signal Processing & Machine Learning
- Combined Tilt Sensing and Seismic Sensors System for Hydraulic Fractures Monitoring and Mapping
- Frac Hit Control and Mitigation by Near Wellbore Stress Barrier
- Improved Production Forecast using Data Analytics and Machine Learning
- Downhole Tool for Direct In-situ Stress Measurement
- Integrated Lost Circulation Prediction, Positioning, and Mitigation



# Team Members & Brief Bios

Hamed Soroush



- 22 years of international experience in Geomechanics.
- Subsurface Engineering Director at Petrolern LLC
- PhD in Petroleum Engineering from Curtin University, WA, Australia

Syed Tariq



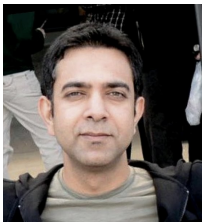
- 45 years of experience in Reservoir Engineering and EOR.
- Reservoir Engineering Director at Petrolern LLC
- PhD in Petroleum Engineering from Stanford University, CA, USA.

Paul Welch



- 15 years of experience in virtual and augmented reality developments.
- Lead developer and technologist at Petrolern LLC
- PhD in Computing Science from Georgia Tech, GA, USA

Ali Payani



- 8 years of experience in data science and machine learning.
- Senior Electrical Engineer and Data Scientist at Petrolern LLC
- PhD in Electrical Engineering from Georgia Tech, GA, USA

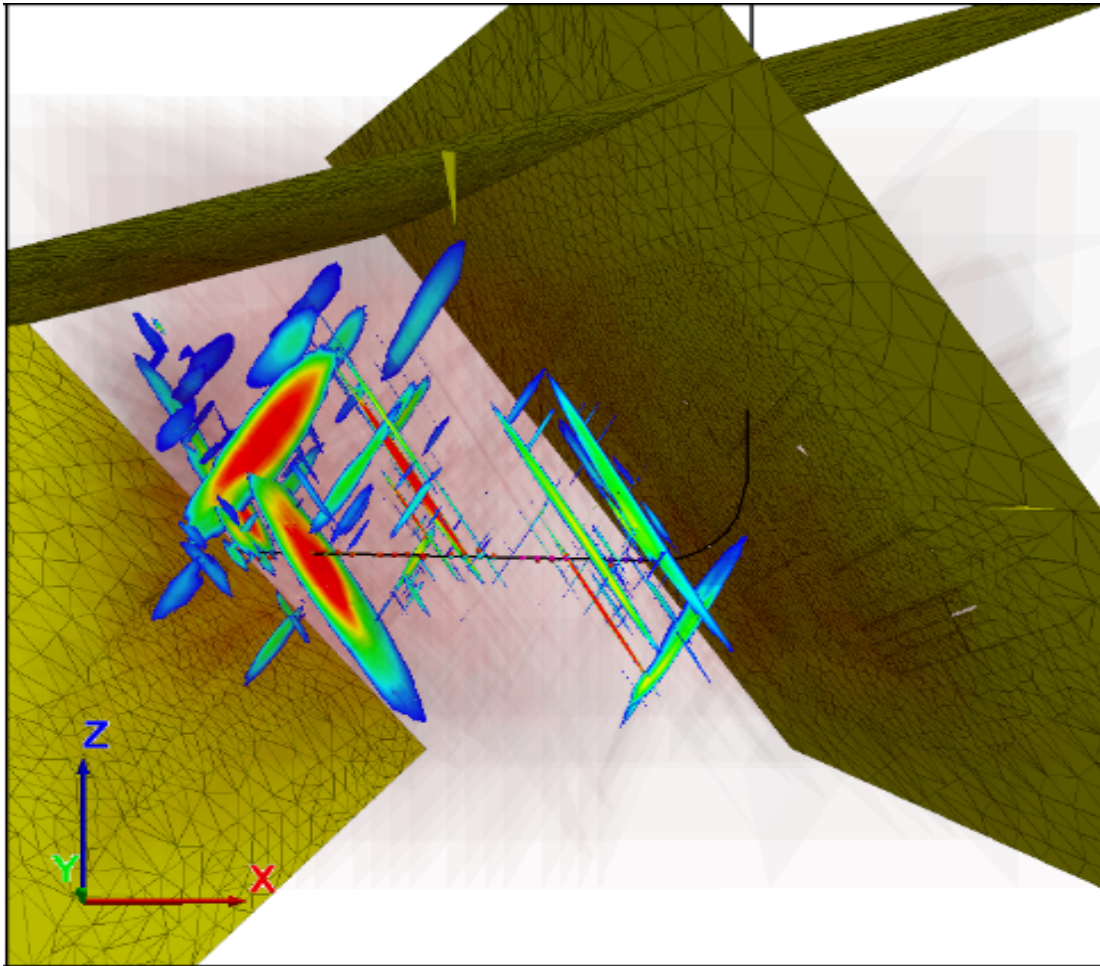
# This is our vision and mission



- Changing the future of subsurface engineering and geosciences by:
  - Knowledge transfer
  - Innovative solutions
  - Imparting the latest knowledge and technologies from other industries to professionals in the energy industry

**Integrity is our Culture**

# Augmented Reality Geomechanics (ARG)



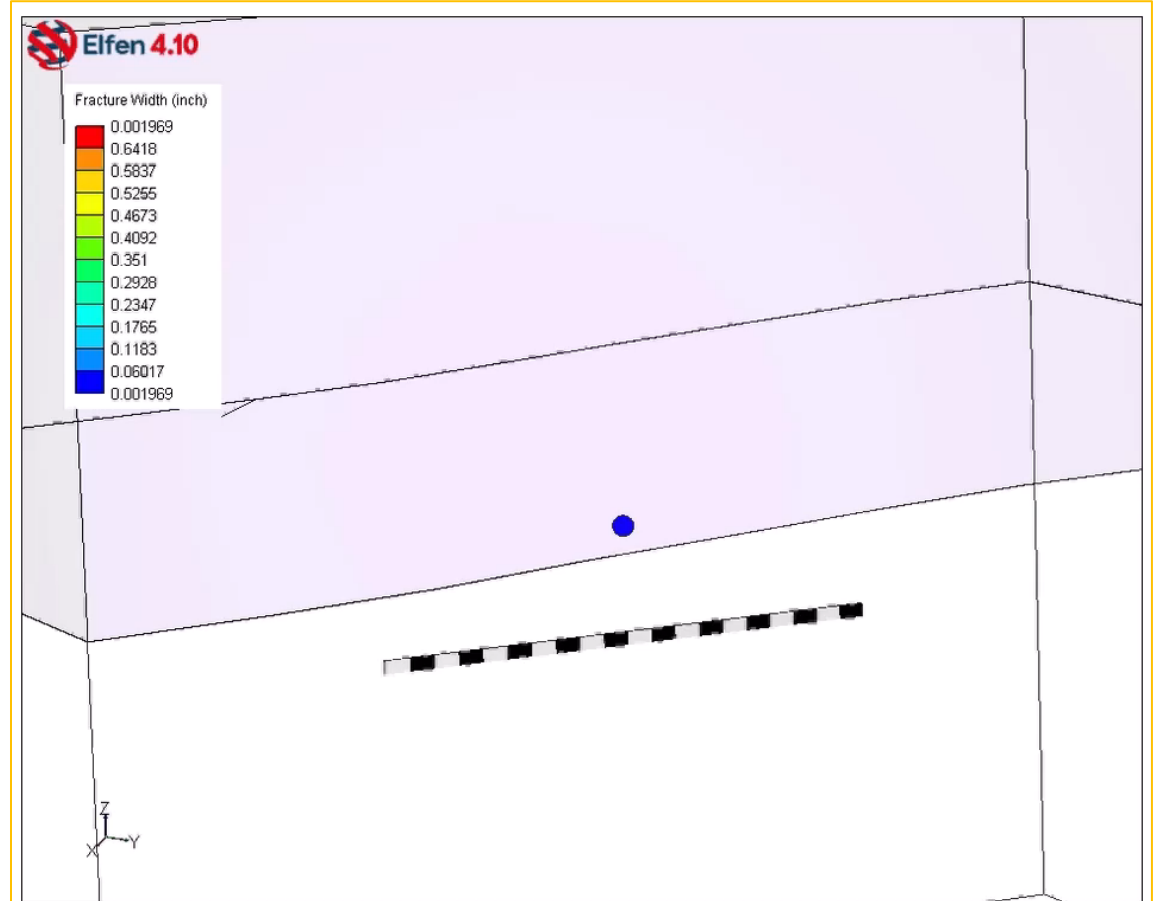
Objective is to develop AR field-scale geomechanical models to:

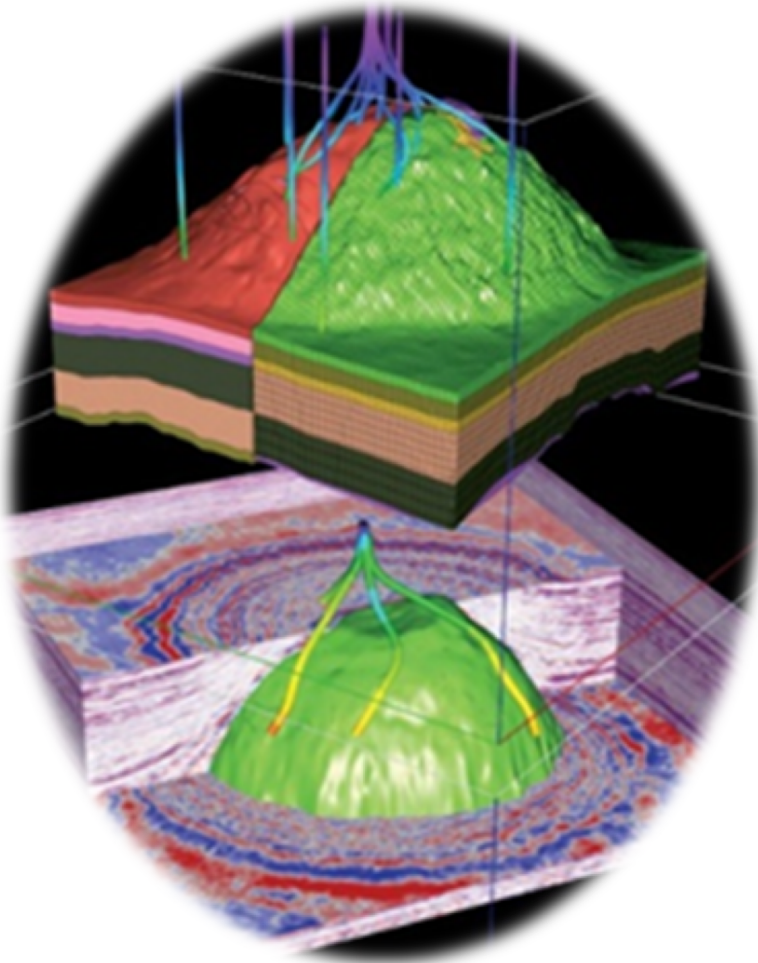
- Improve understanding of subsurface condition
- Enhance team work
- Provide real-feeling interaction with the model
- Enables real-time decision-making during drilling, completion, fracturing, and production
- Help efficient training

**ARG contains all the numerical codes to simulate the physics and mechanics of the Earth.**

**ML will be used along with seismic data to populate the properties.**

- Change the model parameters and watch how the:
  - faults and natural fractures reactivations
  - reservoir get compacted by production
  - stresses rotate along the field
  - wellbore stability condition changes
  - fractures initiate and propagate
- Real-time interaction with hydraulic fractures:
  - Changing frac design, completion design, pumping schedule etc. and see the effect of fracture initiation and propagation right away along with your other stakeholders.





Develop 3D data visualisation and interpretation software tool

- i. Support a wide variety of input data types
- ii. High resolution visualisation with high frame rates
- iii. Enables hybrid FEM/DEM
- iv. Interpretation tools
- v. ML optimization tools
- vi. Easy export to ASCII text files

**We are looking for interested investors to fund the project.**



## Thanks for Listening

### Q & A