Interactive Petrophysics

Experienced Eye

Automated Feature Selection and Curve Prediction Just Got Better in IP

Andy McDonald

Product Champion: Machine Learning and Python

Geoactive

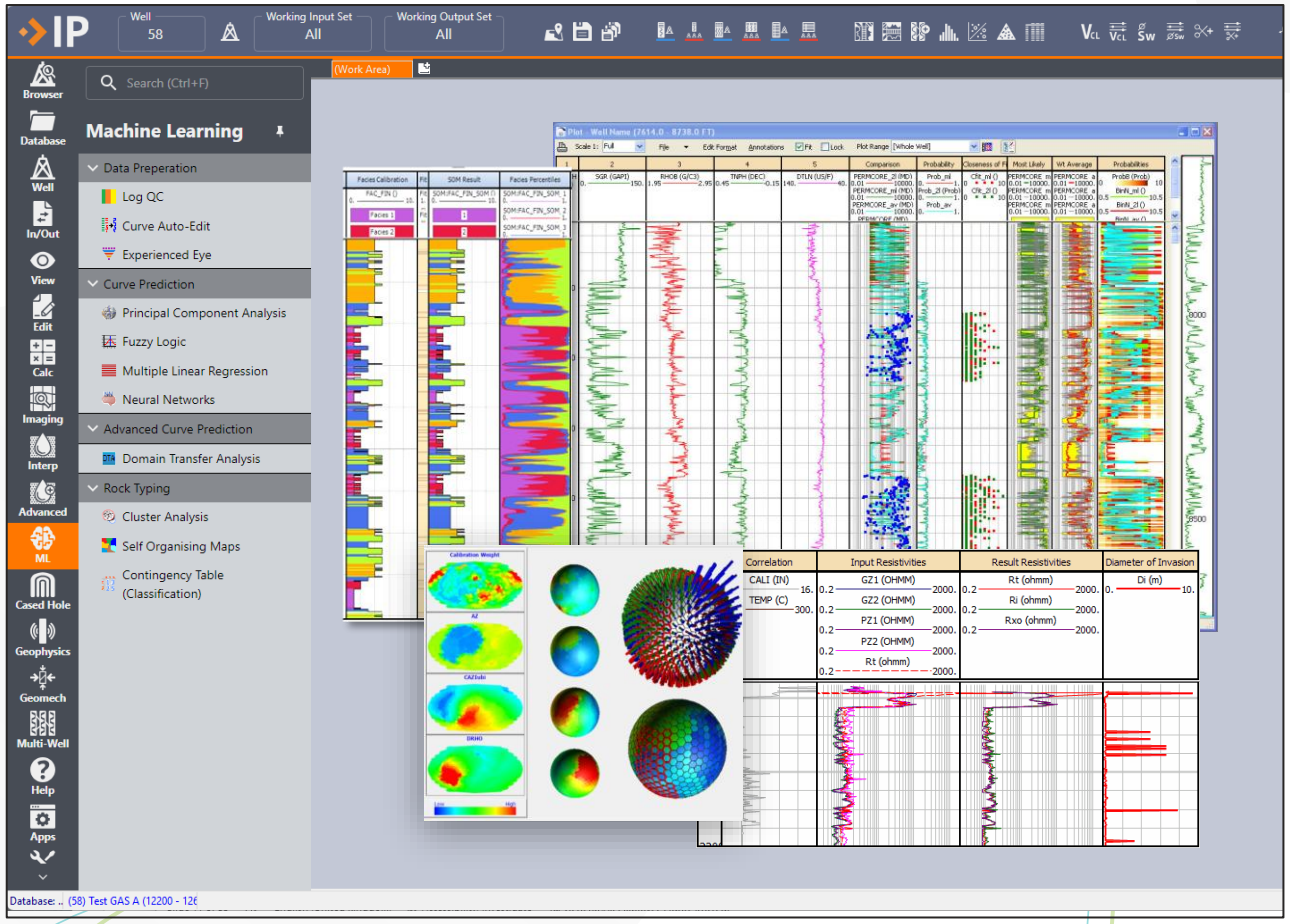
geoactive.com

Agenda

- Introduction
- Overview of Feature Selection
- What is Experienced Eye and how does it work?
- Latest changes to Experienced Eye in IP 2025 Update 3
- Questions

Introduction

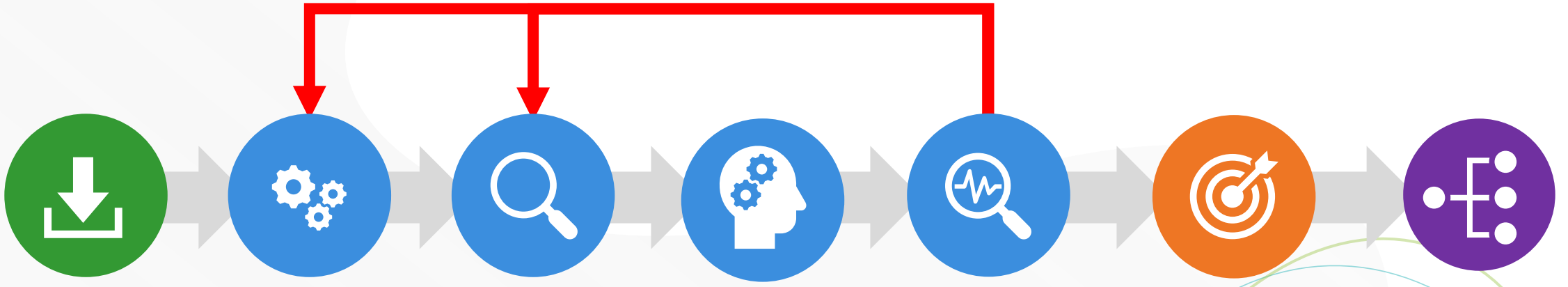
- Geoactive Ltd is a company with a big history
- Our Products:
  - **Interactive Petrophysics (IP)**
  - **Interactive Correlations (IC)**
- Company name changes:
- **PGL > Senergy Software > LR Digital > Geoactive**
- Despite company name changes, our team and products have been consistent over 25 years
- Interactive Petrophysics (IP) is a market leading Subsurface data interpretation software package
- Its multi-discipline and for the lifetime of your wells



“

“Machine Learning is increasing in popularity within the geoscience domain and has many benefits to automating and improving petrophysical interpretations”

Simple ML Workflow



Exploratory Data Analysis

Data QC and Repair

Feature Selection

Interactive Petrophysics

Feature Selection

Feature selection is the process of identifying and selecting the most relevant features (or variables) from a dataset to build a more efficient and effective machine learning model.

Features = Well Logging Curves

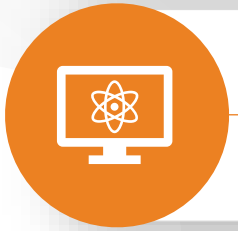
Benefits of Feature Selection

Reduces Training Times

Less input data to train models

Improves Interpretability

Fewer features can make models easier to understand



Reduces Overfitting

Less chance model memorising training data

Improves Prediction Accuracy

More data does not mean better models

Feature Selection

Target Curve → Porosity

Associated Reference curve or 'features' available

- Gamma
- Density
- Neutron
- Sonic Compr.
- Sonic Shear
- Caliper
- Sigma
- Clay Vol.
- Res. Deep
- Res. Shallow
- Res. Micro

How to Choose?

<u>Option 1</u>

Domain Expert + Trial & Error

<u>Option 2</u>

Automated Feature Selection Methods: e.g

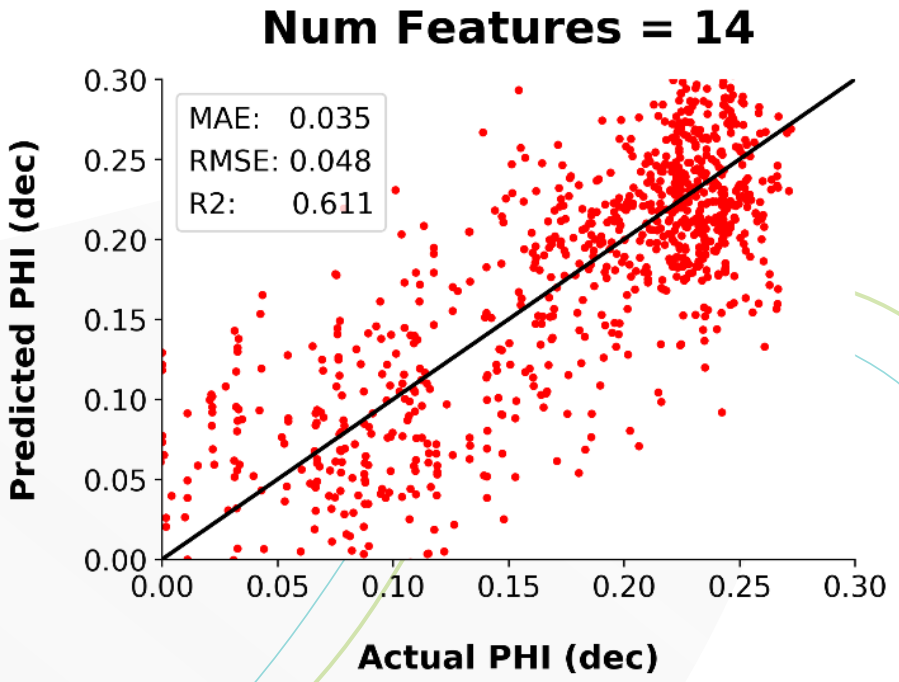
- Peasons Correlation
- Backward Feature Elimination
- Experienced Eye

Feature Selection Example

Features

RHOB	PEF
RS_L10	C1C2
GR	C1C3
NPHI	C1C4
DT	C1C5
DRHO	GASX
CALI	ROPA

ML MODEL

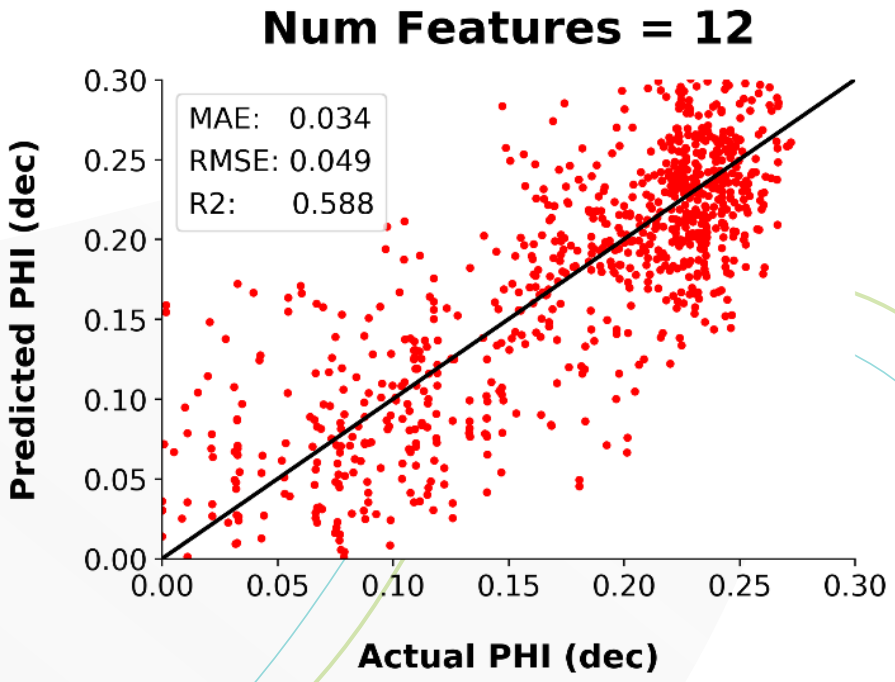


Feature Selection Example

Features

RHOB	PEF
RS_L10	C1C2
GR	C1C3
NPHI	
DT	C1C5
	GASX
CALI	ROPA

ML MODEL

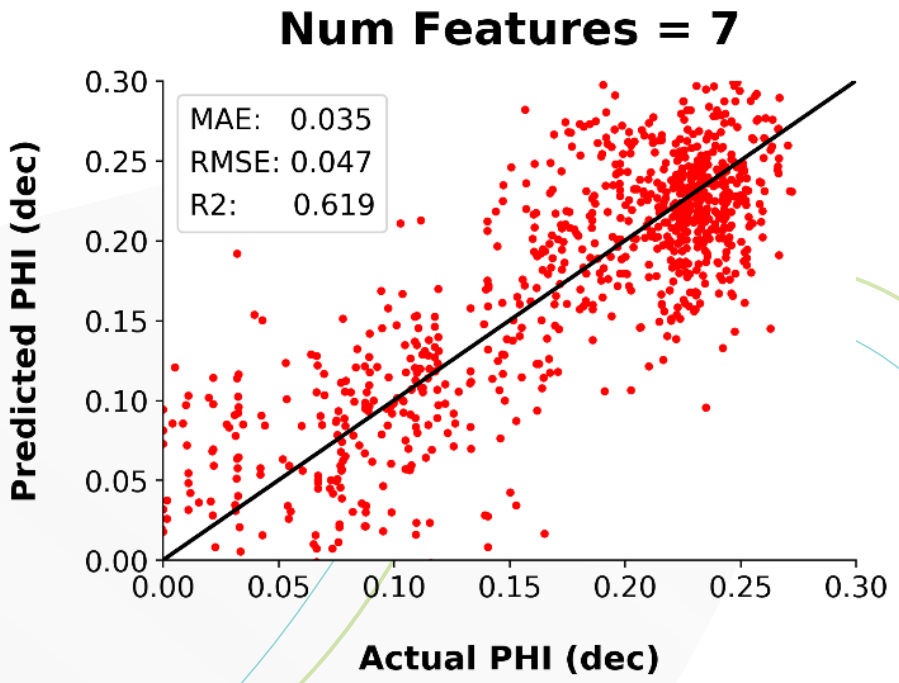


Feature Selection Example

Features

RHOB	PEF
RS_L10	
GR	
DT	
	GASX
CALI	

ML MODEL



Feature Selection Example

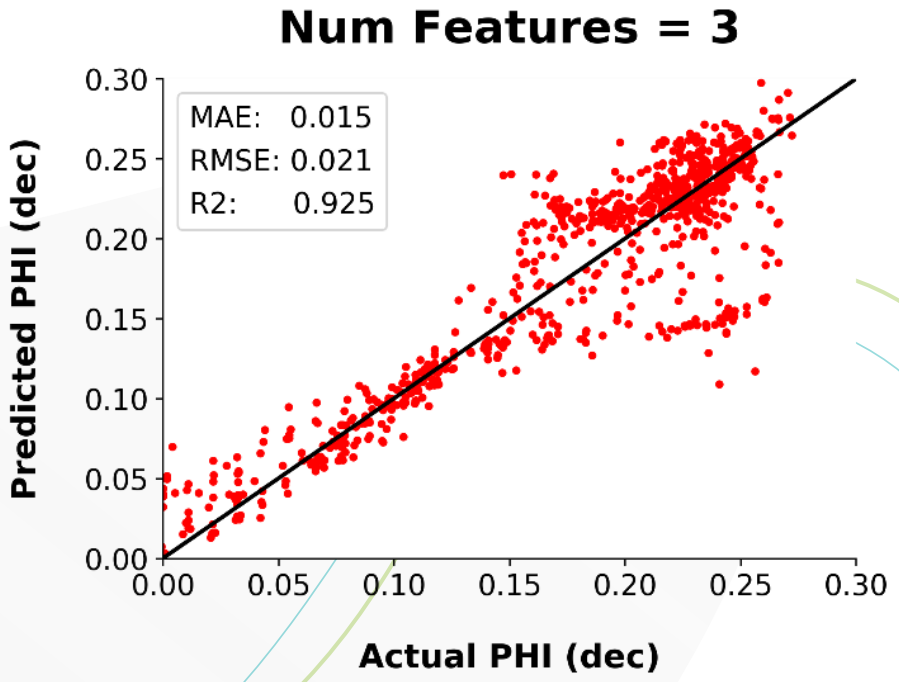
Features

RHOB

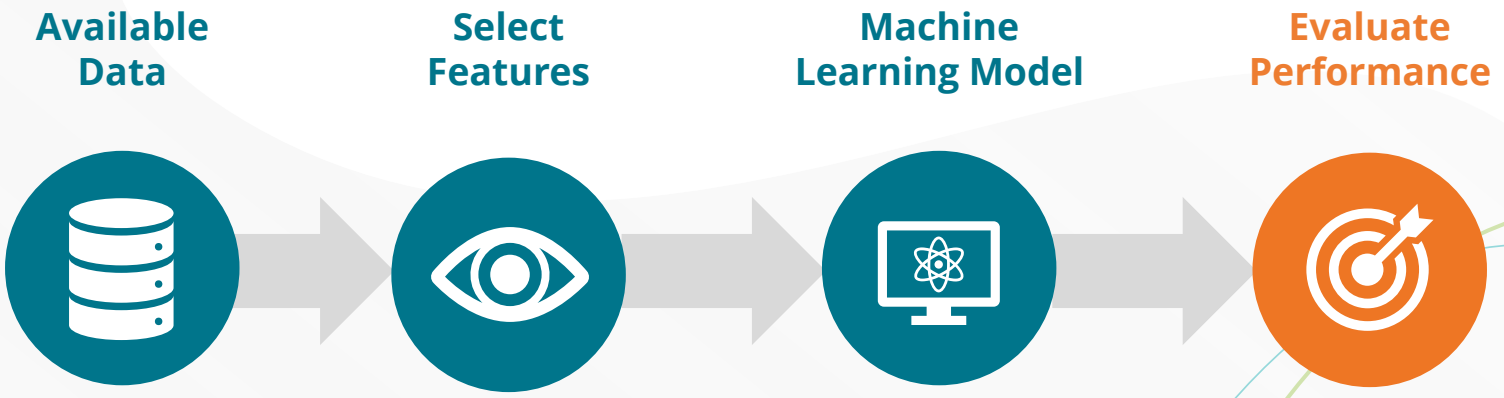
DT

GASX

ML MODEL



Challenge: Comparing Features and Models



Running:

3 Feature Selection Methods

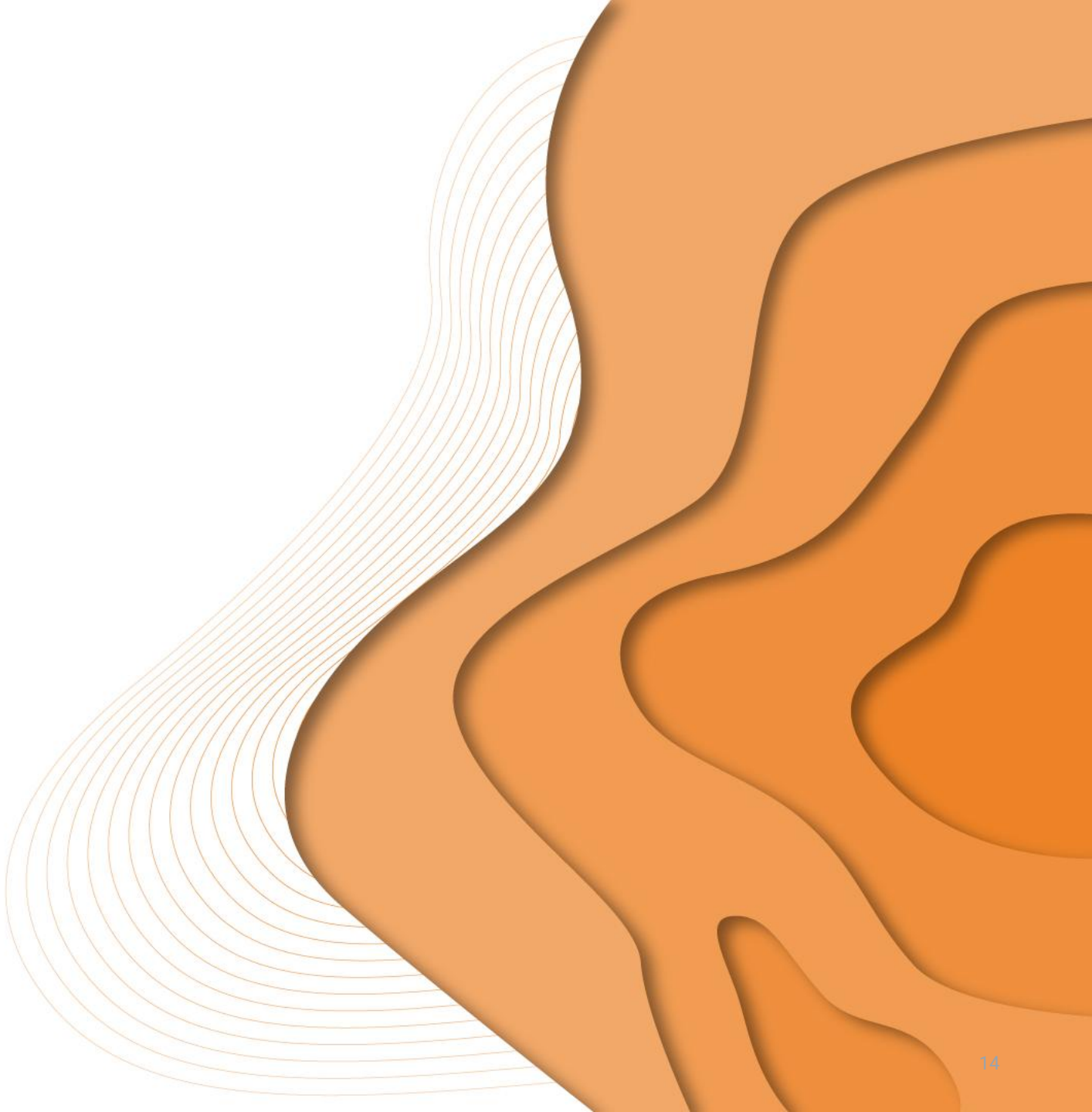
3 Machine Learning Models

6 Different Groups of Inputs (Top 3 – Top 8 Ranked Features)

54
Separate Runs

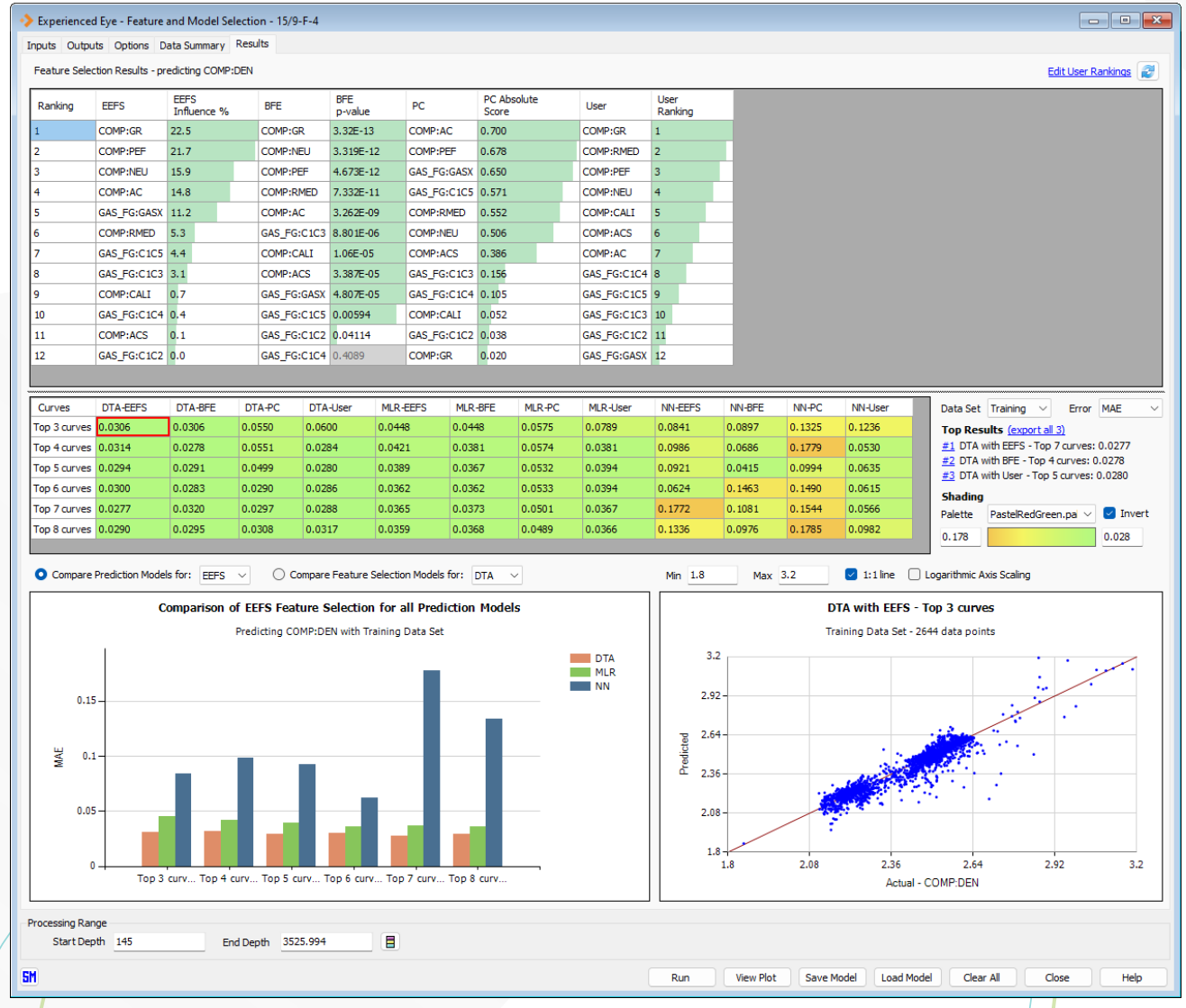
Interactive Petrophysics

Experienced Eye



Experienced Eye IP Module (IP 2023-25)

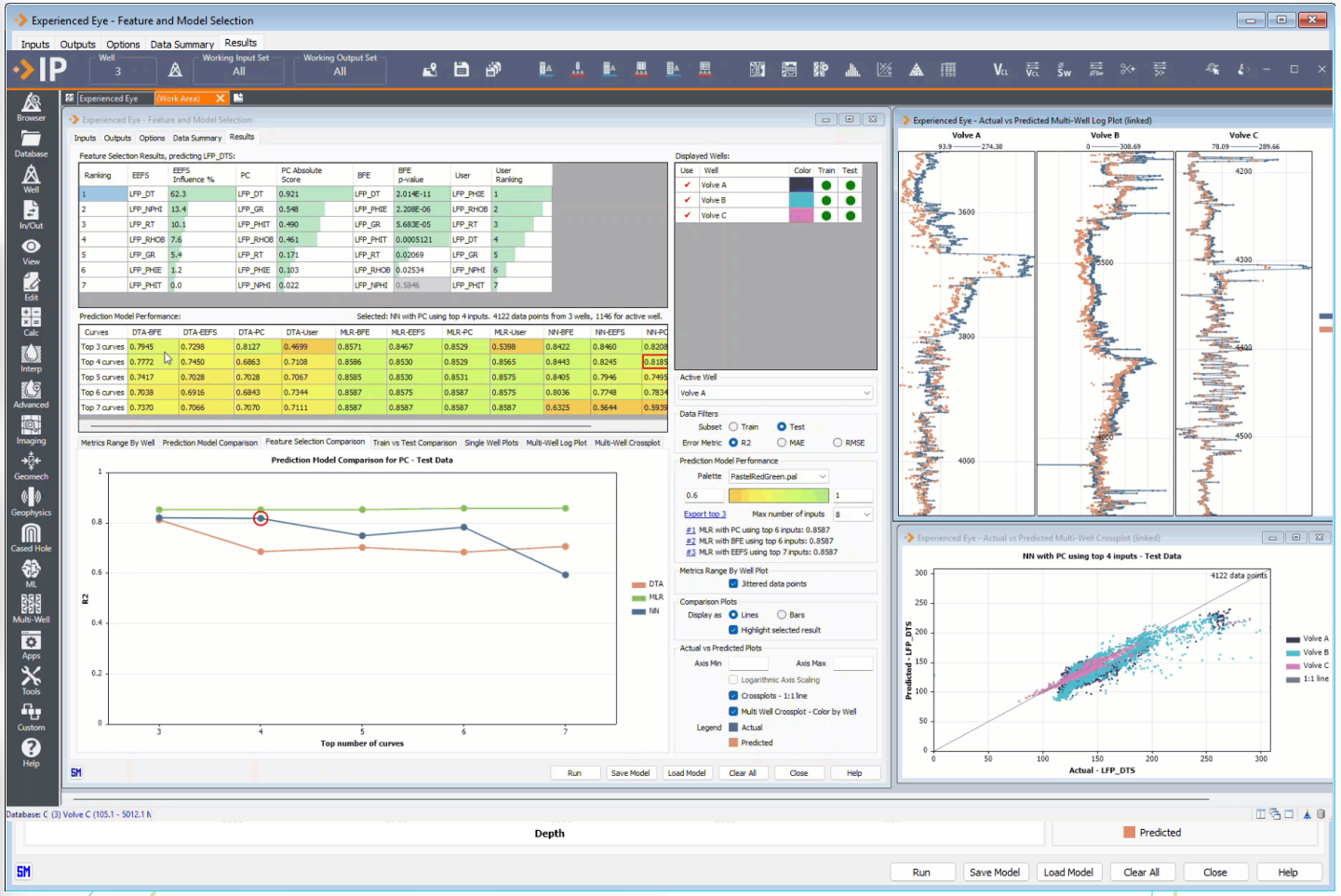
- New module - developed from the ground up
- Interactive results grid to visualise model performance
- Easily compare different curve choices and models
- Automated and streamlined process for curve prediction



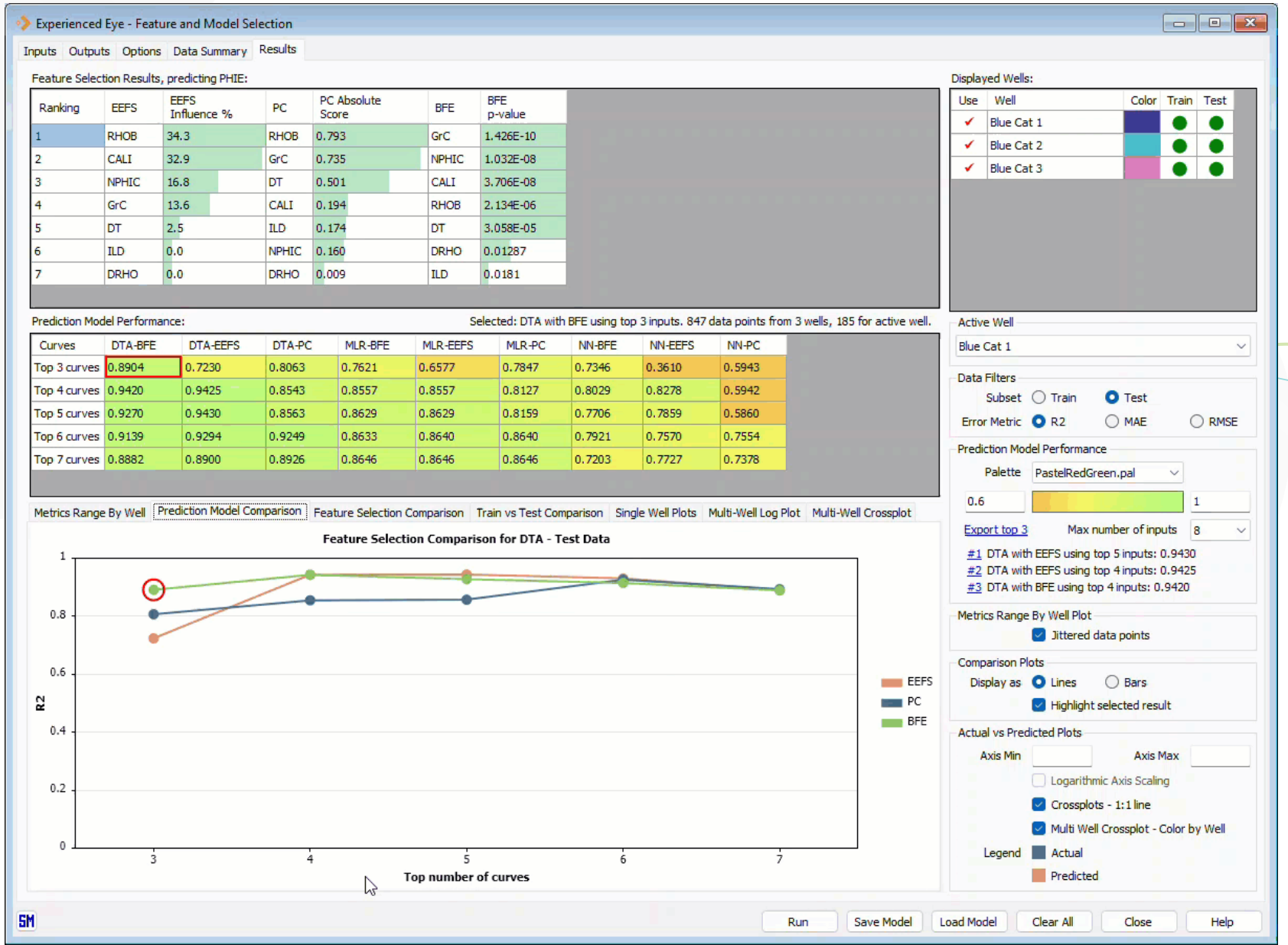
Experienced Eye Module Workflow

Multi-Well Experienced Eye IP Module (IP 2025)

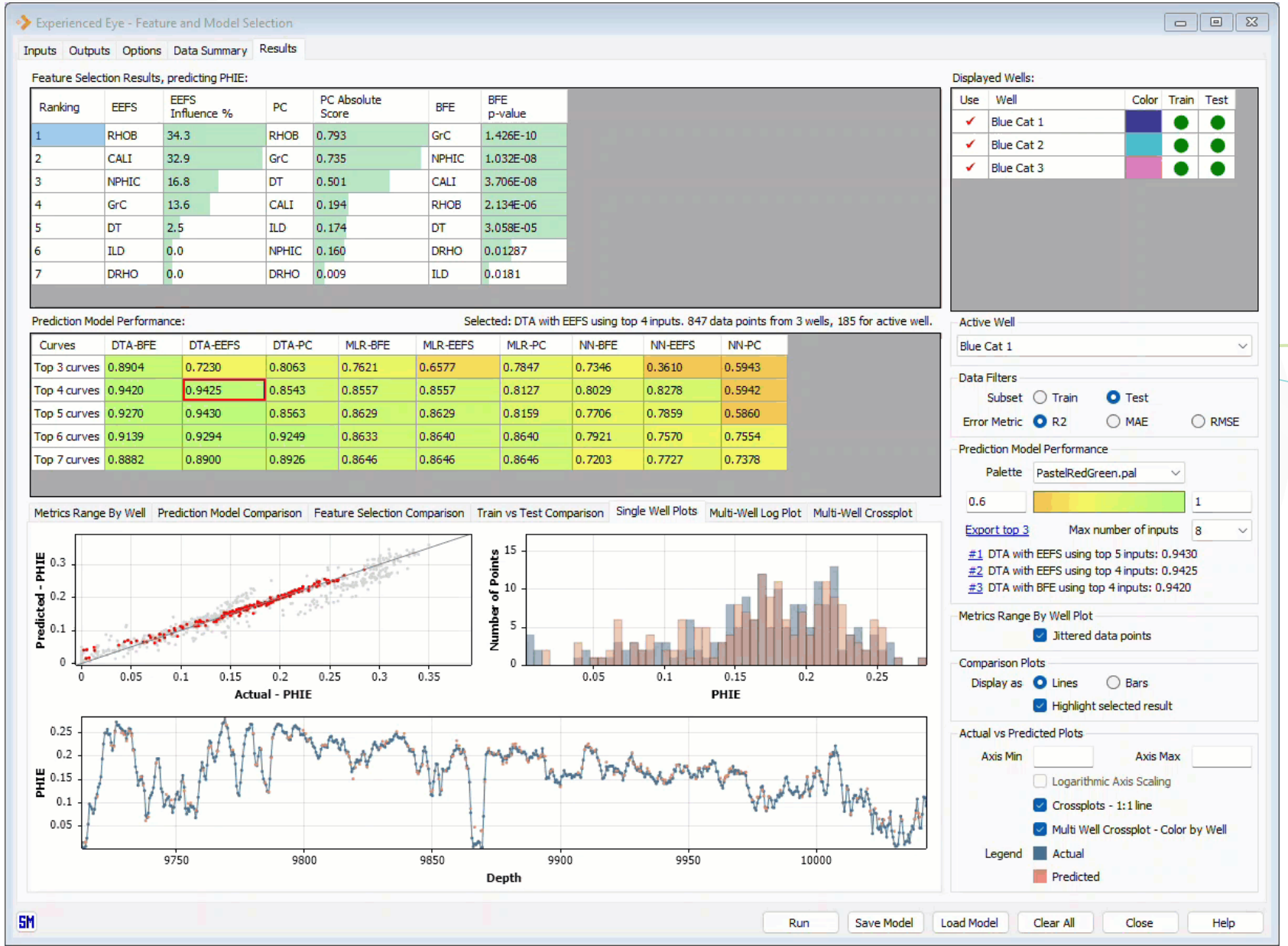
- Bring in multiple wells from your project
- Powerful interactive data visualisations
- Major speed improvements via multi-threading
- Improved algorithms



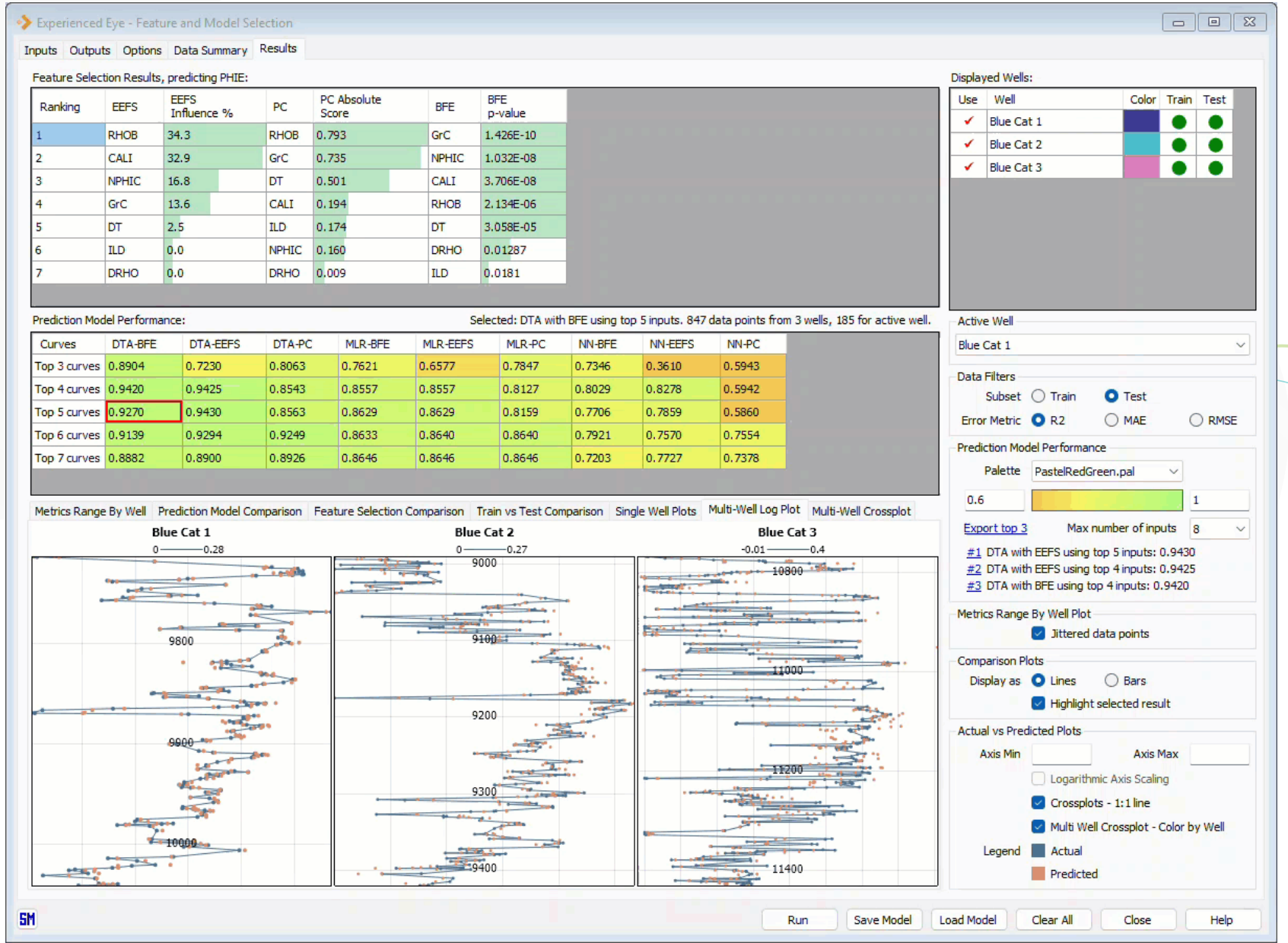
Compare Performance of FS and ML Models



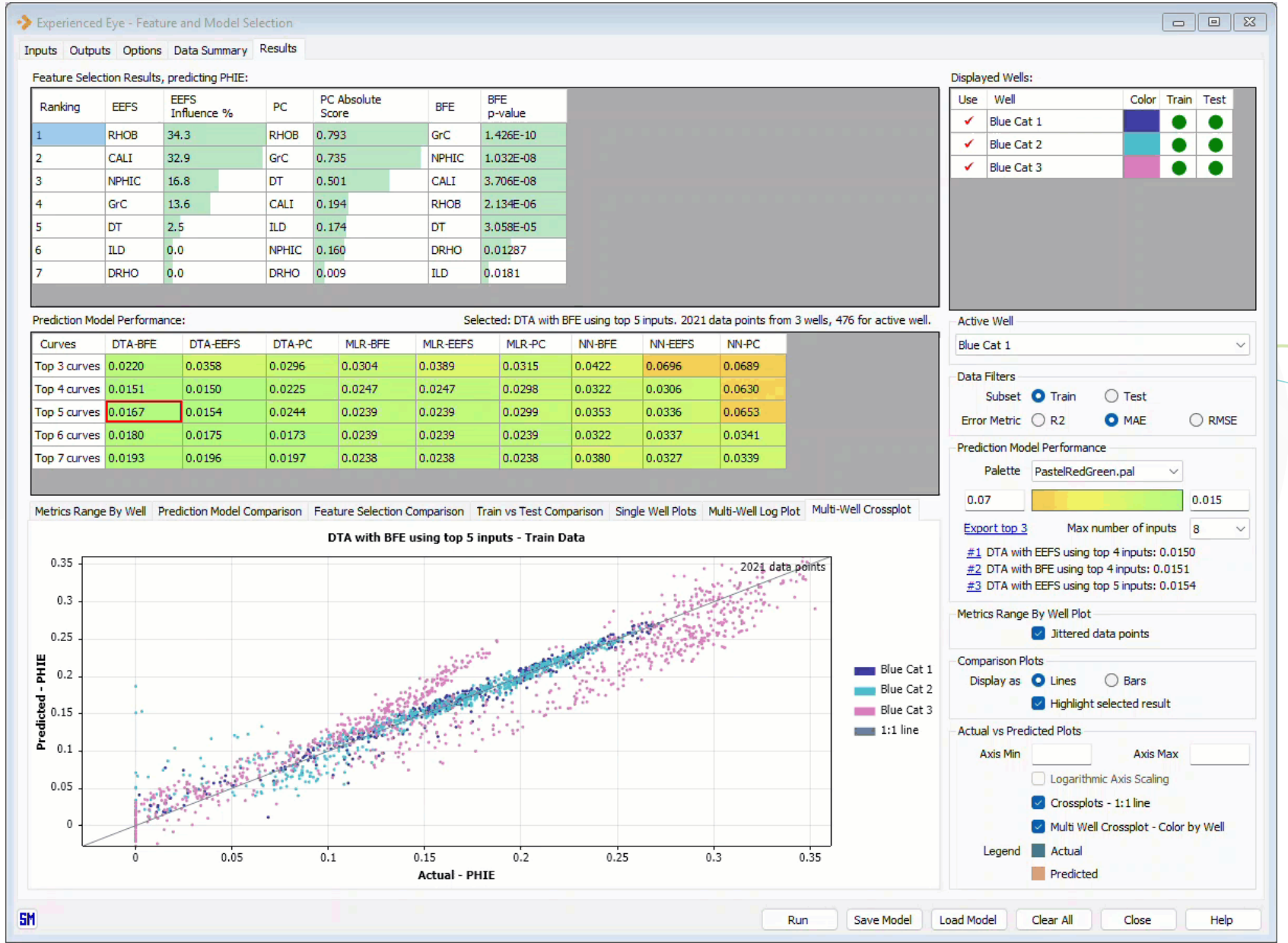
Evaluate Model Performance on a Well-By-Well Basis



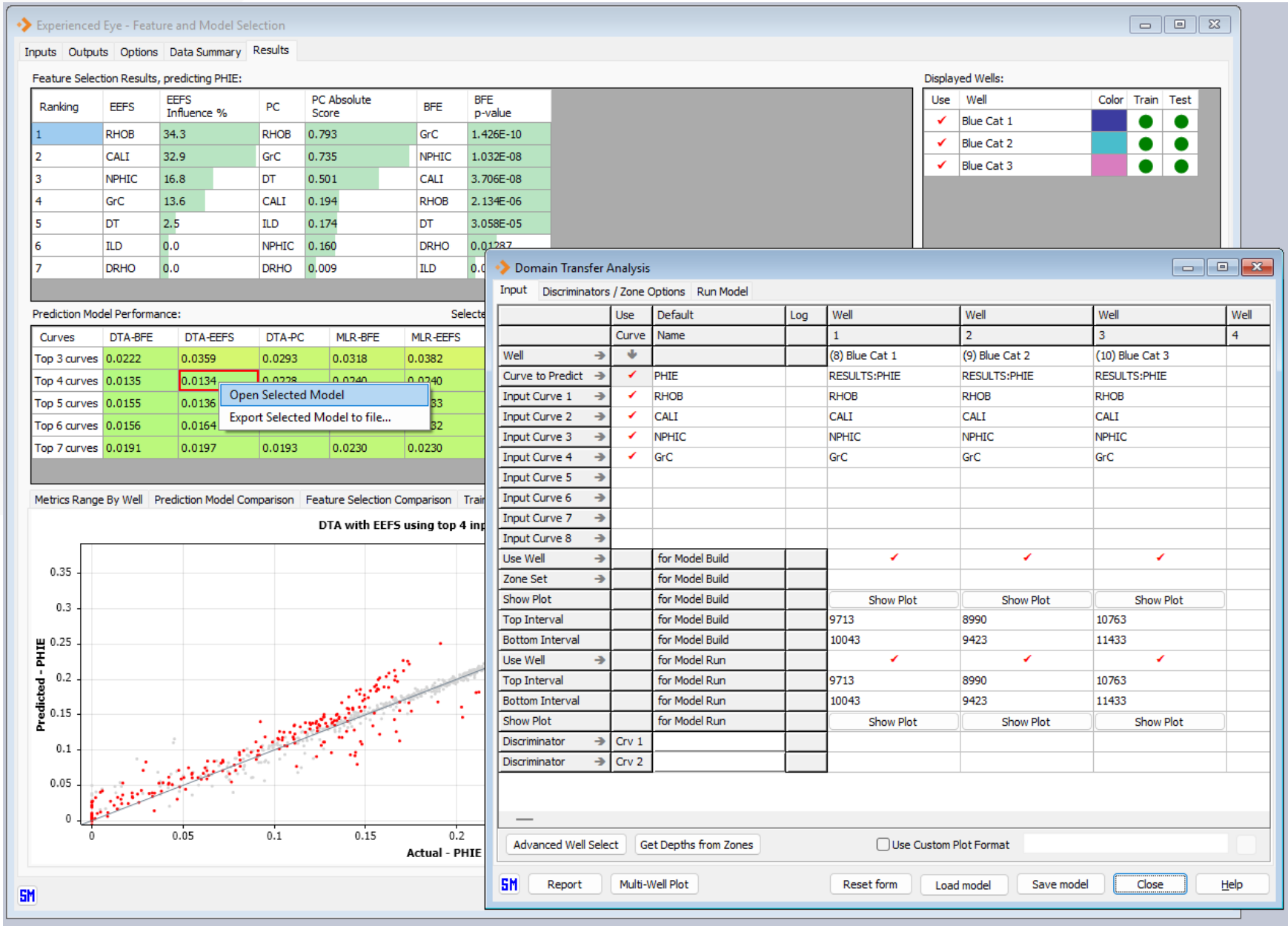
Compare Multiple Wells Side by Side



Explore Multi-Well Performance



Export Final Models



Summary

The latest Interactive Petrophysics (IP) update brings powerful additions to the Experienced Eye module

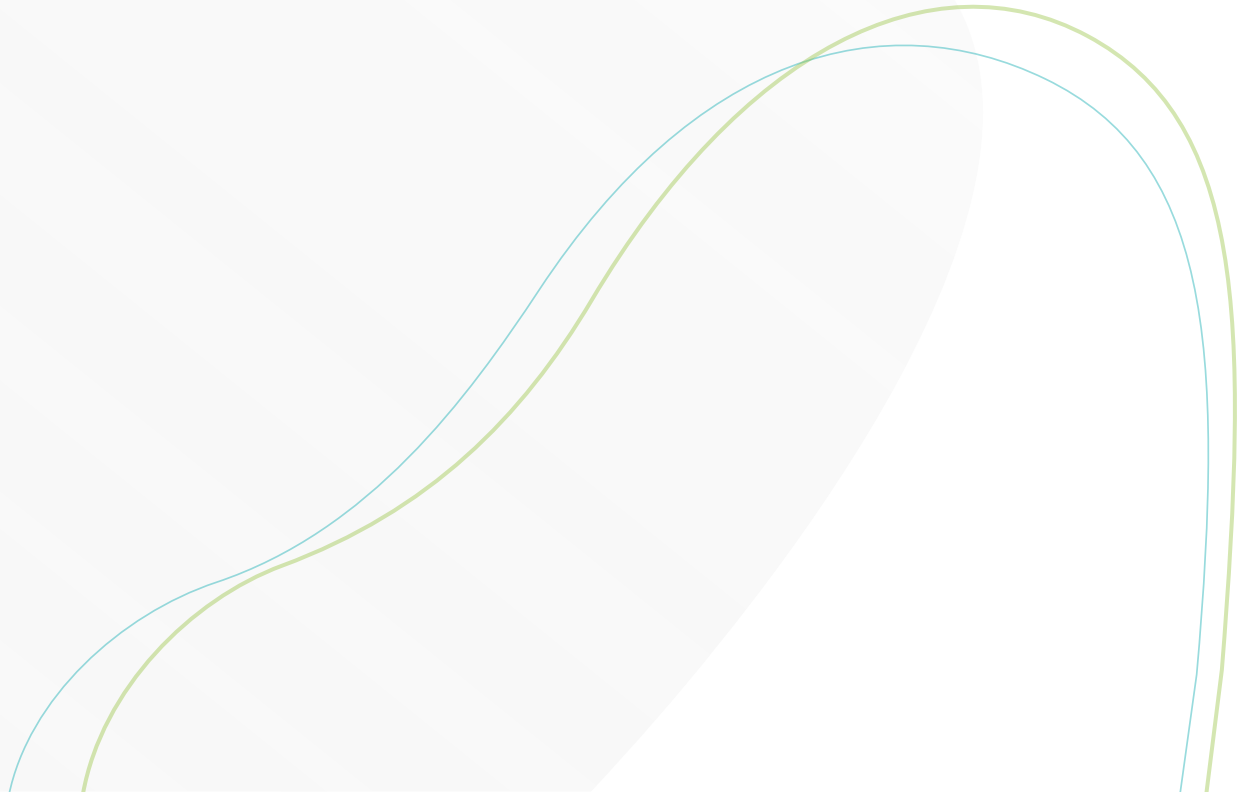
Multi-Well Aware allows you to work with multiple wells in your database to build more reliable and accurate models specific to your field/project

Flexibility to select specific wells for training or testing, or combine them and use random point selection

Powerful Interactive Visualisations make it easier to explore the results from various feature selection and machine learning combinations

Speed improvements make the process of model selection more efficient and enhances productivity

Questions



Thank you

Geoactive Limited
2 Discovery Drive,
Westhill, Aberdeen,
United Kingdom,
AB32 6FG

Asia and Americas +1-713-489-3995
Europe and Africa +44-203-608-8024
softwaresupport@geoactive.com

www.geoactive.com

Get in touch