Decision Science for Unconventional Reservoirs

December 5, 2017

OAG
ANALYTICS
Self-Service Machine Learning

GE Digital
Alliance Partner

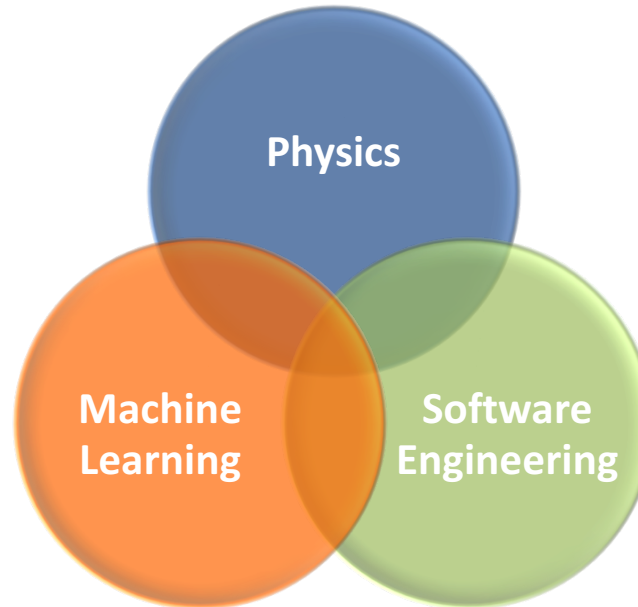**Luther Birdzell**
Founder & CEO
luther@OAGanalytics.com

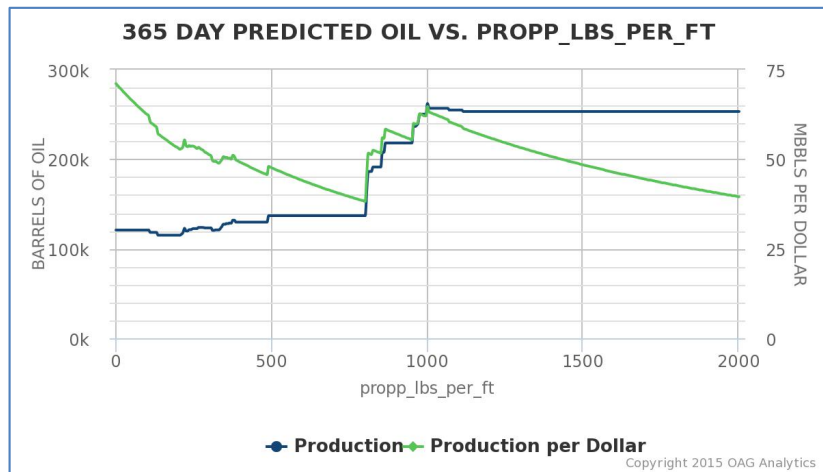# Decision Science augments Physics with Machine Learning and Software Engineering
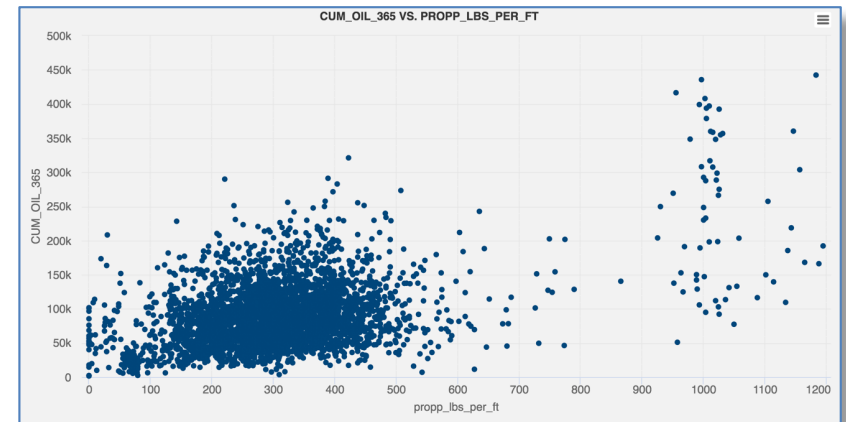
Machine Learning

Separate Signal from Noise in Complex Data

- **Branch of statistics designed for big data[1]**

- **Computers learn from data and write their own programs**
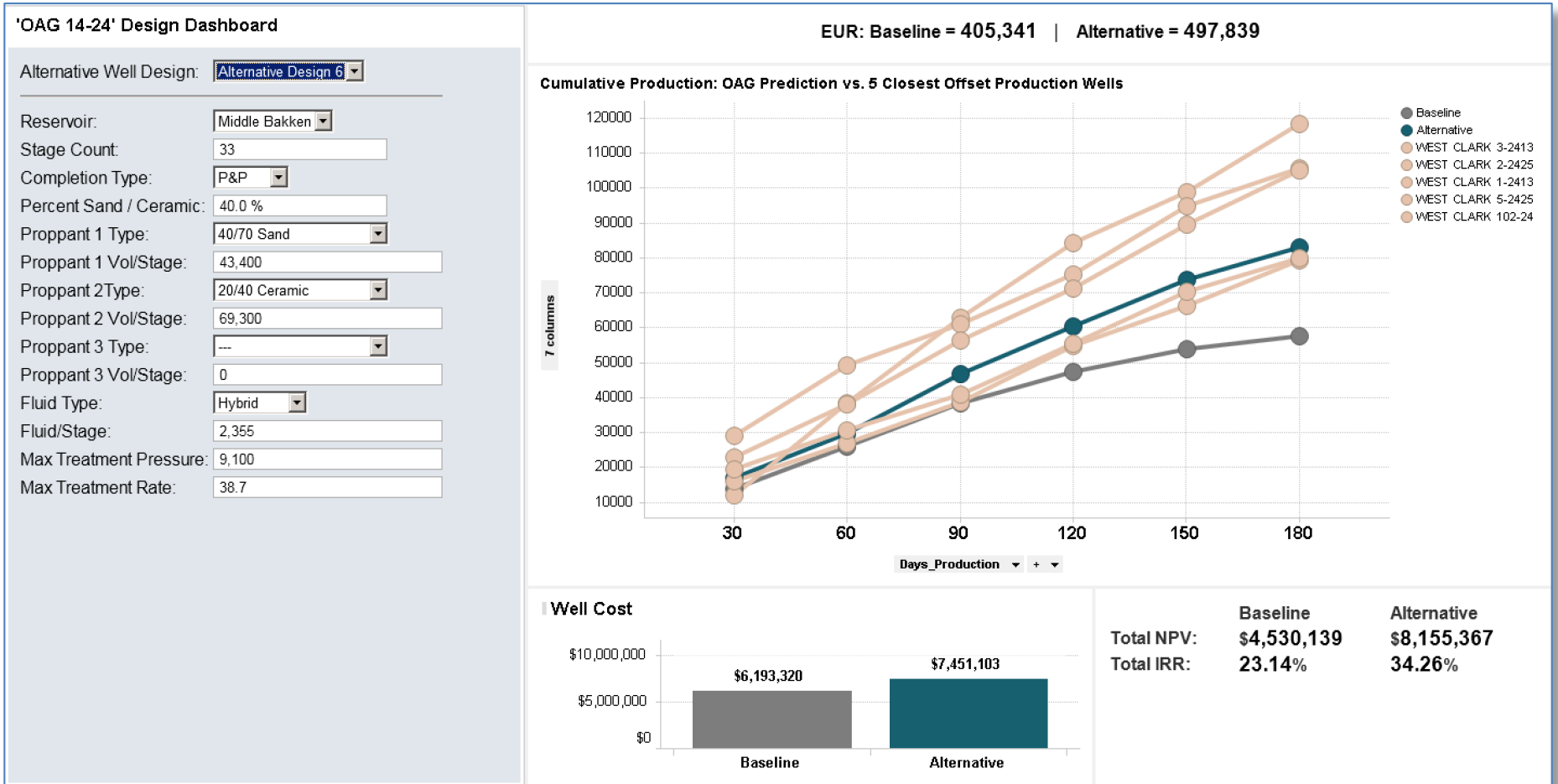 - Rather than follow explicit instructions programmed by humans

OAG Machine Learning

Raw Data

1. HBR July 2015
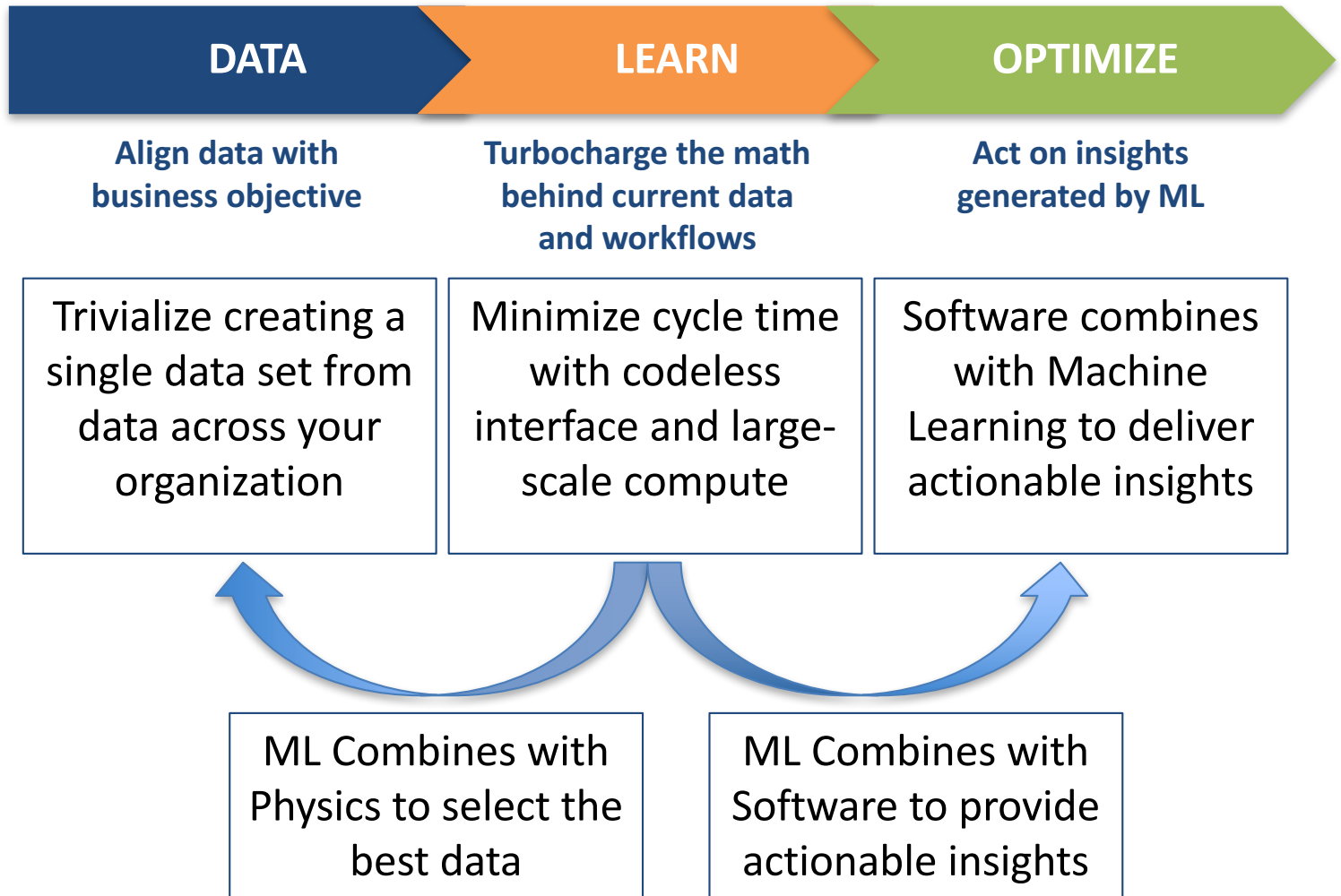
Digital Twin

Software that Represents Physical Assets

'OAG 14-24' Design Dashboard

Alternative Well Design:	Alternative Design 6
Reservoir:	Middle Bakken
Stage Count:	33
Completion Type:	P&P
Percent Sand / Ceramic:	40.0 %
Proppant 1 Type:	40/70 Sand
Proppant 1 Vol/Stage:	43,400
Proppant 2 Type:	20/40 Ceramic
Proppant 2 Vol/Stage:	69,300
Proppant 3 Type:	---
Proppant 3 Vol/Stage:	0
Fluid Type:	Hybrid
Fluid/Stage:	2,355
Max Treatment Pressure:	9,100
Max Treatment Rate:	38.7

EUR: Baseline = 405,341 | Alternative = 497,839

Cumulative Production: OAG Prediction vs. 5 Closest Offset Production Wells

Legend:
- Baseline
- Alternative
- WEST CLARK 3-2413
- WEST CLARK 2-2425
- WEST CLARK 1-2413
- WEST CLARK 5-2425
- WEST CLARK 102-24

Days_Production

Well Cost

	Baseline	Alternative
	$6,193,320	$7,451,103
Total NPV:	$4,530,139	$8,155,367
Total IRR:	23.14%	34.26%

Why Self-Service Matters

Maximize Data Value for Each Business Objective

Identify a high value business problem

DATA	LEARN	OPTIMIZE
Align data with business objective	**Turbocharge the math behind current data and workflows**	**Act on insights generated by ML**
Trivialize creating a single data set from data across your organization	Minimize cycle time with codeless interface and large-scale compute	Software combines with Machine Learning to deliver actionable insights

ML Combines with Physics to select the best data

ML Combines with Software to provide actionable insights

4

Business Value

Interactively Optimize NPV & IRR

D & C | **Production**

Conventional

Traditional Reservoir Modeling/Simulation

Exception Based
- Production Surveillance
- Equipment Monitoring

Unconventional

OAG ANALYTICS
Machine Learning Well Optimization
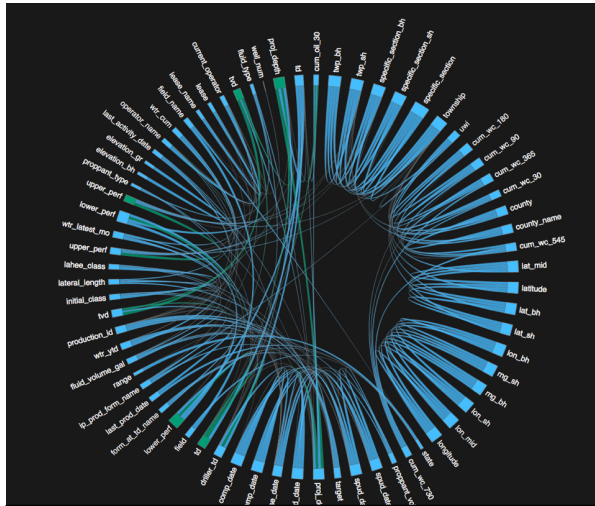
Machine Learning
- Production Surveillance
- Equipment Monitoring
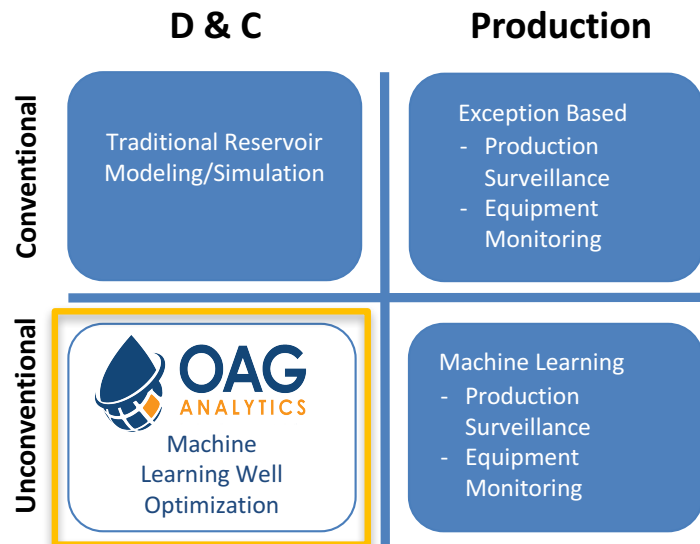
- **$500 Billion annual upstream spend**

- **U.S. wells $4M – $15M each**

- **Minimize costs & analysis cycle time**
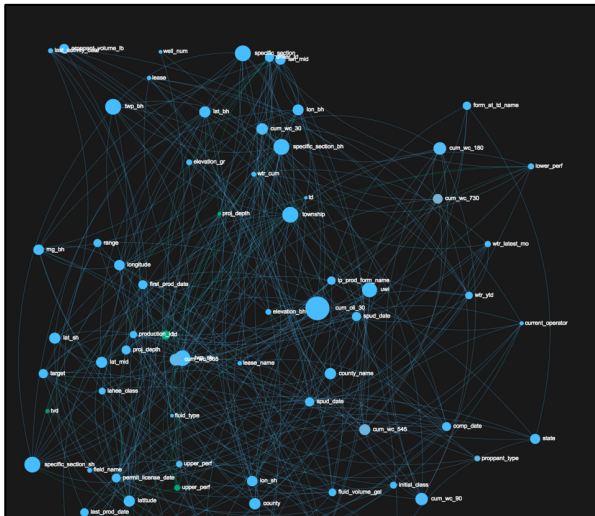
Machine Learning is helping U.S. oil companies:

- **10% completion cost reduction per well**

- **25% more accurate production forecasts**

- **90% faster than reservoir simulation**

Best Practices

Screenshot from OAG Insights Workflow™

Screenshot from OAG Insights Workflow™

Transform data into decisions and operational improvements that can be measured on a balance sheet

- **Start with a business problem**

- **Define success metric(s)**

- **Measure the value of your data**

- **Apply analytics that maximize success metrics**

- **Create trust with transparency & control**

- **Optimize ML for insights & accuracy**

- **Optimize Workflow for cycle time**

Data

Traditional Analysis

ML Stack Rank

ML Correlation

ML Forecast

Insights

Decisions

Self-Service Machine Learning

GE Digital Alliance Partner

Luther Birdzell
Founder & CEO
luther@OAGanalytics.com

info@OAGanalytics.com

844-OAG-WELL

www.OAGanalytics.com