Ongoing Research Activities:
Drilling Data Analytics

Vikrant Lakhanpal
Assistant Director
Well Engineering Research Center for Intelligent Automation
Drilling Center of Excellence, University of Houston
Data Analytics Business Market Value

- **Global**: $130 B in 2014, $203 B in 2020 (CAGR = 11.7%)
- **Oil & Gas**: $4.29 B in 2014, $19.65 B in 2020 (CAGR = 35.5%)

**Our Role:**
Technology Improvement

- Billions of Dollars
Oil and Gas Industry has been innovative. & It will innovate again.

- Heavy Oil/Steam Flooding
- Enhanced Oil Recovery
- Complex Well Geometry
- Real time drilling
- Geosteering
- Imaging beneath salt
- Deepwater drilling
- High Pressure/High Temperature
The Adoption Rate

The Hype Curve

- Innovators
- Early Adopters
- Early Majority
- Late Majority
- Laggards

VISIBILITY

- Peak of Inflated Expectations
- Plateau of Productivity
- Slope of Enlightenment
- Trough of Disillusionment
- Technology Trigger

TIME
WERCIA, a Drilling Center of Excellence at University of Houston, has taken the initiative of doing this initial heavy lifting.
We understand our responsibility and are ready for the consequences...

Even if it means building the curve again.

Roundabout of Repackaging

Swamp of Continued Use

Trash Heap of Failures
Research Eco and Real-time Assistive Systems

- To Change Paradigm from Porespace to Pipeline.
- Focus on real world problems.
- Find an economical and commercialized solution.
Research Eco and Real-time Assistive Systems

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Inter-disciplinary Research Advisors
Inter-disciplinary Research – Example 1

Bit Wear Prediction Using Adaptive Data Analytics

- Developed a data analytics algorithm to predict bit wear prediction
- The Workflow generates a warning with a probability based function
- The warning gives operator enough time to take a timely decision to help prevent catastrophic losses
Visual Data Analytics: Morphological Image Processing Approach on the Evaluation of Foamed Cement Quality

- To develop a methodology for evaluation of foamed cement quality
- To emphasize the significance of image-processing techniques combined with cluster analysis in the petroleum industry
Inter-disciplinary Research – Example 3

Jerk Intensity Analysis and Deconvolution for Vibration Failure Prediction

- Developed a workflow for Jerk Intensity analysis on real time drilling data
- The workflow helps predict high vibration intensities
- A prototype model was prepared to check the results
Jerk Intensity Analysis and Deconvolution for Vibration Failure Prediction

\[ a(t) \rightarrow \text{Convolution} \rightarrow y(t) \]

\[ m(t) \]
\[ n(t) \]

\[ \text{De-Convolution} \rightarrow a(t) \]

\[ m(t) \]
\[ n(t) \]
Automation + Analytics = Create A New Generation of Engineers
Collaboration?

• We combine “inside the box” concepts with “out of the box” thinking to solve all kinds of industrial problems.

• How the technology collaboration will help?

  • We have used some technologies in the past which were actually used in the other sectors.
  
  • We should never forget the **First Principles of Physics**.

  • Understand the basis of each principle and apply accordingly.

• We work on everything!
How to Collaborate?

Send us an email with a brief description about your project/research interests. We will get back with you as soon as we can and fix a meeting.

Dr. Robello Samuel
Executive Director and Chief Advisor, WERCIA
Chief Technical Advisor & Technology Fellow, Halliburton
grsamuel@uh.edu

Vikrant Lakhanpal
Assistant Director, WERCIA
Production Engineer, Proline Energy Resources Inc.
vlakhanpal@uh.edu