Developing the Next Generation of Completion Engineers

Mark Van Domelen
Downhole Chemical Solutions
Primary funding is provided by

The SPE Foundation through member donations and a contribution from Offshore Europe

The Society is grateful to those companies that allow their professionals to serve as lecturers

Additional support provided by AIME

Society of Petroleum Engineers
Distinguished Lecturer Program
www.spe.org/dl
SPE Distinguished Lecturer Program

I. Founded in 1961 (with 3 lecturers)

II. Committee has 40 members from around the world

III. Rigorous selection process (200 nominations, 100 applications, 50 Potential lecturers, 32 selected as DLs for 2018)

IV. DLs travel to various SPE sections around the world
Agenda

I. Defining the Need for Talent Development

II. Training Options

➢ Internally Focused Development Programs
➢ External Resources

III. How Can You Help?
Defining the Need

Overcoming Workforce Gaps

"15 year oil glut"
600,000 layoffs
Very little hiring

2014 Price Collapse
350,000 layoffs

*Source: Macrotrends Historical Data
Defining the Need

A Growing Demand for Petroleum Engineers

**Petroleum Engineers**
Percent change in employment, projected 2016-26

- Petroleum engineers: 15%
- Engineers: 8%
- Total, all occupations: 7%

*Note: All Occupations includes all occupations in the U.S. Economy.*

*Source: U.S. Bureau of Labor Statistics, Employment Projections program*

**Expanding investments in oil and gas exploration**

Global oil and gas capital expenditures

US$ millions

Source: Rystad Energy; Strategy& research
Since 2015, average well production has risen 42% and EUR has risen by 22%
Defining the Need

Global Expansion of Unconventionals

Defining the Need

The Importance of Multidisciplinary Knowledge

Example of Workflow Process for Unconventional Reservoirs

Training Options

Internally Focused Engineering Training
"College of Completions Engineering" – A Case Study

Guiding Principles

• Advanced level training – minimum 2 years with company
• 10 total courses, one course per quarter
• Multidisciplinary curriculum
• Use in-house subject matter experts when possible

Curriculum – In-House Training Program

Topics

- Depositional environments
- Petroleum systems
- Source rock maturation
- Geomechanics
- Log analysis
- Formation evaluation
- Geophysical measurements
- Earth modeling
- Data mining

*Source: SPE 173599 – Van Domelen, et al 2015*
Curriculum – In-House Training Program

Topics

• Horizontal well completions
• Artificial lift
• Perforating strategies
• Fracture modeling
• Diagnostic methods
• Collaborative projects
• Reservoir simulation

Curriculum – In-House Training Program

Topics

• Well performance evaluation
• Refracturing techniques
• Field assessment and well planning
• Optimization strategies
• Final project

Observations from the Training Program

• Program received well by students and management
• Demand was very high
• Low attrition rates
• Many career advancements
• Opportunities for mentoring
Industry Training Resources
Industry Resources – Society of Petroleum Engineers

“The SPE’s mission is to provide opportunities for professionals to enhance their technical and professional competence.”

Available Resources

- Competency Management Tool
- Classroom Training Courses
- Conferences and Workshops
- Knowledge Databases (OnePetro, PetroWiki, etc)
- Online Webinars and Training Modules

*go to SPE Online Education*
SPE - Classroom Training Courses

### Complete Course and Seminar Catalog

<table>
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<tr>
<th>COURSE</th>
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<td>A Systematic Approach to Water Management in Unconventional Reservoirs While Doing Surface Field Development Planning</td>
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<td>Lorenzo Hernandez P. Eng.</td>
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<td>Addressing New Opportunities in Mature Oil and Gas Fields</td>
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<td>Advanced Coiled Tubing Engineering and Best Practices</td>
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<td>Advances in Formation Testing</td>
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<td>Hani Elshahawi</td>
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<td>An Overview of Enhanced Heavy Oil Recovery</td>
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<td>Behrooz Fattahi</td>
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<td>An Overview of Microseismic Imaging of Hydraulic Fracturing</td>
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<td>Kenneth D. Mahrer</td>
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*Source: Screen capture from http://www.spe.org/training/courses.php*
SPE – Conferences and Workshops

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<td>13 - 14 Sep 2017</td>
<td>SPE Liquids-Rich Basins Conference - North America</td>
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<td>SPE Annual Technical Conference and Exhibition</td>
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<td>SPE Kuwait Oil &amp; Gas Show and Conference</td>
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*Source: Screen capture from http://www.spe.org/events/calendar/*
SPE – Online Education

My Dashboard

Search by using key words (separated by commas) that may be included in the title or description. Do not type the full title of the event as this will overpopulate your results.

- All Categories
- All Types
- All Content Types
- Keywords

Show Hidden Products

On-Demand Products

- How to Present like an Award Winning Actor
- Reservoir and Completion Considerations for the Refracturing of Horizontal Wells (Based on SPE-184837-MS)

*Source: Screen capture from https://webevents.spe.org/
# Self-Paced Training Program using SPE Resources

<table>
<thead>
<tr>
<th>Topic</th>
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**Condensed Program**

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<td>20</td>
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Third Party Training

PetroSkills

IHRDC

Peice

Courses - Petroleum / Reservoir Engineering

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How Can You Help?
Volunteer and Engage

- University presentations
- Local SPE chapters and functions
- Young Professional (YP) groups
- Mentoring opportunities
- SPE meetings and workshops (chairing sessions, program committee, etc)
Expand your Knowledge

- Use all the resources
- Broaden your skill set
- Seek out mentors
- Publish and present
- Consider a Professional Engineering (PE) License
Summary

- Our industry faces several challenges regarding the development of our young engineers

- Both internal and external training options can be used for engineering development

- Companies that focus on advanced training will be rewarded with a more competent and inspired workforce
Thank you!

Your Feedback is Important

Enter your section in the DL Evaluation Contest by completing the evaluation form for this presentation.
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