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Rocks and docs

Two of Houston's major industries—medicine and oil and gas—surprisingly have discovered many similarities in the technologies they use and the challenges they face. This discovery prompted a meeting to examine the parallels and determine if there are crossover technologies that could benefit each.

On Nov. 12, in a session called "Pumps & Pipes 1," a group of petroleum, medical, and imaging experts met at the University of Houston's (UH) Texas Learning and Computation Center to explore their similarities in the hope of sparking solutions to problems inherent to both industries.

Alan B. Lumsden, professor of surgery at the Methodist Hospital's DeBakey Heart Center, organized the session along with William E. Kline, manager of the drilling and subsurface technology division of ExxonMobil Upstream Research Co., and Ioannis Kakadiaris, the University of Houston's Eckhard Pfeiffer professor.

The invitation-only audience included researchers from medical device manufacturers; computer scientists; imaging specialists; physicists and engineers from academia; geologists, physicists, and researchers from the oil and gas industry; and surgeons, vascular biologists, researchers, and clinicians interested in cardiovascular disease. The room was packed.

Anatomy and geology

In an introduction they dubbed, "Docs and Rocks," Lumsden explained the anatomy and physiology of the human cardiovascular system, while Kline followed with an overview of the geology and physics of conventional hydrocarbon production.

Meeting presenters examined three common areas: fluid dynamics (hydraulics, conduits, and pumps); accessing targets (navigation, metallurgy, and robotics), and imaging and remote monitoring.

Like participants in a tennis match, medical topic experts were paired with petroleum engineers and other experts to discuss like issues. One pair discussed the use of corrosion inhibitors in pipelines compared with drugs to dissolve plaque in blood vessels.

A discussion of left ventricular assist devices (heart pumps) was followed by an explanation of subsurface well pump effectiveness. Atherosclerosis was compared with corrosion and scale management; mechanical repair of blood vessels compared with through-tubing workovers; and navigating through the body to view anomalies was compared with geosteering a drillbit for a horizontal well.

Such medical imaging as computed tomography (CT) scans, ultrasound, and three-dimensional pattern scans were compared to and contrasted with oil and gas seismic and other imaging and computing proficiencies. Kakadiaris explained medical imaging and computing that UH is working on with its biomedical cluster competencies.

At the meeting, questions followed each presentation as meeting participants focused on learning as much as possible about the two industries' methodologies and problems.

Ideas and solutions

The idea for this gathering came from discussions Lumsden had with oil professionals while traveling and with hospital board members from the oil industry. He and the oil workers soon recognized similarities in terminology and concepts. Lumsden visited the Ocean Star rig and museum in Galveston, Tex., and the Wiess Energy Hall in Houston and again was struck by similarities between the industries.

About 18 months ago Lumsden and Kline began planning the meeting to discuss topics with potential crossover benefits. They hope that learning of technologies used by each industry will stimulate ideas for resolving problems common to both. Perhaps some technologies in one industry can be modified for use, on a very different scale, by the other with ideas emerging from this and other such gatherings.

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