

Methodist International

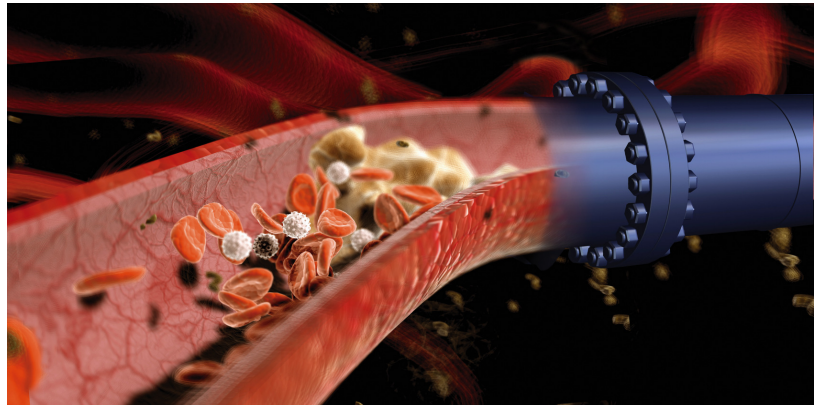
Pumps and Pipes Project Unites Medical and Oil Industries in Unique Collaborations to Advance the Fields

Remarkable similarities exist between the oil and gas industry and the treatment of cardiovascular disease. Both deal in pumps and pipes and the movement of liquid through hollow tubes. Key components include imaging, navigation and steady consistent flow – be it blood or oil.

Now a project developed in Houston, the energy capital of the world and home to the internationally known Texas Medical Center, has created a problem solving network that combines the brightest minds in the two industries and provides a forum for brainstorming and creativity.

Led by The Methodist Hospital, the first Pumps and Pipes symposium two years ago included 130 participants representing a host of specialties. Included were medical device engineers, cardiovascular physician-scientists from throughout the Texas Medical Center, geologists, metallurgists, bioengineers, computer scientists and physicists from Rice University, the University of Houston and Texas A&M University.

Projects sprouted after the more recent second symposium, spurring formation of a Rice University MBA (Master's Degree in Business Administration) project to develop a business that leverages concepts proposed via Pumps and Pipes. Students are interviewing Pumps and Pipes participants to harvest the best concepts and survey areas of interest and future formats.



A book entitled *Pumps and Pipes* is in the works to spread information gleaned in the forums and to promote the concept of sharing technology and ideas among diverse fields. The Methodist Cardiovascular Robotics Institute is another Pumps and Pipes spin-off, and the next symposium – scheduled for 2010 – includes robotics as one of the main topics for discussion. The second main topic will be imaging, both in a well bore and inside a blood vessel.

The idea for integrating medical and petroleum know-how is not new. Nearly 40 years ago, the seemingly disparate problems of pipeline sludge and pulmonary embolus triggered a collaboration that led to development of an umbrella-like filter to prevent blood clots passing from the legs to the lungs.

Dr. Lazar Greenfield teamed up with entrepreneur-inventor Garman Kimmell of the oil industry to design a prototype tested first on animals then used on patients in the early 1970s. Its modern descendant, the Greenfield filter, is a stainless steel medical apparatus that traps emboli but allows blood flow. Marketed today by Boston Scientific, the filter has been implanted in more than 200,000 patients, but the original idea sprang from a conical filter used in the oilfield to trap sludge in the center of a pipe while still allowing flow around it on the sides.

Integrating today's medical and petroleum knowledge goes much further than filter implants. At the first Pumps and Pipes meeting, Methodist's Dr. Alan Lumsden demonstrated The Sensei Robotic Catheter Control System by Hansen Medical. The technology removes the proximity of the radiation source and puts the clinician at a workstation where he or she controls the robotic arm that moves a special magnet-tipped wire through blood vessels. By altering the direction and strength of the magnets, the wire tip can navigate through tortuous vessels and tight stenosis while minimizing vessel wall contact.

In the near future, physicians will be able to integrate something like a computed tomography angiogram with an on-table angiography. A computer will calculate exact coordinates and command the robot arm to move the wires through the vessels without damaging vessel walls, resulting in less radiation and fewer complications.

From the oil side, Schlumberger's Geoff Downton demonstrated Geo-steering, or using imaging to guide drill bits through miles of earth and bedrock. While it is possible to calculate drilling pathways in advance, the earth's interior is complex and often requires the ability to adjust and change strategy, much like the robotic catheter must adjust to blood vessel maneuvering.

How these two industries adapt to using advanced imaging capabilities is a study in how cross-fertilization and brainstorming might be used to ultimately improve patient outcomes and energy exploration.

Obviously, the scale of operation between the two industries makes direct transference challenging. Surgeons accessing a target lesion may have to navigate through several centimeters of tortuous vasculature to reach a vessel less than a centimeter in diameter.

On the other hand, petrophysicists measure distances in meters, kilometers or miles and must navigate pipeline through varying densities of soil and bedrock. The worlds are different, but the potential for crossover ideas can benefit both. Tapping into the talent of different industries can trigger profitable associations, creative solutions and better choices for patients around the world.

Methodist International and members of The Methodist Hospital Pumps and Pipes project will be at the Bilateral US-Arab Chamber of Commerce 13th Annual Welcome Reception to discuss partnership opportunities.