



# IEEE

## Ottawa Section



**Seminar by IEEE Ottawa IMS, PES and RS Chapters, Ottawa Educational Activities, and Algonquin College IEEE Student Branch**

*The IEEE Ottawa Section is inviting all interested IEEE members and nonmembers to a seminar on*

### ***Why Instrumentation & Measurement is Critical in Underground Construction and What Challenges it Faces***

*By*

*Dr. Mike Gard, Charles Machine Works, Perry, Oklahoma*

**DATE:** Thursday, September 15, 2011.

**TIME:** Refreshments, Registration and Networking: 18:30; Seminar: 19:00 – 20:30

**PLACE:** [Algonquin College, B-Building](#), Room B156, 1385 Woodroffe Ave., Ottawa.

**PARKING:** No fee after 5 p.m. at the Parking Lots 8 & 9. Please respect restricted areas.

#### Abstract

Horizontal Directional Drilling (HDD) is a construction technique used to emplace utilities without trenching or digging. Although borehole creation is a mechanical process, surprisingly complex electronics and software are needed to locate, detect and avoid existing utilities; plan the borepath; determine depth; steer the drillstring; and control the machine. The primary tools for routine field operations rely on magnetic field measurements and are significantly constrained by power limitations, physical demands of the construction environment, and a difficult, highly variable, and unpredictable medium (soil, sand, gravel, and rock). This presentation introduces the basic physics, technology, and techniques employed in obstacle location and borepath tracking; reviews recent experimental research involving data telemetry and unconventional applications of the industry's magnetic field technology; reviews the current state of ground penetrating radar (GPR) in HDD applications; and touches on some difficult and unanswered problems still awaiting solutions.

#### Michael (Mike) Gard's Bio



Dr. Gard received the BSEE from Kansas State University in 1971, MSEE in Biomedical Engineering from Washington University in St. Louis, MO in 1972, and Ph.D. EE (Geophysics minor) from Southern Methodist University in 1992. He is a patent agent; inventor or co-inventor of thirty-two patents; and author in the technical literature. He occasionally teaches as adjunct faculty in the Department of Electrical and Computer Engineering, Oklahoma State University, Stillwater, OK.

Dr. Gard is presently employed by the Charles Machine Works, Perry, OK. Previous employers include Beech Aircraft Corporation, the Veterans Administration Medical Center (St. Louis, MO), AMOCO Exploration Company, ARCO Oil and Gas, and GE Medical Systems. His primary technical interests are real-time data acquisition and precision analog and analog/digital system design for low power and hostile environments.

Dr. Gard is a registered professional engineer in the state of Oklahoma. He is Senior Member of the IEEE and a member of the I&M Society's AdCom and Board of Directors, the AdCom's Education Committee, and is the I2MTC Tutorials Chair.

**Admission:** Free. Registration required.

Please register by e-mail contacting: [branslav@ieee.org](mailto:branslav@ieee.org) or [almuhtadi@ieee.org](mailto:almuhtadi@ieee.org)