The First Annual Meeting and Conference of the American Society of Nepalese Engineers (ASNEngr)

(http://www.ASNEngr.org)

with the
Association of Nepalese in Americas (ANA) Annual Convention 2008
(http://www.ana-convention.org)

Date: Friday, July 04 & Saturday, July 05, 2008

Venue: Baltimore Marriott Hunt Valley Inn
245 Shawan Road, Hunt Valley
Maryland 21031 USA

Technical Program Schedule

Friday, July 4th, 2008 **5:30 PM – 7:00 PM** **Room: Salon C & D**

5:30 PM – 5:40 PM: ***Opening Remark***

5:40 PM – 6:00 PM:
*"**Petroleum Exploration in Nepal**" by **Rajendra K. Shrestha, Ph.D.***; ConocoPhillips Company, Houston, TX

6:00 PM – 6:20 PM:
*"**Reliability of the Metal/High-k Gate Stack: Identifying the "Weak Link" in the Multilayer Dielectric**" by **Pradeep Khanal***, University of Texas, Austin, TX.

6:20 PM – 6:40 PM:
"Software Development and Outsourcing in Nepal - A case study" by **Himal Karmacharya**, **D2Hawkeye, Inc.,** Waltham, MA.

6:40 PM – 7:00 PM:
***"Engineering and Construction on the Moon – A New Frontier of Exciting Challenges for Engineers to Conquer"** by **Ramesh B. Malla, Ph.D.**;* Department of Civil & Environmental Engineering, University of Connecticut, Storrs, CT.

Petroleum Exploration in Nepal[+]

Rajendra K. Shrestha, Ph.D., Geophysicist
Houston, TX

Discovery of commercial quantities of hydrocarbons (petroleum) has the ability to transform a nation from an impoverished state to one of prosperity, wealth, and political power by tremendously contributing to its economy in an instant. The petroleum exploration process is very time-consuming and requires a great deal of highly advanced technological work, supported by heavy financial investment. Cairn Energy - which is aggressively pursuing petroleum exploration, development, and production activities in India and Bangladesh - has acquired concessions from Government of Nepal with a 100 percent operating interest. The concession includes five blocks (Block 1, 2, 4, 6 and 7) in the Terai and foot hill regions of western and central Nepal. Cairn Energy has already completed the study of satellite geology of the area and is planning to conduct airborne gravity and magnetic survey and acquire seismic survey in 2008 and 2009. Petroleum exploration in Nepal was launched in 1979 under Petroleum Exploration Promotion Project of Department of Mines and Geology by initiating the Airborne Magnetic Survey of 2,400 line kilometers over the Siwalik and Terai area, made possible by the World Bank financial assistance. The goal was to perform preliminary assessment of the oil and natural gas potential in the country. The successful completion of this survey led to an additional financial support for acquiring over 5,000 kilometers of seismic data on a regional scale, between 1982 and 1992. Nepal is considered a frontier province, or a lightly-explored area, for petroleum exploration. Thus far, the country has seen only one exploration well (Shell Biratnagar #1) drilled in Radhanagar, close to Biratnagar, in 1989 by Royal Dutch Shell and Triton Energy, which turned out to be a dry hole. The Nepali diaspora / Non-Resident Nepalis (NRNs) can play a significant role in petroleum exploration in Nepal by

1) Providing financial investments in collaboration with international oil/gas firms,
2) Providing consulting services;
3) Sharing their hands-on experience; and
4) Training the national engineers and geoscientists in the State–of-the-Art technologies in various aspects of petroleum exploration, development and production.

[+]Submitted for presentation at the 1st Annual Meeting and Conference of the American Society of Nepalese Engineers, Hunt Valley/Baltimore, MD, U.S.A.; July 04-05, 2008

(Abstract submitted for presentation at the 1st Annual Meeting and Conference of the American Society of Nepalese Engineers (ASNEngr), Hunt Valley/Baltimore, MD, U.S.A.; July 04-05, 2008)

Software Development and Outsourcing in Nepal

Himal Karmacharya
Vice President of Engineering, D2Hawkeye Inc., Waltham, MA

Software Development is an emerging business sector in Nepal. Because software development is suitable for remote collaboration and development, it offers real opportunity for our country. We are making real strides in this area. Already there are more than 100 software companies in Nepal that have more than 10 employees. There are about 30-35 colleges and universities which offer a degree in computer science. They churn out an average of 40 graduates every year. There are many challenges in outsourcing. Some include: perception of the political climate in Nepal, ability to recruit qualified people, infrastructure, project management, and resource fatigue due to different time zones. Our experience in software outsourcing has taught us the importance of implementing software development process. It helps set realistic expectation on the part of our development team as well as our customers and helps establish reliable and repeatable system for success.

Opportunities for Nepalese diaspora include entrepreneurship due to the obvious cost competitiveness. Recently there are also opportunities for employment as there are some multinational companies that are setting shop in Nepal. With these come sophisticated projects as well as attractive compensation and benefits. There are many opportunities available for students and researchers to collaborate with their peers in Nepal. Other areas for involvement include mentorship of university projects and young engineers who are just entering the job market. One could also participate in and encourage adoption of open source initiatives such as Nepali Linux and D2Labs.

(Submitted for presentation at the 1st Annual Meeting and Conference of the American Society of Nepalese Engineers (ASNEngr), Hunt Valley/Baltimore, MD, U.S.A.; July 04-05, 2008)

Reliability of the metal/high-k gate stack: Identifying the "weak link" in the multilayer dielectric

Pradeep Khanal
University of Texas, Austin, TX

In order to alleviate the reliability concerns raised by shrinking transistors in size to the order of few nanometers, higher dielectric (k) materials like Hafnium Oxide, HfO_2 has been used to replace traditional silicon dioxide, SiO_2. My research further explores the reliability of the multilayer gate stack in these noble devices with high-k materials.

OR

Metal-oxide-semiconductor field-effect-transistor (MOSFET) has been the backbone of integrated circuits (IC) for decades now. Some IC chips, especially computer microprocessors these days comprise of billions of MOSFET devices. In order to enhance circuit performance, reduce power consumption and costs, MOSFETs have been shrinking in size to the order of few nanometers (a human hair's diameter measures about 100,000 nanometers). This unprecedented shrinking in size has led to some reliability concerns, like increased leakage currents.

To cope up with these concerns, there has been works to replace silicon dioxide, the gate oxide material since its inception with higher dielectric, k, materials thereby increasing gate capacitance without any significant leakage effects. Hafnium oxide, HfO_2 has been the high-k material of choice because of its electrical characteristics. As we move on to these new materials, we need to take a look at new reliability issues. My research project looks into the reliability of the devices with these high-k materials by identifying the "weak" link in the stack.

Engineering and Construction on the Moon - A New Frontier of Exciting Challenges for Engineers to Conquer[+]

Ramesh B. Malla*, Ph.D.
University of Connecticut, Storrs, CT 06269

The National Aeronautics and Space Administration (NASA) of the United States of America had gathered valuable information on the moon from the human Apollo program in the 1960's and1970's (first Apollo landing on the Moon, July 20, 1969; last Apollo landing on the Moon December 19, 1972). During the Apollo program and a decade or so following the last Apollo flight, there were increased research and development activities on various scientific and engineering aspects related to the Moon. However, the excitement had waned considerably since mid 1990's until President George Bush's announcement in January 2004 the United States' commitment to return to the moon by 2020 for permanent human presence and settlement and go to Mars after 2030. This has once again invigorated the interest for substantial exploration and development of lunar and Martian bases. The scientific, engineering, and commercial sectors with interest in space exploration worldwide have begun to increase activities to explore and develop the Moon for human habitation.

This presentation gives an in-depth overview of many challenges that engineers have to face in designing and constructing lunar habitats/structures for human habitation and other engineering activities on the Moon as the Moon has extreme and harsh environment. First, the harsh lunar environment is described. The lunar environment includes complete lack of atmosphere (hard vacuum), absence of moisture, micrometeorite bombardments, reduced gravity, moonquakes, severe temperature extremes, and drastic solar radiation exposure. There are several benefits from the human exploration of the Moon, including: Natural Resources – minerals; Energy (solar) and He3; Stepping stone to other planetary and space voyages; Medical research; Scientific and engineering innovation; Astronomy – better understand our universe; and Long term benefit – Save Earth Resources and human race. For a long term human settlement on the moon, there are many facilities that need to be in place on the Moon, such as Pressurized Habitats, Power, Launch/Landing Facilities, Roads, Radiation Protection, Food Growing Facilities, and Mining/Manufacturing Facilities

Finally, the design and analysis of a possible human habitat made of a composite structural assembly consisting of pressurized three-dimensional frame and membrane is presented. Some of the structural and functional requirements of a lunar habitat include: (1) containing internal pressure without leakage; (2) supporting shielding mass and support systems; (3) limiting/withstanding local damage and loss of internal pressure; (4) being inspectable and repairable; (5) allowing heat dissipation; (6) being durable in harsh lunar environment; (7) using in situ material for construction (thus reducing the payload to be carried from the earth); (8) being easily deployed/assembled/constructed; (9) being feasible to be built entirely under or over the ground, as well as partly under and partly over the ground. Furthermore, the structure system should be designed such that its construction can expanded easily to accommodate increase needs in the future.

The lunar structure should provide protection from Cosmic/Solar radiation, meteoroid impact and temperature extremes. It has been suggested that this shielding can be provided by a layer of regolith (lunar soil) placed atop the base roof. The advantages of using regolith are numerous. Vacuum is a superb insulator, and the presence of hard vacuum between grains of lunar regolith (soil) makes the layer a very poor thermal conductor. This insulates the base from the extreme temperature changes that occur during the diurnal cycle.

[+]Submitted for presentation at the 1st Annual Meeting and Conference of the American Society of Nepalese Engineers (ASNEngr), Hunt Valley/Baltimore, MD, U.S.A.; July 04-05, 2008
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