2009 NINE ACTIVITIES

THE NATIONAL INSTITUTE FOR NANO-ENGINEERING

June 1st – July 25th, 2009

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WILLIS WHITFIELD: THE CLEAN ROOM

FEATURED CASE STUDY

The idea seemed so simple to Willis Whitfield that he didn't think it was an invention. He couldn't believe someone hadn't thought of it. To keep a room very clean, let air be the janitor — a "janitor" sweeping the premises every six seconds.

The modern electronic age as we know it began in the early 1960s when Willis, a Sandia engineer, envisioned using fans not only to send outside air through filters into a room but also to remove the air in equal measure through exhaust pipes in the far wall.

THEN AND NOW — During a tour of the Microelectronics Development Laboratory to see how Sandia has put his clean room invention at the very heart of its most important work.

The air had to move slowly enough to be imperceptible, but fast enough to avoid aimless whirling. Later he varied the design of the "clean room" to insert air from the ceiling and exhaust it through the floor. This meant that with an assist from gravity, particulates dropping from a device being cut or sanded or soldered would more readily "go with the flow" to be immediately cleansed from the room.

The omnipresence of the technique today in hospital surgery units, electronics fabrication plants, and laboratories makes it easy to take the invention for granted. At that time, things were different. "I was amazed at the high level of interest [generated], chiefly from hospitals," said Willis during a visit back to Sandia last month (see photo, *Lab News*, Jan. 21). "They were very nervous about infections, and rightfully so." So-called clean rooms of that era had no control over their own air, and depended solely on masks, gowns, and janitorial services. Major corporations like General Motors — aware that dust was an increasing problem as circuit sizes decreased — built rooms with sloping walls in misguided, expensive attempts to minimize free-floating particulates. They also paid excessive attention to keeping doorknobs clean. "They were looking at the wrong things," said Willis softly. "I said we could build a room out of drywall and latex paint. Some of these people almost passed out." The difference in cleanliness between the old way and new was immediately apparent when Willis' group checked for dust contamination in their prototype clean room. "We turned on the particle counter and it just stopped counting. We thought there was something wrong with it," he recounted to a small group of Sandia management who gave him a tour of the Microelectronics Development Laboratory on January 14. The Sandia prototype facility was 1,000 times cleaner than any room ever measured.

CENTER FOR INTEGRATED NANOTECHNOLOGIES (CINT) OVERVIEW

Featured Speaker: Dr. Neal Shinn

Monday, June 8th & Monday, July 20th
Bldg CINT, Room 1026-1028 10:15 – 10:45AM
Duration: 30 min

About the Seminar:

This activity includes a brief overview of CINT and selected nanoscience highlights. CINT is a DOE Office of Basic Energy Sciences nanoscale science research center operated as a national user facility by Los Alamos and Sandia National Laboratories. Through its Core Facility (Albuquerque, NM) and Gateway to Los Alamos Facility (Los Alamos, NM), CINT provides access to tools and expertise to establish the scientific principles that govern the design, performance, and integration of nanostructured materials into the micro- and macro worlds. Our users work with staff scientists to exploit expertise in four scientific thrusts: Nanophotonics & Optical Nanomaterials; Nanoscale Electronics, Mechanics & Systems; Soft, Biological & Composite Nanomaterials; and Theory and Simulation of Nanoscale Phenomena.

Related Links:

CINT Main Website: http://cint.lanl.gov/

About the Speaker:

Neal Shinn is the User Program Manager for the Center for Integrated Nanotechnologies (CINT), a collaborative nanoscale science research center jointly operated as a National User Facility by Los Alamos and Sandia National Laboratories for the U.S. Department of Energy. Neal received a B.S. degree in Chemistry and Mathematics from the Pennsylvania State University and a Ph.D. degree in Chemical Physics from the Massachusetts Institute of Technology. He was a National Research Council Post-Doctoral Fellow at the National Institute of Standards and Technology, where his research involved the elucidation of surface reaction intermediates using vibrational and electronic spectroscopies in conjunction with thermal and stimulated desorption. In 1985, he joined Sandia as a Senior Member of the Technical Staff, and became the Manager of the Surface and Interface Science Department prior to his current position. He has published more than 80 scientific papers, serves on DOE and academic advisory boards, and was the 2007 President of the AVS Science & Technology Society.

NATIONAL SOLAR THERMAL TEST FACILITY (NSTTF) TOUR

Featured Speaker: Nathan Siegel

Monday, June 8th & Monday, July 20th
Travel to NSTTF Area from CINT 11:15AM – 12:00PM
Duration: 1 hr

About the Seminar:

Concentrating Solar Power (CSP) technologies use mirrors to collect solar energy in the form of heat that can be used to drive power cycles or chemical processes. Unlike other solar technologies such as photovoltaics (PV), CSP offers the ability to store solar energy in the form of heat thus enabling CSP facilities to operate around the clock. This seminar will include an introduction to CSP technologies, a discussion of their potential for power and fuel production, an overview of ongoing R&D, and a tour of the National Solar Thermal Test Facility.

Related Links:

http://www.energylan.sandia.gov/sunlab/

www.nrel.gov/csp/troughnet/

http://www1.eere.energy.gov/solar/csp.html

About the Speaker:

Nathan Siegel is a mechanical engineer in the Solar Technologies Department (6337). He is currently involved in projects focusing on solar fuels production (hydrogen and hydrocarbon), high temperature heat transfer and storage fluids (molten salts), and advanced central receiver systems for high temperature power production and chemical processes. He recently pioneered the process of cooking hot dogs using a solar furnace at power levels in excess of 6500 kW/m^2 (6500 suns).

SUNSHINE-2-PETROL OVERVIEW

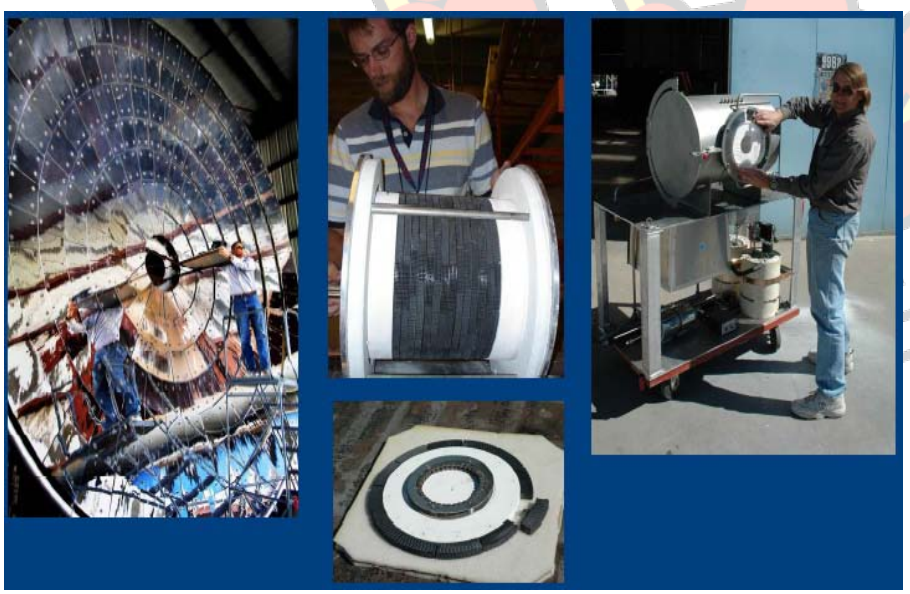
Featured Speaker: Dr. Jim Miller

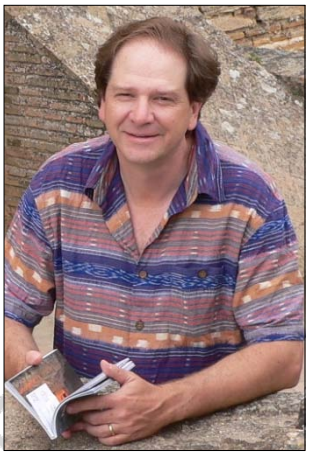
Monday, June 8th
Bldg 858EL Room L2000 1:15PM – 1:45PM
Duration: 30 min

About the Seminar:

"Sunshine to Petrol" (S2P) is a Sandia-developed approach to harness highly concentrated thermal energy from the sun to re-energize the combustion products carbon dioxide and water into synthesis gas. This mixture of carbon monoxide and hydrogen are combined to produce liquid fuel. This would decrease the current vulnerability the United States has as the world's leading importer of petroleum. The vision of S2P is to directly apply a solar energy source to effectively reverse combustion and "energize" CO_2 and H_2O into hydrocarbon form in a process analogous to, but more efficient than, the one that produces bio- and fossil fuels. It is to incorporate CO_2 into the Hydrogen Economy captures the benefits of hydrogen and preserves the Hydrocarbon Economy. The key challenges are to:

- Understand how active materials work and why.
- Develop qualitative understanding of reaction and transport processes.
- Apply this knowledge to create new materials.
- Quantitatively characterize reaction and transport processes.
- Develop and apply models of reaction and heat and mass transport at multiple scales.
- Develop an optimized thermochemical heat engine.
- Develop system framework and economic models.





About the Speaker:

Jim Miller has been involved in heterogeneous catalysis and chemical processing research at Sandia National Laboratories for over 16 years. His work currently centers on the production of synthetic fuels from carbon dioxide using solar energy (Sunshine to Petrol) and includes the development of a new high temperature thermochemical water- and carbon dioxide-splitting reactor and composite oxide materials for that reactor. Other recent activities have included the development and characterization of novel nanostructured Pt materials, catalysts for solid oxide and PEM fuel cells, catalysts for selective hydrocarbon oxidation (to olefins and syngas), catalysts for NOx storage and reduction, and materials and concepts for low-temperature hydrogen combustion, characterizing processes for lignin depolymerization. Jim holds a BS degree in Chemical Engineering from Texas A&M University and a PhD in Chemical Engineering from the University of Texas at Austin.

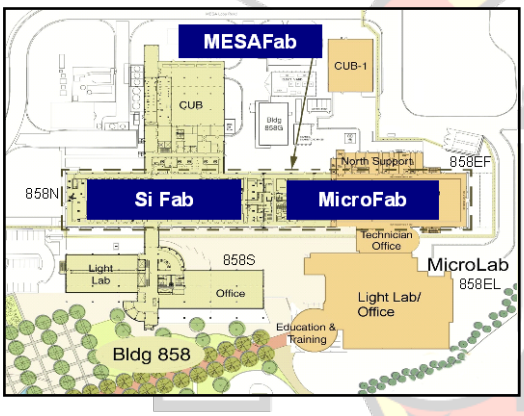
Microsystems and Engineering Sciences Application (MESA) Tour

Featured Speaker: Carol Sumpter

Monday, June 8th
Bldg 858EL Room South Lobby 1:45PM – 2:45PM
Duration: 1 hr.

About the Tour:

The MESA Complex is designed to integrate the numerous scientific disciplines necessary to produce functional, robust, integrated microsystems and represents the center of Sandia's investment in microsystems research, development, and prototyping activities. This suite of facilities encompasses approximately nearly 400,000 square feet and includes cleanroom facilities, laboratories and offices.



The MESA Fab includes the Silicon Fab and the MicroFab. The focus of the Silicon Fab is the development, application and production of radiation hardened CMOS integrated circuit technologies capable of realizing digital, analog, mixed-mode, and nonvolatile memory circuits for the nuclear stockpile. In addition, the silicon wafer fab is the world's premier R&D source of surface micromachining technology. The facility includes 12,500 square feet of class 1 clean room space. The MicroFab includes 13,700 square feet of Class 10 clean room space designed for flexibility to allow development of a range of compound semiconductor based optoelectronic, RF, and photonic microsystem technologies.

About the Speaker:

Carol W. Sumpter received the B.S. degree in electrical engineering in 1980, and the MBA degree in new product development and technical marketing in 1988, both from The University of New Mexico. She was the Class of 1988 Outstanding MBA Student and the University of New Mexico 1988 Marketing Scholar of the Year. She served as a Research Intern at Bell Telephone Laboratories in Murray Hill, NJ, in 1980 and worked for Motorola, Inc. and Fairchild Semiconductor as a Device Engineer and R&D Product Engineer. She joined Sandia National Laboratories in 1989. She served as the Sandia Liaison to the Semiconductor Industry Association from 1996 to 1997. She currently works in the Microsystems Science, Technology, and Components Center at Sandia National Laboratories and serves as a Principal Member of the Technical Staff. Her job responsibilities revolve around strategic and business planning for the Center including support for both internal and external programmatic coordination. Memberships include but are not limited to the Institute of Electrical and Electronics Engineers (IEEE) and IEEE Engineering Management.

WHAT IS IT LIKE TO BE AN ENTREPRENEUR AND A DOSE OF ACCOUNTING

Featured Speaker: Regan Stinnett

Tuesday, June 9th
Bldg CINT, Room 1026,1028 8:30AM – 9:45AM
Duration: 1.15 hrs

About the Seminar:

The field of nanotechnology provides an exciting foundation for generating potentially world-changing advances covering a spectrum of applications. Many scientists and engineers working in this area dream of seeing their most exciting technology advances successfully make the transition from laboratory demonstration to commercial product.

In order for this to happen it is important that inventors learn enough about the business world to be able to effectively communicate the value of their ideas to business people and to learn from them about the process involved in technology commercialization. This requires that scientists and engineers become familiar with basic business concepts and vocabulary as well as the most important motivators and constraints involved in the business of technology commercialization.

In the first part of this presentation we will discuss, from a technologist's point of view, some practical but fundamental concepts that are key to successful commercialization of technology advances.

To follow-up, an introduction to accounting concepts for technical people will be provided.

About the Speaker:

Dr. Regan Stinnett is Program Manager for the National Institute for Nano-Engineering (NINE) at Sandia National Laboratories. Regan did his thesis work in plasma physics, graduating from the University of Texas at Austin.

He was hired by Sandia to do research in inertial confinement fusion and pulsed power. For several years he led the Ion Source and Beam Experiments Departments. After co-inventing a new ion beam surface treatment technology, Regan left Sandia to found Quantum Manufacturing Technologies Inc., where he served as President and CEO.

Since his return to Sandia, he has worked with the MESA team on Microsystems technologies, established new partnerships between Sandia's micro/nano programs and U.S. universities, worked with Sandia's Advanced Concepts Group, co-leading its study of microsensor systems for the War on Terrorism, and served as manager for the Intrusion Detection Technologies Department. In 2007, Regan became Program Manager for NINE.

Regan has received the U.S. Department of Energy Award of Excellence for contributions to the Nuclear Weapons Program and is the holder of 5 patents.

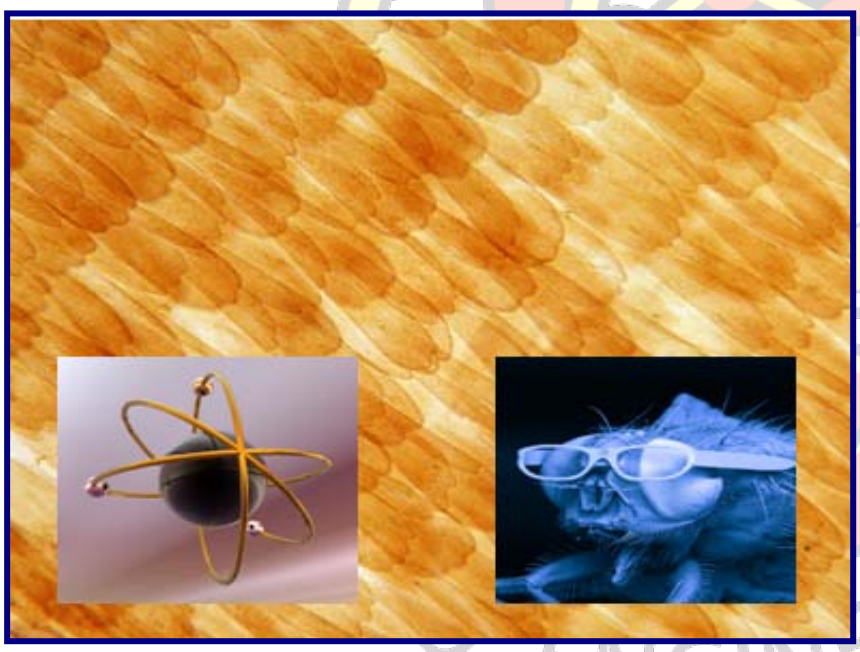
Small is Cool: The Amazing World of MEMS & Nanotechnology

Featured Speaker: Marlene Bourne

Tuesday, June 9th
Bldg CINT, Room 1026-1028 10:00AM – 11:15AM
Duration: 1.15 hr

About the Seminar:

What is nanotechnology? What are MEMS? And what's the big deal about them anyway? How about the creation of edible restaurant menus? Cloaking devices? Implantable sensors? Bionic penguins? These are just a few exciting examples of how MEMS and nanotechnology are being put to use in *real* products today – and the possibilities are endless. There's no question that when it comes to next-generation science and engineering, small is cool! From food and clothing, to medicine and robotics, we'll take a look at the current state-of-the-art in MEMS and nanotechnology, and then explore how both are playing a major role in reshaping our future.



Related Links:

www.bourneresearch.com

About the Speaker:

Marlene Bourne, President & Principal Analyst of Bourne Research LLC, is internationally recognized as one of the leading experts on MEMS (micro-electro-mechanical systems) and its convergence with nanotechnology. With nearly 15 years of expertise as an industry analyst, Marlene has provided insight on emerging technologies to many business and technical publications, including *Business 2.0, Business Week, The Economist, Forbes, Investor's Business Daily, Los Angeles Times Magazine, the New York Times, USA Today* and the *Wall Street Journal*. Marlene also produces a weekly podcast looking at recent developments in MEMS and nanotechnology, and is the author of two award-winning books: *A Consumer's Guide to MEMS & Nano-technology,* and *MEMS & Nanotechnology for Kids*.

NOW YOU'RE COOKING!

Featured Speakers: Bernadette A. Hernandez-Sanchez, Mark Rodriguez, and Ping Lu

Wednesday, June 10th & Friday, July 24th
Bldg AML, Large Conference Room 9:00AM – 4:00PM
Duration: All day event

About the Seminar:

Are you tired of not knowing how to make nanomaterials? Do you fret over what steps to take to make sure you have the right nanoproducts? Do you want to learn how to stick your nanoparticles onto micron size stuff? Well, stop your worrying and come learn how to overcome these challenges! This workshop will cover basic synthetic routes used to generate nanomaterials and how to characterize them. Participants will get hands on experience in making nanomaterials. Fundamental characterization techniques such as X-ray diffraction, UV-Vis spectroscopy, and Transmission Electron Microscopy will also be introduced and explored.

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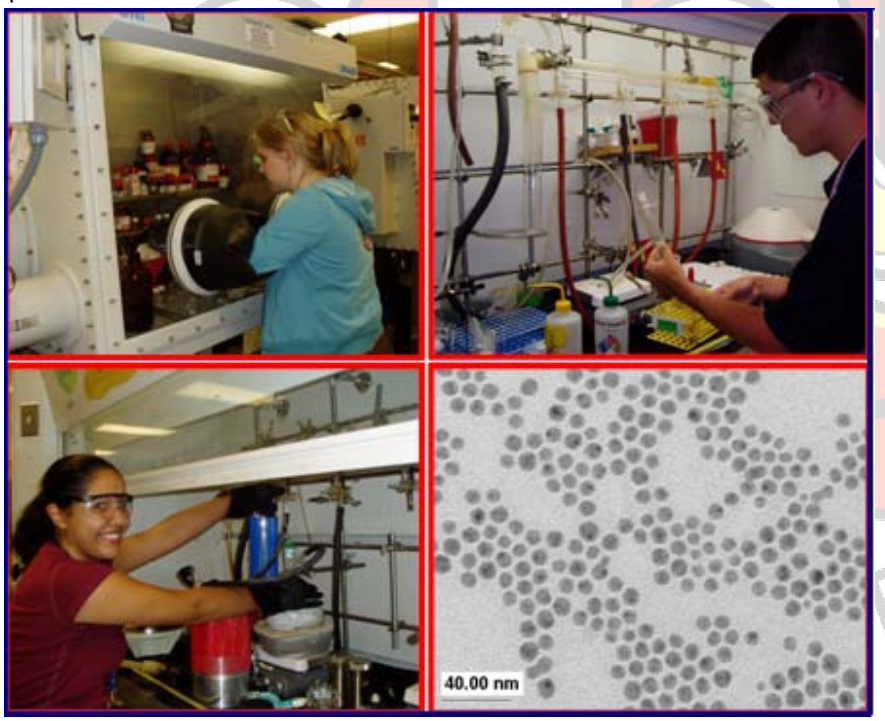


Related Links:

www.sandia.gov/materials/science/visiting/aml.html

www.sandia.gov/LabNews/070216.html

About the Speaker:

Dr. Bernadette A. Hernandez-Sanchez is an inorganic chemist at Sandia National Laboratories. Her current research is focused on understanding nanomaterial structure-property relationships and controlling the synthesis, assembly, and morphology of nanomaterials for applications ranging form in non-toxic bio-imaging agents to ferroelectric nanoparticles. In addition, Bernadette has contributed to SNL's science outreach efforts in K-12 to postdoctoral education.

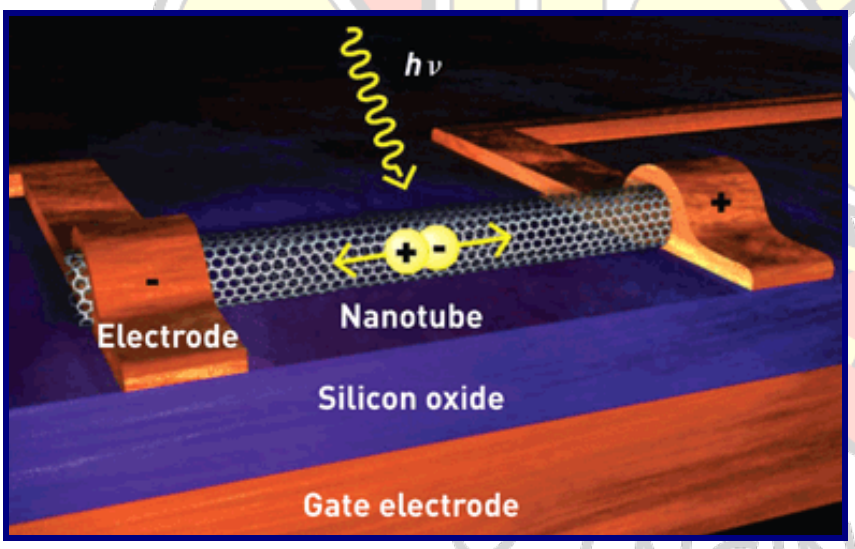
NANOFEST: NANO-BASED SOLUTIONS – PROBLEM TO PRODUCT

Featured Speakers: Lori Parrott & Tom Karas

Thursday, June 11th
Bldg 897, Room 1010,1012 8:30AM – 4:00PM
Duration: All day event

About the Seminar:

This interactive workshop, or "fest," will feature a series of structured brainstorms that explore new applications of nanotechnology to address global energy problems. Participants will be engaged in brainstorming, collaborating in small groups on new ideas, and discussing their ideas with the large group. Emphasis will be placed on understanding the idea of how to bring a problem to product. This will address not only how to formulate innovative nano-related technologies to solve current issues in today's world, but also how to develop a product that can successfully be brought to market.



About the Leader:

Lori Parrott manages the Strategic Studies group at Sandia, an organization that explores national security topics and issues on behalf of executive management. She has led laboratory strategic planning, served as the laboratories' congressional liaison, and managed scientific and technical publications and journals. She has an MS in Science Communications from Rensselaer Polytechnic Institute and a BS in Geology from Iowa State University.

About the Leader:

Tom Karas is a member of the Strategic Studies group. Earlier, he was in the Sandia Advanced Concepts Group for 8 years, during which he studied, among many other things, energy policy issues. He earned a BA in Political Science is from Yale and a Ph.D. in Political Science from Harvard.

VISIT TO SANDIA PEAK

Featured Tour: Sandia Peak

Thursday, June 11 & Wednesday, July 22nd
Meet at Hyatt Lobby 5:30PM – 8:00PM
Duration: ~2.5hrs

Hiking:

From the tram station at the top of Sandia Peak, passengers may hike along the forest trails in the Cibola National Forest observing the rock formations, natural vegetation and wildlife.

During the summer, one of the Sandia Peak Ski Area chairlifts offers a lovely ride down the east side of the mountain through the towering trees. Sandia Peak has more than 26 miles of trails for mountain bikers with easy access via the chairlift for riders and their bicycles.

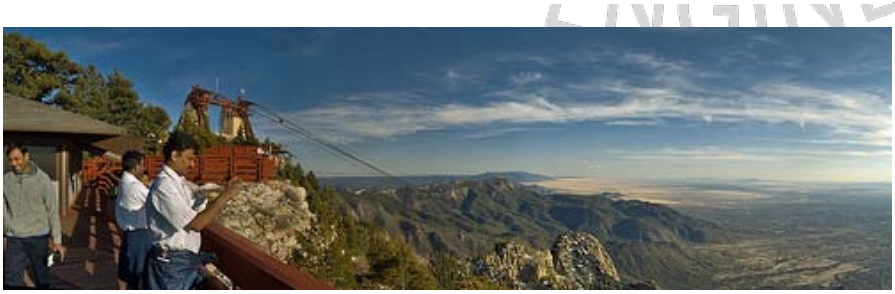
New Mexico Sky Museum:

The New Mexico Sky Museum is now open! Located at the base of the tram, visitors can drop in and learn about the history of skiing in NM – it's free!

Dining:

High Finance Restaurant and Tavern is the only restaurant located at the top of Sandia Peak. Travel 2.7 miles aboard the world's longest tramway to take in the breathtaking views of the Land Of Enchantment while enjoying top-notch cuisine such as slow roasted prime rib, steaks and seafood for dinner, or a wide variety of burgers and sandwiches for lunch.

Santiago's Mexican Grill, located at the base of the Sandia Peak Tram, offers unique coastal Mexican cuisine, along with traditional Mexican dishes complement the spectacular views of Albuquerque sunsets and shimmering city lights.



About the Tram:

The scenery steals the show on the Sandia Peak Tramway! The Tram, as it is affectionately known, has taken more than 9 million passengers to the top of Sandia Peak and back again, and celebrated its 43rd anniversary this May. Located on the eastern edge of Albuquerque, New Mexico's largest city, the Tram is one of the most popular tourist attractions in Central New Mexico.

A trip on the world's longest aerial tramway transports you above deep canyons and breathtaking terrain a distance of 2.7 miles. See some of nature's more dramatic beauty unfold before you. At sunset the desert skies produce a spectacular array of color, and your vantage point from the observation deck atop 10,378 foot Sandia Peak in the Cibola National Forest affords an 11,000 square-mile panoramic view of the Rio Grande Valley and the Land of Enchantment.

Related Links:

www.sandiapeak.com

UNDERSTANDING INTELLECTUAL PROPERTY

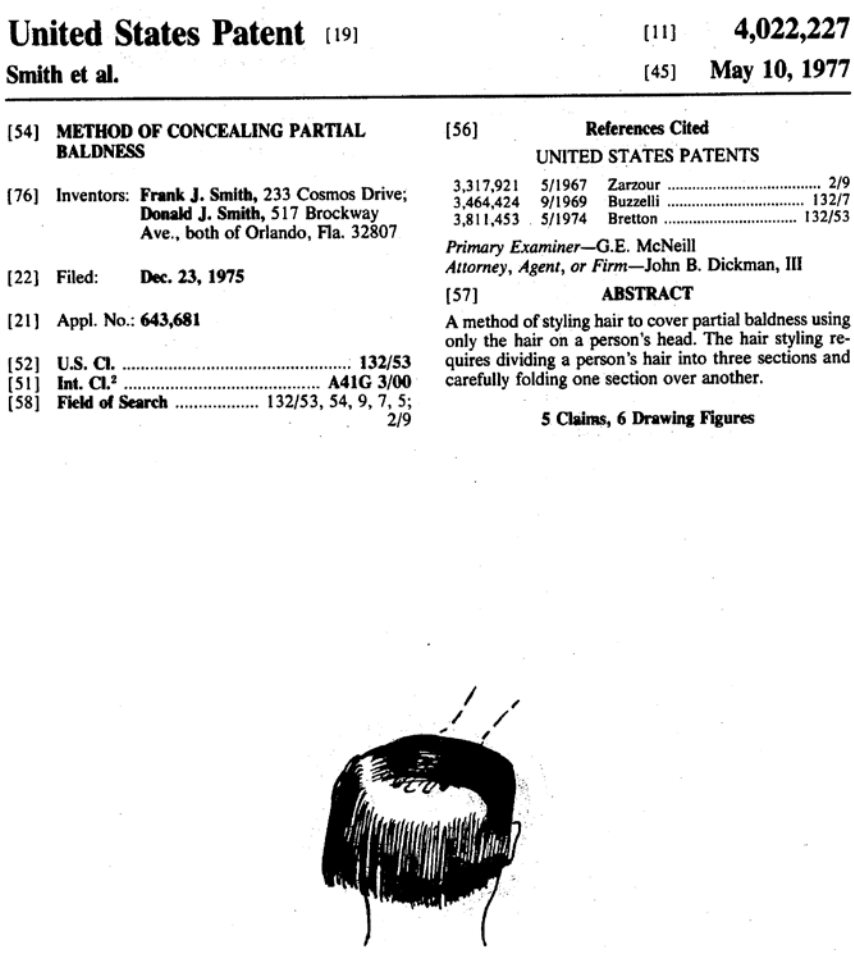
Featured Speaker: Paul M. Smith

Friday, June 12th
Bldg CINT, Room 1026-1028 9:00AM – 9:30AM
Duration: 30 min

About the Seminar:

Attendees will learn what Intellectual Property (IP) is and how to recognize it, how IP is created and protected, and how IP can be used. Patents and copyrights will be emphasized in the presentation. An overview will be presented on the requirements for patentability and the lifecycle of a patent. The nature of IP rights and ways to extract value from IP will be discussed. Examples will be provided throughout.

Discussion and questions about IP are encouraged.



United States Patent [19]
Smith et al.

[11] **4,022,227**
[45] **May 10, 1977**

[54] **METHOD OF CONCEALING PARTIAL BALDNESS**

[76] Inventors: **Frank J. Smith,** 233 Cosmos Drive; **Donald J. Smith,** 517 Brockway Ave., both of Orlando, Fla. 32807

[22] Filed: **Dec. 23, 1975**

[21] Appl. No.: **643,681**

[52] **U.S. Cl.** **132/53**
[51] **Int. Cl.**[2] **A41G 3/00**
[58] **Field of Search** 132/53, 54, 9, 7, 5; 2/9

[56] **References Cited**

UNITED STATES PATENTS

3,317,921	5/1967	Zarzour	2/9
3,464,424	9/1969	Buzzelli	132/7
3,811,453	5/1974	Bretton	132/53

Primary Examiner—G.E. McNeill
Attorney, Agent, or Firm—John B. Dickman, III

[57] **ABSTRACT**

A method of styling hair to cover partial baldness using only the hair on a person's head. The hair styling requires dividing a person's hair into three sections and carefully folding one section over another.

5 Claims, 6 Drawing Figures

About the Speaker:

Dr. Smith works in Sandia's Technology Transfer (TT) organization, and is responsible for the management of intellectual property and the negotiation of license agreements for selected Sandia organizations. He helped establish NINE and negotiated and helped develop a novel license agreement that was signed by eight New Mexico research institutions that supports the licensing of technologies developed across multiple organizations. Prior to joining TT in 2000, he was a principal investigator at Sandia and performed research on semiconductor processing and other technologies that affect semiconductor device performance.

Dr. Smith earned a Ph.D. in Materials Science and Engineering from Cornell University in 1991, an EMBA from the University of New Mexico in 2005, and a BS in Electrical Engineering from the University of Wisconsin at Madison in 1984. He became a Registered Patent Agent in 2002. He has authored or co-authored over 25 technical publications and is an inventor on 4 patents.

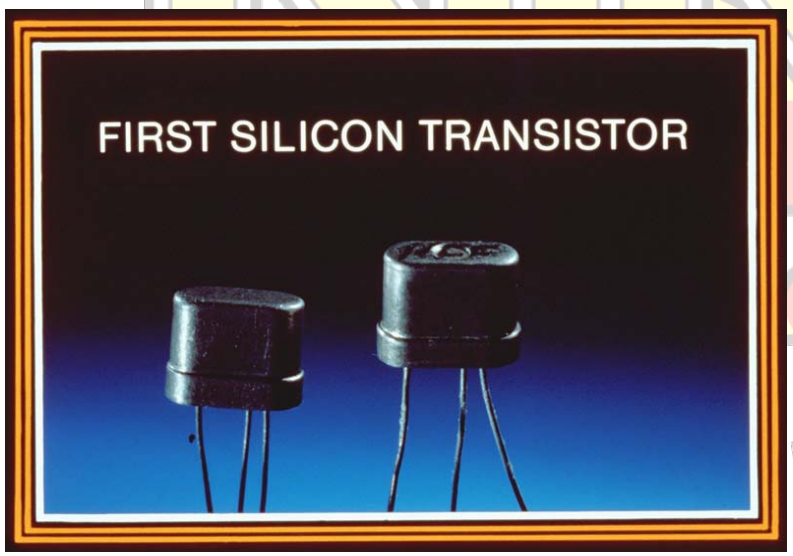
History & Future of Microelectronics

Featured Speaker: Dr. Ted. Dellin

Monday, June 15th - Tuesday, June 16th
Bldg CINT, Room 1026-1028 8:30 – 12:30PM
Duration: 4 hrs per day

About the Seminar:

The course starts with the basic properties of semiconductors, how they can be engineered and the basic building block of all devices - the pn junction. The course then considers the MOS transistor and CMOS IC. Next we go on to consider the fundamental semiconductor processing techniques, CMOS processing and packaging. The seminar then shifts to optoelectronics, considering how semiconductors absorb and emit light and the major optoelectronic devices such as photodetector, solar cell, LED and laser diode. Continuing, we consider how silicon IC processing can be used to make bulk and surface micromachined devices. The course concludes with considering how to integrate two or more of these technologies into a microsystem, using examples such as the Analog Devices accelerometer and TI Digital Mirror Device. Includes the **21st Century Semiconductor Technology Handbook.**



Related Links:

http://www.quickstartmicro.com/microelectronics,optoelectronics,microesystems.htm

About the Speaker:

In his semi-retirement Dr. Ted Dellin works part-time on training and the future of ICs. Through his company, Quick Start Micro Training LLC, he develops better methods to help working adults acquire an intuitive understanding of semiconductor devices, technology and reliability. He also continues to lead the development of the reliability section of the International Technology Roadmap for Semiconductors. In 2004 Dr. Dellin retired as the Chief Scientist of the Microsystems Center at Sandia National Labs. He is a past chair of the NV Memory Workshop, a recipient of the FLC award for technology transfer and has given 5 tutorials at IRPS. He has a Ph.D. in Physics from the City University of New York.

ANTICIPATORY GOVERNANCE OF EMERGING NANOTECHNOLOGIES

Featured Speaker: David Guston

Friday, June 12th
Bldg CINT, Room 1026-1028 12:15PM – 1:30PM
Duration: 1.15 hrs

About the Seminar:

The Center for Nanotechnology in Society at Arizona State University (CNS-ASU) is a Nano-scale Science and Engineering Center (NSEC) funded by the National Science Foundation to perform research, training and outreach on the societal aspects of emerging nanotechnologies. At the programmatic level, CNS-ASU pursues a suite of activities known collectively as "real-time technology assessment" (RTTA; Guston and Sarewitz 2002), which aims at building the capacity to address the societal aspects of emerging technologies "upstream," that is, before they have reified into more concrete products and networks of interests. At the strategic level, CNS-ASU pursues the development of "anticipatory governance" (Barben et al. 2008; Guston 2008), which aims at strengthening the capacities across society to anticipate (but not predict) emerging technologies, engage various publics over their values regarding those anticipated technologies, and integrate expertise and values through collaborations between the social sciences and the natural sciences and engineering. This talk will address the most recent developments at CNS-ASU at both the programmatic and strategic levels, as well as education and training programs and outreach activities that extend the center's development of capacities for anticipatory governance.

D. Barben, E. Fisher, C. Selin, and D. H. Guston. 2008. "Anticipatory Governance of Nanotechnology: Foresight, Engagement, and Integration." Pp. 979-1000 in E. J. Hackett, O. Amsterdamska, M. E. Lynch, and J. Wajcman, eds., *The New Handbook of Science and Technology Studies*. Cambridge: MIT Press.

D. H. Guston. 2008. "Innovation Policy: Not Just a Jumbo Shrimp." *Nature* 454:940-41.

D. H. Guston and D. Sarewitz. 2002. "Real-Time Technology Assessment."

Related Links:

http://cns.asu.edu

About the Speaker:

David H. Guston is Professor of Political Science and Co-Director of the Consortium for Science, Policy and Outcomes at Arizona State University, where he is PI and Director of the Center for Nanotechnology in Society. CNS-ASU is a National Science Foundation-funded Nano-scale Science and Engineering Center (#0531194; $6.2M over five years) dedicated to studying the societal implications of nanoscale science and engineering research and improving the societal outcomes of nanotechnologies through enhancing the societal capacity to understand and make informed choices. He is widely published on research and development policy, technology assessment, public participation in science and technology, and the politics of science policy; his work has been cited cumulatively more than 1100 times (Google Scholar). In 2002, he was elected a fellow of the American Association for the Advancement of Science. In 2008, he served as co-chair of the Gordon Research Conference on Science and Technology Policy, "Governing Emerging Technologies." He holds a B.A. from Yale and a PhD from MIT.

Z MACHINE TOUR

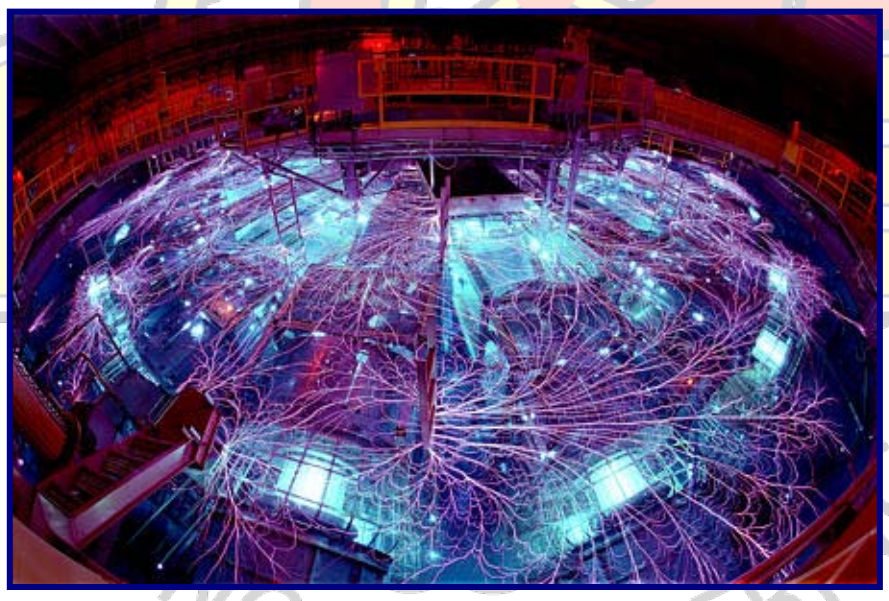
Featured Speaker: Guy Donovan

Friday, June 12th
Meet at CINT, 1026-1028 2:00PM – 3:15 PM
Duration: 1.15 hrs

About the Tour:

The Z Machine is the world's most powerful electrical device. It generates a 50 trillion watt electrical pulse that is used to study the physics involved in fusion reactions, the properties of matter at high temperature and density, and survivability issues related to the U.S. nuclear stockpile.

The electrical output from Z is used to produce X-rays. Experiments have produced up to 280 trillion watts of x-ray power, which is 80 times the electrical generating capacity of all the power plants on earth. The temperatures produced by these experiments have approached 1.8 million degrees Celsius – 300 times the temperature on the surface of the sun.



Related Links:

http://zpinch.sandia.gov/

www.sandia.gov/z-beamlet

TRIP TO SANTA FE & BANDELIER

Featured Tour: Santa Fe & Bandelier

Saturday, June 13th
Meet at Hyatt Place Uptown Hotel 8:00AM – 3:00PM
Duration: All day event

Bandelier: Hiking & Museum

Most visitors begin their exploration of Bandelier with a walk on the *Main Loop Trail*. This short 1.2 mile loop trail starts from the Visitor Center and leads through excavated archeological sites on the floor of Friioles Canyon. Other trails in this area include the 5 mile round-trip *Falls Trail* to the Rio Grande and various trails of different lengths and difficulty leading up to the mesa tops.

Visitors to Bandelier can also explore the *Bandelier Museum Exhibit*. These displays inside the Visitor Center showcase Ancestral Pueblo pottery, tools and artifacts of daily life. The museum also features two life-size diaramas comparing Pueblo life in the past and today.

Santa Fe: Museums, Shopping, Historic Sites

Santa Fe has dozens of historic sites where visitors will encounter thousands of years of rich history, from ancient Native American ruins to Spanish Colonial churches, mining towns and remnants of America's Wild West frontier days.

Take a walking tour of Santa Fe's diverse architecture, ride a vintage train car into high-desert country, or peer into deep space on an astronomy adventure. Santa Fe is also one of the country's hottest art markets, Hundreds of galleries host exhibits year-round and studio tours take place throughout the year. Museums regularly exhibit new shows of work done in the Southwest as well as traveling shows from around the world.

About Santa Fe:

Santa Fe's origins date back to between 1050 -1150, when it was occupied by a number of Pueblo Indian Villages. Today, it is the capital of the state of New Mexico, and it is most well known for its rich Native American culture and history, art exhibitions, museums, architecture, and performing arts including music, dance and opera.

About Bandelier:

Bandelier's human history extends back for over 10,000 years when nomadic hunter-gatherers followed migrating wildlife across the mesas and canyons. By 1150 CE, ancestral Pueblo people began to build permanent settlements, remainders of which are still evident in the park today. Woodrow Wilson created Bandelier National Monument in 1916, and today the park hosts the road into Frijoles Canyon, the visitor center, a new lodge, and miles of hiking trails.

Related Links:

www.nps.gov/band

www.santafe.org

SOCIAL STYLES SEMINAR

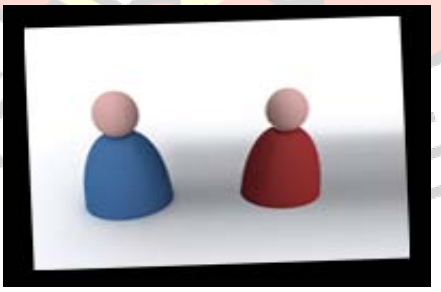
Featured Speaker: Keri Stewart

Monday, June 22nd
Bldg 897, Room 1010-1012 9:00AM – 11:00AM
Duration: 2 hrs

About the Seminar: Research has found that all of us may fall into one of four social interaction and communication styles: driver, expressive, amiable, or analytical. This seminar will introduce you to these four styles and teach how people of each style relate to each other. This seminar will help you learn to look for cues which indicate social style. Understanding how different styles operate can provide you with tools that will allow you to better communicate with the people in your life.

By studying human behavior, Keri has found that she can assist companies to:

- Create & implement Operational Plans
- Decrease communication challenges
- Facilitate and train employees
- 1:1 coaching sessions
- Integrate new plant managers
- Strategic plan & implementation
- Formulate vision, mission and values
- Bring alignment to departments
- Develop customized programs
- Initiate steering teams and project teams
- Develop team cohesiveness
- Increase accountability & productivity
- Bring laughter into the workplace
- Increase sales



Related Links: www.results4business.net

About the Speaker:

In July 2008, Keri founded Results 4 Business, Inc., an Albuquerque based business consulting firm fueling her passion of assisting people and companies ***explore and explode what they want more of.***

Keri's background is diverse with over 20 years in sales and four years in facilitation, coaching and training. Organizational Development client interaction included: Libbey Glass and Syracuse China manufacturing facilities, Lucky Friday silver mine (a unit of Hecla Corporation), Sandia National Laboratories, Lockheed Martin, Navajo Refining Company, Brandt Engineering, Steamatic, Amerind, USDA Forest Service and the Department of Energy.

Keri is an energetic and enthusiastic person with a tapestry of work/life experiences from companies like Coca-Cola, Dr Pepper of Albuquerque, Northwestern Mutual Financial Services, Prudential Overall Supply, Norrell Temporary Services and DeLaPorte and Associates.

STRATEGIC SELLING SEMINAR

Featured Speaker: Lenann Gardner

Monday, June 29th
Bldg 897; Rm 1010-1012 9:00AM – 11:00AM
Duration: 2 hrs

About the Seminar: Developing funding today is a process of becoming familiar with what's working in selling -- there is a body of knowledge available, rather than just anecdotal evidence of individuals' successes. Becoming proficient in using that knowledge to approach those who are in a position to authorize, or recommend authorizing, funding for Sandians' work is worth the effort. Lenann's programs combine lecture, participative exercises, and long term follow-up and coaching to be sure that the approaches learned translate into funding secured for your group.

Do you know what it takes to uncover a customer's or project funder's needs? What is the key to unlocking those key requirements that can make or break a project? Join Lenann McGookey as she shares her insights based on her experience working with technical teams at Sandia for over 10 years, and as a sales and marketing professional for over 20 years.

Related Links:

http://www.youcansell.com/

About the Speaker:

Lenann Gardner has been working with Sandians for over nine years to help them obtain the funding they need for the work they would most like to do.

She is a Harvard MBA and magna cum laude graduate, whose sales and marketing consulting firm, Lenann McGookey Gardner Management Consulting, Inc., has assisted scientific and technical providers of services and products in mastering state-of-the-art new business development and closing skills. She is an expert in adapting effective sales techniques to different environments; her clients are located across the U.S., in Canada, the U.K., Europe, Asia, Africa and South America.

Lenann is a former Par Club President (#1 sales rep worldwide) at Xerox Corporation, where she achieved that distinction in her first year selling. Lenann received the American Marketing Association's Professional Services "Marketer of the Year" award for our state in 1996. She is profiled in Who's Who in America, 2004 and 2005 Editions.

USING TRLs TO MANAGE TECHNOLOGY AND CROSS THE "VALLEY OF DEATH"

Featured Speaker: Michael R. Daily

July 13, 2009
Bldg 897, Room 1010-1012 9:00AM to 11:00AM
Duration: 2 hrs

About the Seminar:

First Hour (OUO)

Using Readiness Level Techniques to Manage Technology Risk
Discusses problems caused by the differing mental models and expectations team members, project leaders, customers, and suppliers often have of a new product development project and how these differing mental models and expectations can lead to customer disappointment and project inefficiencies.

Strategies are presented on ways that Sandia's 9-level Readiness Level Scale can be used to draw out and clarify these differences and get the team and customers, "on-the-same-page".

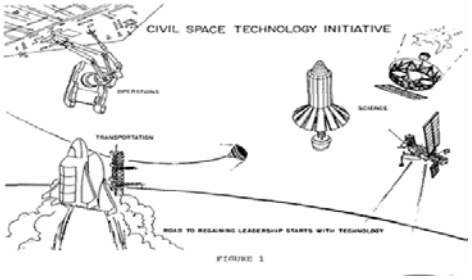
Second Hour (OUO)

Crossing the "Valley of Death": Why is Deploying New Technology so Hard?
Discusses the "Valley of Death" - a term coined by Congressman Vern Ehlers and refined by the Department of Commerce to describe the transition between Basic Research and Product Deployment that seemingly no one wants to pay for.

The Valley of Death has unique risks that can lead to project failure. This module will cover some of the causes of the Valley of Death, the unique risk issues, and strategies for mitigating these issues and improving the probability of success.

http://ast.sandia.gov/Program%20Information/presenterInfo.php?id=1http://ast.sandia.gov/Program%20Information/presenterInfo.php?id=1

"Worse than not having the technology is to fool ourselves into believing it is ready."



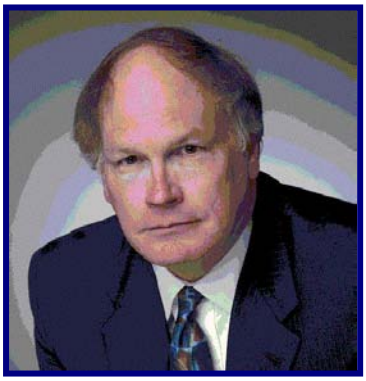
About the Speaker:

Michael Daily received B.S. & M.S. degrees in Electrical Engineering from Oklahoma State University in 1982 and 1984 respectively. From '82 to '84 he developed software for modeling of geothermal basins for Conoco Exploration R & D. In 1985 he joined Sandia's Electronic Subsystems Center where he worked for 9 years as a designer of electronic subsystems for missiles. In 1994 he moved to Sandia's Microsystems Center where he initiated and led the development of multiple microsystem products. In 1998 he became manager of Sandia's Integrated Microsystems department, transitioning emerging microsystem technologies into products. In 2007 he became the senior manager of Surety Engineering, Group 420, his current position. Mike has co-authored conference papers on thermal management using diamond films, CZT gamma spectrometers, MEMs accelerometers, and new product development processes. Mike received an R&D100 award from R&D Magazine in 2002. He also holds one US patent, "Geophysics-based Method of Locating a Stationary Earth Object".

COMING SOON: INNOVATION FOR COUNTERTERRORISM

Featured Speaker: Steve Walsh

Tuesday, July 21st
Bldg CINT, Room 1010-1012 10:00AM-11:15AM
Duration: 1.15 hr



About the Seminar:

This seminar will cover several topics, including some ideas on the nanotech market size and segmentation, leaders in the field, and where the US is relative to other countries in research and business development. This will include trends in patents, publications and commercialization.

The last segment of the talk will be devoted to how entities might embrace this firm, including how they might take advantage of nanotechnology knowledge centers like Sandia National Labs and the NINE partners. I will bifurcate firm strategic commercialization efforts into those which support and extend current industry practice or alternatively those which disrupt them and try to create a new commercial paradigm.

About the Speaker:

Steven Walsh is the Alfred Black Professor of Entrepreneurship and the Co-Director of the Technology Management Center at the University of New Mexico's Anderson School of Management, and an internationally renowned academic and businessman. He has been a Director at a Fortune 5 Company Division, General Manager and Vice President of medium sized businesses and President of entrepreneurial and non-profit companies. Steve received his BEng and Strategic Management PhD at Rennsselear Polytechnic Institute. He has published over 100 articles serving both the academic and practitioner communities. He has assisted firms in gaining over $200 million in equity resources in the past four years. Steve has been a plenary or invited speaker for over 40 economic development groups and industrial organizations. He is MANCEF's Founding Past President and Co-Editor of the international roadmap for MEMS and Top Down Nano technologies.

COMING SOON: ANTICIPATORY GOVERNANCE OF EMERGING NANOTECHNOLOGIES BY JAMEY WETMORE

COMING SOON: CINT HANDS-ON ACTIVITIES