

Engineering & Physics Club

NEWSLETTER

Spring 2005

"The artist is nothing without the gift, but the gift is nothing without work."

- Emile Zola
(1840-1902)

"When you do the common things in life in an uncommon way, you will command the attention of the world."

- George Washington Carver
(1864-1943)

See the latest
Puzzler -- on page 3



Dean Kotowski Returns to His First Love: Teaching



Dean Joe Kotowski announced recently that he will return to teaching, which he has grown to miss as much as he has enjoyed guiding Division 2. Faculty, students, and staff will miss their dean. In the words of a current student; "It has been a pleasure to have a dean who understands the needs and problems of teaching technical programs. It is a big advantage to us in the technical programs to have a dean who knows and understands the language of engineering and technology and we need to find someone who has the same strength in these areas."

During his tenure, Dean Kotowski instituted many positive changes in the department, including the establishment of the Engineering and Physics Club, and the link to area high schools so that Oakton remains first as a viable alternative to four year colleges.

In describing Dean Joe Kotowski, the words integrity and empathy come to mind. He is so tuned into his students that they are drawn to him for his advice, guidance and listening skills. His door is always open to both faculty and students. Said one faculty member, which summarizes all our feelings; "Oakton loses a great dean but regains an excellent teacher."

SPRING 2005 MATH COMPETITION

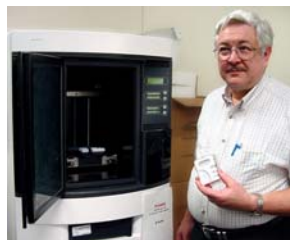
The annual AMATYC Competition is to be held on March 3, 2005 in room 1608 between 1:00-3:00 pm. All Oakton students are invited to participate. The level of competition is precalculus. Students who will participate are instructed to bring a Valid Picture ID (government issued preferred), calculators and pencils. Be sure that your calculator does not contain a keyboard or disk drive.

Last year Oakton placed 2nd in a regional competition of 34 Midwest Junior colleges. We hope to be number one this time around and with your help we are sure to achieve this goal. Every student who participates receives a certificate of participation. Students who achieve 10 points or better receive honorable mention. Students who place 6th - 1st receive US savings bonds. The awards ceremony will be held in April.

For sample problems and practice tests, contact STEM Club president Robert Krule (rkrule6249@oakton.edu), Eugene Kalininskiy (aded@usa.com), or Tingxiu Wang (tingxiu@oakton.edu).

Oakton Has It - The Rapid Prototype Machine!

By Davy Murukurthy, Vice-President, Engineering and Physics Club



We now have a solid modeling machine in our Engineering Lab, room 2615. Its official name is a stereolithography machine and it's used for Rapid Prototyping, a technique where plastic is printed layer by layer to create a 3-D model. The advantage of this process is the enormous power it gives engineers and marketing people to see a product, or component, before investing in costly equipment and tools. Initially, in the early development stages of the late 1980s and early 1990s, it used a very expensive polymer which was hardened by a laser beam. Stratus, Inc. made these machines for around \$750,000. They found that they had a very small market for the machines because of the price. They set up a subsidiary company, Dimension, that produced an

affordable, more practical unit for about \$45,000. The school acquired a unit for about \$32,000 in June, 2004, thanks to the insight and negotiating skills of David Geller, assistant professor, Manufacturing, Math and Technologies.

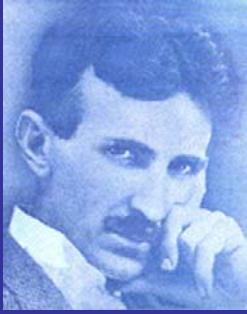
"Designers and engineers are required to have rapid prototyping skills just as they need to be able to turn on a printer" said David Geller. "It is a machine which is used in all 3-D classes such as Solid Works, AutoCAD Inventor, and Pro-E. Before acquiring the machine students were only able to experience part of industry's steps and did not have the complete skills necessary for the competitive world we live in. Now they are able to."

Money to purchase this machine was received from a Perkins Grant, the Tooling Manufacturers Association, and the Footlick Family. The Footlick family donated \$15,000 and has been very helpful to Oakton's development for many other projects.

Photo: Professor Geller holding a prototype design just removed from Oakton's stereolithography machine.

Nikola Tesla: Legacy of a Genius for Future Generations

By Milija Pekic, Secretary, Engineering and Physics Club



Nikola Tesla

"...possibly the greatest mind in the history of science and engineering."



"Everyone is a genius at least once a year; a real genius has his original ideas closer together."

- George Lichtenberg (1742-1799)

For the many people who are familiar with the work and heritage of this great man, there is an image of Nikola Tesla in the word of science that shines in a pure, rare and precious light. Like a bright star in the midnight sky, he literally brought light into our lives. On the other hand, there are too many of us who never heard of Nikola Tesla. One thing that we do know is that our lives today are dependent upon technology, and we take this technology for granted. Perhaps that's one of the reasons so many have forgotten the name of the Serbian-born inventor, electrical engineer and physicist, Nikola Tesla.

Nikola Tesla was born on July 9, 1856 in Smiljan, Lika (then part of Austro-Hungary Empire) and died on January 7, 1943 in New York City. He began his studies in physics and mathematics at Graz Polytechnic Academy, Austria. He worked as an electrical engineer in Hungary, France, and Germany. In 1884, Tesla moved to United States where he remained until he died. In 1888 Tesla invented the AC (alternating current) generator and designed the first practical system for generating and transmitting electrical energy.

Tesla worked for Thomas Edison, and later for George Westinghouse. Thomas Edison, who quickly became Tesla's rival, was an advocate of the DC (direct current) transmission system, and therefore opposed Tesla's newer, better system. George Westinghouse, who was a rival of Thomas Edison, purchased the patents to Tesla's induction motor, and made it the basis for the Westinghouse power system. In 1893 Westinghouse demonstrated the system for the first time at the World's Columbian Exposition in Chicago. Two years later, Tesla's AC motors were installed at the Niagara Falls power plant. Tesla's invention of the AC generator, and the polyphase design, was the basis for the power system which still transmits energy in this country and all around the world. His unique and brilliant design eliminated the need for current carrying brushes.

As earlier mentioned, one of Tesla's greatest inventions was the AC generator, but there are many more. Tesla did experiments and research on high-voltage electricity. He devised a system for wireless communication, radar, and fax machines, to name a few. Some of his inventions are Tesla's coil, the high frequency generator, and transformers that are used in radio and TV technology. His inventions form much of the foundation of computer science, robotics, and aeronautics. More than 800 U.S. patents were granted to Tesla over his lifetime.

Nikola Tesla is considered one of the pioneers in the field of electrical engineering. His contributions and achievements are so great that we cannot measure their importance. Many consider him one of the top 50 scientists of all times.

After the Nobel Prize was awarded to Marconi for radio in 1909 (radio was Tesla's invention), it was believed that Tesla and Edison were to share the Nobel Prize for Physics in 1915. As soon as Tesla had found out this, he contacted the physics award committee and let them know that he would not share the award with Edison. A few months after Tesla's death, on June 21, 1943, the Supreme Court of the United States decided that Marconi's patent for improvements of wireless telegraphy was invalid. In 1917 Tesla was awarded the highest honor of the American Institute of Electrical Engineers – the Edison Medal.

Tesla was possibly the greatest mind in history of science and engineering. His extraordinary work was far ahead of its time.

For more information on Nikola Tesla, read *Wizard: The Life and Times of Nikola Tesla – Biography of a Genius*, by Marc Seifer, (featured below in Book Corner).

Book Corner

Wizard: The Life and Times of Nikola Tesla – Biography of a Genius

by Marc Seifer, Citadel Press

Highly recommended by the *American Academy for the Advancement of Science*, you don't need to be a math or engineering major to enjoy this fascinating bio on one of the world's greatest geniuses.



Why did Tesla's name drop into obscurity? What happened to his top secret papers, especially regarding the so-called death ray? What happened between Tesla and powerful financier, J.P. Morgan? Did Tesla really receive signals from Mars?

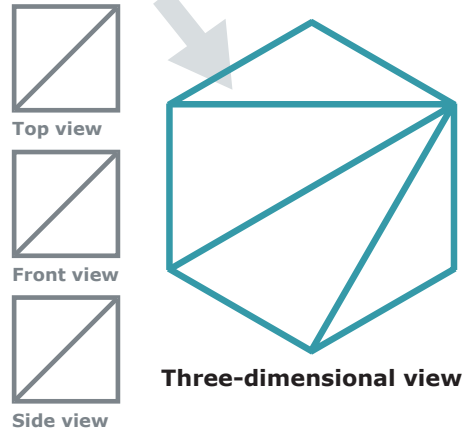
All these questions and more are revealed in Marc Seifer's definitive, utterly absorbing book. There are over 1400 end notes and more than 400 personal letters. Better known "geniuses", such as Pupin, Steinmetz, and Marconi borrowed Tesla's ideas without giving credit – contributing to his relative obscurity. Tesla died alone and penniless in a New York hotel room. His bizarre work ethics (he often slept only two hours a night), his apparent life-long celibacy, and many other idiosyncrasies, make this a fascinating read.



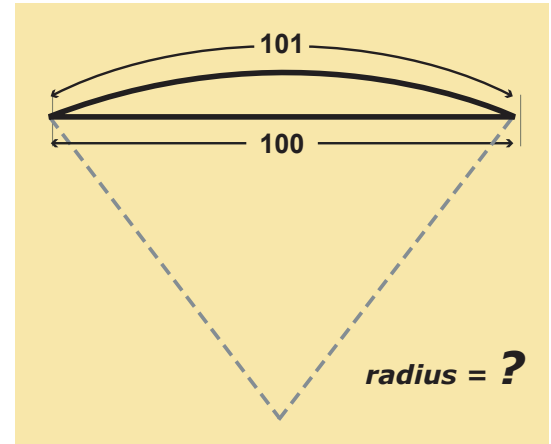
“The nuclear black market is almost as old as the nuclear bomb itself.”



Solution to the last Puzzler:



The NEW puzzler:



Investigative Report: Pakistan and the Nuclear Black Market

By Syed M. H. Abidi, second year engineering student

The hot topic of the last couple of weeks has been the alleged transfer of nuclear technology from Pakistan to other countries like Libya, Iran and North Korea by a famous Pakistani scientist Dr. Abdul Qadeer Khan, also known as “Father of the Islamic bomb.” Pakistan is the only Islamic country with nuclear capability. Pakistan came into limelight after North Korea refused to let U.S inspectors investigate their nuclear program and after the International Atomic Energy Agency probing Iran’s nuclear program found evidence that some Pakistani scientists might have aided the neighboring country in its developing nuclear program. Now that the U.S claims to have sufficient evidence that Pakistan has been sharing its nuclear technology with other countries, it is worried that someone might leak Pakistan’s nuclear secrets to terrorists against whom the U.S has launched a global war, a war that has already taken many lives. Dr. Khan, the Pakistani national hero, metallurgist turned-nuclear wizard, graduated from Pakistan, moved to Europe for further studies and earned his doctorate from a university in Belgium. After sometime he started working for a top-secret Dutch lab from where he is suspected to have allegedly stolen blueprints for enriching Uranium. The Pakistani government, one of the main allies of the United States in the war against terrorism, now finds itself in a quandary, where on one side stands the fate of a national hero and on the other side, the promise of trust to the U.S.

The nuclear black market is almost as old as the nuclear bomb itself (Cawasjee, Dawn). When Khan returned back to Pakistan in the mid 70’s, the demand for nuclear technology was rising all over the world. The then government of Pakistan greatly appreciated Khan’s knowledge to enrich uranium to produce nuclear power. In 1976, Khan took charge of the secretive Engineering Research Laboratories in Pakistan where he started to develop and assemble the machinery and manpower required to produce weapon-grade uranium. He recruited scores of Pakistani scientist living abroad to work with him at his laboratories. Khan says he and his colleagues devised “a strategy to buy everything we needed in the open market to lay the foundation of a good infrastructure and would then switch over to indigenous production” (The Risk Report). According to Khan western governments repeatedly tried to prevent Pakistan from acquiring nuclear capability but they were foiled by the greed of their own industries. In an interview, replying to a question Khan said “Many suppliers approached us with the details of the machinery and with figures and numbers of instruments and materials..... in the true sense of the word they begged us to purchase their goods. We purchased whatever we required.”

In 1998, Khan watched proudly as Pakistan detonated its first nuclear device and thus gave Pakistan the honor of being the first Muslim nation to possess nuclear technology despite tremendous pressure from the rest of the world, especially Washington, thus shocking the whole world. He was hailed throughout the Muslim world as the “Father of the Islamic Bomb” (“Inside The Bomb Bazaar,” Time magazine, January 19, 2004).

Last November, after sufficient evidence was found, Khan and a few other Pakistani Scientists were convicted for aiding some countries in their developing nuclear program. Names of three countries appeared the most: Iran, Libya and North Korea. The Pakistani and U.S intelligence confirmed the allegation that Dr. Khan had direct links with international black market dealers who sold non-peaceful nuclear technology and hardware to Iran and Libya and offered similar deals to Syria and former Iraqi dictator Saddam Hussein. Investigators believe that money was the main reason behind this proliferation. They also believe that the government of Pakistan was well aware of the sharing of nuclear secrets by Pakistani scientists and that some government officials and top military brass might actually be involved in this issue. A former Pakistani nuclear



"I think there is a world market for maybe five computers."

- Thomas Watson (1874-1956), Chairman of IBM, 1943

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Investigative Report -- *Continued from page 3*

scientist, unwilling to disclose his identity says "I don't know about the exact nature of transfer that took place but I knew that nothing moves in Pakistani nuclear spectrum without the knowledge of the chief of army staff." (Procrastination 2002)

One of the main pieces of evidence that proves Khan guilty was the record of his money transactions with buyers in the black market. An investigation official says "Most importantly, the governments of Iran and Libya have exposed the racket. They made no attempts to hide their sources as if they wanted to settle the score with Pakistani scientists."

But just a couple of weeks back, breaking news appeared in the headlines of all news channels, newspapers and magazines that Pakistan's chief nuclear scientist Dr. A.Q Khan has confessed to sharing nuclear technology with Iran, Libya and North Korea, according to a briefing given by government officials. (Owais Tohid). A key investigator says "During our investigation, Khan said we wanted some other Muslim countries to develop nuclear technology, so that pressure on Pakistan could be released." When it was pointed out that North Korea was not a Muslim country, Khan "could not give a specific answer," says the source.

Khan and a few other scientists are being investigated and placed under house arrest but the real problem is that for the Pakistani public, Khan is more than a hero, "People name their kids after him," says McGeary, and for the rest of the world, he is now "the Godfather of nuclear proliferation." The fate of Khan in the probe now lies with the nuclear command authority. The options are said to include a military court, a special tribunal, or administrative action. Putting the national hero on trial would be a risky move for the current government especially for a nation whose people are already sensitive about protecting its sovereignty (Owais Tohid).

UPCOMING EVENTS

Open House – Discover all that Oakton has to offer!

Tuesday, March 1, 5:30 – 8:00 PM

TenHoeve Center, 1600 E. Golf Road, Des Plaines, Illinois, 60016
See the Open House flyer for more information, or call the Office of Admission and Enrollment Management: 847-635-1629

Spring 2005 Mathematics Competition

Thursday, March 3, 2005, 1:00 – 3:00 PM

Level of Competition: Precalculus
Please bring: Picture ID, calculators and pencils
Every Oakton student is welcome to participate.

See page 1 for more information.

Contacts: Robert Krule (rkrule6249@oakton.edu), president of the STEM club, Eugene Kalininskiy, (aded@usa.com), vice president of the STEM club, or Dr. Wang at 847-635-1751 or (tingxiu@oakton.edu).

Engineering and Physics Club Annual Pizza Night:

"Meet the engineers of the Illinois Society of Professional Engineers"

Thursday, March 24, 6:30 – 9:30 PM

ILSPE website: www.nsc-ilspe.org

Room 1610, Oakton Campus

Sign up soon, as seating is limited.

See our flyer, or contact Peggy Swedroe, Division 2 (pswedroe@oakton.edu), 847-635-1688

Ford Assembly Plant Tour

Last week of March; date to be announced -- watch for our flyer!

Engineering and Physics Club event.