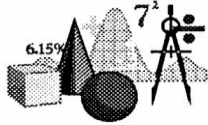




SPARKS

Daytona Section Newsletter
February 2017



FEBRUARY SECTION MEETING

SPECIAL ENGINEER'S WEEK PROGRAM

**** NOTE DATE AND LOCATION ****

Thursday February 23rd

Presentation 6:00 PM

Embry-Riddle Aeronautical University

Lehman Bldg. Atrium, 1st floor

600 S. Clyde Morris Blvd

Daytona Beach

PRESENTATION TOPIC

NEXTGEN: INVENTING THE NEXT GENERATION AIRSPACE

CHAIR'S REPORT



It's February, and that means Engineer's Week, or EWeek.

EWeek is our annual celebration of all things engineering, and a time to reach out to those not in engineering to advertise what we do and how we do it. In particular, this is a time when we reach out to students considering college degrees and careers to attract new blood to the profession.

Celebrations and outreach activities like EWeek are important to the future of the profession. The National Science Foundation reports a steady increase in engineering undergraduate enrollments since 2005, with a jump of 7.5% in 2014-2015 alone. In other words, outreach works. This year's EWeek is being held from February 19 – 25. As in past years, our February Section meeting will be held on Feb 23 at ERAU as part of ERAU's EWeek celebration.

Some notable engineers and scientists born during this month are Thomas Newcomen (b. 1664, improved steam engine), Heinrich Hertz (b. 1857, numerous contributions to physics and early electronics), David Sarnoff (b. 1891, founded RCA), Linus Pauling (b. 1901, Nobel Laureate), and Steve Jobs (b. 1955, co-founded Apple).

The Daytona Section ExCom met on Feb January 31. Most of the meeting centered on how to transport and assemble the Small Radio Telescope (SRT) from its current location at the Museum of Arts and Sciences to the new research center at ERAU. The SRT has not been operational since the museum building it was mounted on was flooded some time ago.

Billy Barott accepted the role of team leader to make the transition happen by March 23. Additional discussion centered on increasing our relationships with Volusia County schools, including increasing our involvement with the annual Science Fair and possibly giving presentations to Volusia County schools during the rest of the year.

Keith

IEEE MEMBERSHIP RENEWAL

Remember to renew your membership for 2017

FEBRUARY'S PRESENTATION

NEXTGEN: INVENTING THE NEXT GENERATION AIRSPACE

The global aviation community is involved in a monumental effort to incorporate new technologies into air traffic control. The development of ubiquitous networking, global positioning systems, air traffic growth, and the introduction of unmanned aerial vehicles requires that new policies and systems be developed to handle these new features efficiently and safely. This talk will present how the FAA and global partners are modernizing our airspace, and will provide examples of specific activities taking place at ERAU and the ERAU-managed Florida Test Bed.

OUR SPEAKER

Kirsten Kasper works at the Florida NextGen Test Bed (FTB) as a Project Manager. The FTB is a Federal Aviation Administration (FAA) initiative, managed by Embry-Riddle Aeronautical University (ERAU), being used to integrate and demonstrate NextGen and legacy technologies into existing and planned enhancements for the National Airspace (NAS). The FTB is designed to provide stakeholders with a rapid integration capability for testing Operational Improvements and enablers by leveraging the National Airspace System (NAS) using prototype capabilities. It utilizes a cost-effective and scalable architecture to allow for new growth as the Operational Improvements and enablers evolve. She enjoys the interaction between government, academia, and industry in this position and the many challenges and opportunities it brings.

ALL MEMBERS AND GUESTS ARE WELCOME TO ATTEND

In addition, many events are taking place throughout ERAU with faculty, students and staff

JANUARY'S PRESENTATION



January's presentation by Mr. James H. Brown gave an interesting presentation on the role of the FDA which included what the FDA is responsible for, what the FDA is NOT responsible for, device classification, the medical device approval and inspection process, lobbying the FDA, as well as the speakers personnel experiences with the FDA. The scope of the FDA's responsibilities are quite broad and cover a wide range of products from drugs to major medical diagnostic equipment. Mr. Brown spoke of the testing and documentation procedures required by the FDA which are needed to obtain approval for a device before it could be sold and put in use.

Mr. James H. Brown is shown after receiving our Daytona Section cup with Section Vice Chair Richard Kent.

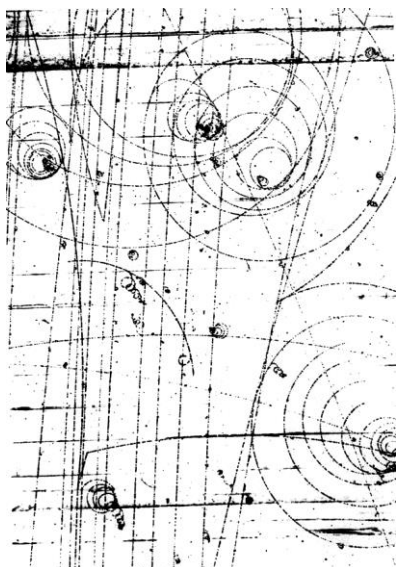
ANOTHER TALE FROM THE OLD PROFESSOR

When I was an undergraduate student, I had the privilege to serve as an intern at the Princeton/Pennsylvania Accelerator, PPA, at the Forrestal Research Center in Princeton, N.J. In those days, a particle accelerator was called an "atom smasher" which is very misleading. To rip an atom apart, that is to remove an electron or two, doesn't take much energy. What the particle accelerator did rip apart was the nucleus and that takes quite a bit more energy. It takes a big machine to tear apart a small nucleus.

The PPA machine whirled protons around an eighty-foot diameter ring to an energy of 3 billion electron volts or 3 BEV. (Today, the accepted term is giga electron volts or GEV.) To make this ring and shield the radiation caused by the energetic beam took 350 tons of iron and an untold amount of high density concrete and earth. Most of the machine was below ground level. Magnetic fields kept the beam from taking off on a tangent and that required 27 tons of copper and water cooling to dissipate the 1.1 million watts of energy loss. The magnetic field throughout the entire ring oscillated at 19 Hz and used a huge bank of capacitors to resonate with the magnets. The capacitors stored 740 kJ of energy with a peak voltage of over 50 kV. In spite of the massive size and power consumption of these magnets they had to be very precisely controlled. A failure of any part of the magnet system would result in an immediate shut down of the beam to prevent the floor from becoming completely covered with little protons rolling around all over the place and a huge cleanup job.

As an undergraduate, seeing this mammoth machine for the first time was overwhelming. But shortly after starting my internship, my professor treated me to a trip to the Brookhaven accelerator on Long Island, which has a beam diameter over 1200 feet.

A unique feature of an accelerator are the pictures hanging in the entrance lobby. If the lobby were of a corporation the pictures would be portraits of the CEO and board members. But at an accelerator the pictures are cloud or bubble chamber traces showing a new subatomic particle or other subatomic interactions that were first discovered at that accelerator. The Xi Baryon was discovered at Brookhaven and fittingly a huge photographic enlargement of the bubble chamber traces hung in the lobby. Alas, our little 80-foot diameter accelerator back in Princeton did not have the honor of discovering any new subatomic particles but still had plenty of cloud chamber pictures of other discoveries that did take place at Princeton.



To the left is the bubble chamber snapshot that hangs in the lobby of the Brookhaven National Laboratory. It shows the traces that discovered Xi Baryon in 1964. The discovery of the Xi Baryon led to the understanding of Omega Minus Baryons. Don't see it? The Internet has several "maps" showing the Xi Baryon path.

Why do we mistreat and misunderstand the word nucleus or nuclear? First; the word is pronounced "nu-clear" and not "nu-cu-lar". Four U.S. presidents and one vice president preferred the "nu-cu-lar" pronunciation. Nuclear has also been used to describe situations that have gone berserk; as "it went nuclear" or the "nuclear option".

During my childhood in the 1950's we were all fearful of nuclear war. Remember "duck and cover"? This led to the fear of anything nuclear. As an example, everyone knows the value of an MRI scan. MRI means magnetic resonance imaging. But there is something very important missing from MRI; it's N. The term is NMRI, nuclear magnetic resonance imaging. It's the nucleus that resonates. The N was dropped because too many people associated the term "nuclear" with radiation and feared they would be harmed by an MRI scan. The irony of this thought is that with the extremely high magnetic fields that are being used today in MRI there are concerns the technicians that install, maintain and operate MRI scanners may be subjected to excessive magnetic fields causing health issues. Maybe we should eliminate the "M" from MRI. A problem with our world is when something engenders fear due to lack of understanding, we purge the word or thought to calm the uninformed.

Let me leave you with these calming thoughts. The atomic nucleus is a wonderful thing. Understanding the nucleus is important to unlock the secrets of nature. The nucleus will not harm you unless you start attacking it and then it will fight back.

Al Helfrick

DAYTONA SECTION SHIRTS



We are pleased to offer Daytona Section polo shirts for our Section members. The shirts are embroidered with the IEEE Logo and DAYTONA SECTION on the left and your name and grade, if desired, on the right. The shirt is a high quality 5 oz, 65/35 poly/cotton pique in Royal Blue with white embroidery. Available in S - 2XL in men's as well as ladies sizes. Price is \$29, including tax, for S-XL size's, 2XL size is \$3 additional.

For more information or to order shirts contact: Allan Jusko 386-671-3706 or a.jusko@ieee.org. Indicate shirt size and name and grade if desired. Shirts must be paid for before ordering, typical turn-around time is 2 weeks. Arrangements can be

made to pick up shirts or have them shipped to you.

DAYTONA SECTION COFFEE MUGS



The Daytona Section has available coffee mugs with the IEEE Daytona Section Logo and are available for \$7.00. Purchase one or more to show your support and pride in our Section.

Contact Ron Gedney at 386-478-1204 or r.gedney@ieee.org for more information.

EDITORS NOTES

The **SPARKS** newsletter is also available on our website <http://www.ieee.org/go/daytona>

Region 3 website

<http://www.ewh.ieee.org/reg/3/>

Other web sites of note

Melbourne Section website

www.ieeemelbourne.org

Orlando Section website

www.ieee.org/orlando

FUTURE MEETING DATES:

The dates for the 2017 spring session are: Mar 23 and Apr 27

IEEE MEMBERSHIP PINS

Membership pins are available for all member grades. Check out this website for more information http://www.ieee.org/membership_services/membership/products/pins.html

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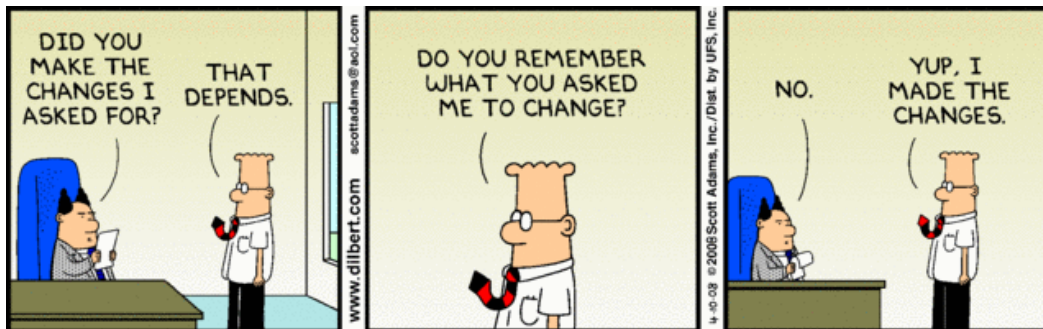
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ENGINEERING HUMOR



FEBRUARY 2017 MEETING

Thursday February 23rd at Embry-Riddle Aeronautical University
Lehman Bldg. Atrium, 1st floor
600 S. Clyde Morris Blvd
Daytona Beach

TOPIC– Nextgen: Inventing the Next
Generation Airspace

SPEAKER – Kirsten Kasper, Project
Manager, Florida NextGen Test Bed (FTB)

AGENDA

5:30 PM Buffet (optional)
6:00 PM Presentation

Dinner Menu

Italian Buffet

Members and guests \$20.00 each
Students \$5.00

Please contact Allan Jusko by Wednesday, February 22nd at noon
to give us a count for the buffet or for further information

If you make reservations and are unable to attend, call prior to the event to cancel.

The Section is charged for all dinners ordered, please let us know if your plans change

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