



SPARKS

Daytona Section Newsletter
September 2018



2018 Outstanding Section Membership
Recruitment and Retention Performance
Daytona Section

SEPTEMBER SECTION MEETING

Thursday September 27th at the Halifax River Yacht Club, 6:00 PM
331 South Beach Street, Daytona Beach, Florida 32114

PRESENTATION- A Bioremediation Method for Oil Spills

CHAIR'S REPORT



Welcome back from the summer break! I hope everyone had an enjoyable summer. My summer was restful, and so there is not much to report on the IEEE front. Last year we set out to increase our visibility in the local public schools, and we've had some success. I hope to continue this initiative. One way to do this is to share your real world experiences with students at any level, K-12 or college. If you would like to arrange a campus visit please let me know and I'll help make it happen.

Every year we encourage our members to promote themselves within the IEEE. If you have seven or more years of experience in your field, consider moving to Senior Member status this year. The process is not difficult, and the Section leadership, past and present, are here to help you if needed.

Keith

APRIL PRESENTATIONS

For our April meeting, student teams from ERAU did presentations of their senior and robotics projects and students from B-CU presented their robot entered in the SouthCon competition. In addition, our Daytona Section Junior Special Award winner at the 2017-2018 Tomoka Science and Engineering Fair was introduced to our membership and gave a presentation of his project. The Senior Special Award winner was unable to attend and is our speaker for this month's presentation.

SEPTEMBER PROGRAM

Effectiveness of Nitrogen, Phosphorus, and Sulfur Compounds on Bioremediation of Oil Spills by *Pseudomonas Fluorescens* and *Bacillus* with the Aid of Ferrofluid

The enormous task of cleaning up oil spills has burdened industry, government, and environmentalists for years. The clean-up is very time consuming, expensive, and slow. Bioremediation involves microbial metabolism of harmful substances, but with a huge length of time.

This study was undertaken to enhance oil spill bioremediation through the addition of sodium sulfate, sodium nitrate, and sodium phosphate to samples containing *Pseudomonas fluorescens* and *Bacillus subtilis*. These bacteria utilize nitrates during cellular respiration and nitrate ammonification. Therefore, it was hypothesized that sodium nitrate would increase the amount of hydrocarbon metabolites present in samples more than sodium sulfate or sodium phosphate. Samples containing different combinations of bacteria, .1 and .01 molar solutions of the above nutrients, salt water, and crude-oil-substitute hexadecane (utilized to replicate the long hydrocarbon chains found in petroleum) were shaken at 27°C for seven or 14 days. Bacterial concentration was estimated by turbidity measurements. Each organic layer was analyzed with gas chromatography to identify any smaller hydrocarbons. The data from two trials partially disproves the hypothesis.

While the treatment of .1 M sodium nitrate caused one of the greatest increases in bacterial concentration with *P. fluorescens* and *B. subtilis*, the chromatographic data from these treatments differed only marginally from the positive controls and other treatments.

Additionally, the data suggested that substantial metabolite formation occurred only in *P. fluorescens* samples with .1 M and .01 M treatments of sodium phosphate. However, the .1 M nutrient combination and .01 M sodium sulfate treatments caused the greatest hexadecane disappearance. These results are relevant to the enhancement of bioremediation techniques; a need exemplified by the Deepwater Horizon catastrophe.

OUR SPEAKER

Sohayla Eldeeb is a senior at Spruce Creek High School who has been involved in science research since she was 11. Her research has evolved into a focus on the environment, specifically oil spills. Her novel method of magnetizing the oil using ferrofluid nanotechnology has gained attention and recognition both on the regional and state level. She has been recognized for developing her research in improving the bioremediation process (of *Pseudomonas Fluorescens* and *Bacillus*) by using natural compounds. She's been honored by prestigious associations include The Institute of Electrical Engineers, Florida Association of Water Control, DaVinci Branch of Engineers, and the Army of Engineers.

Her research allowed her to develop her interests and findings into action. She's organized a march and lobby day in Washington D.C. to educate the public and elected officials about

maintaining a sustainable environment. Her activism will continue to be pursued as she advocates for her project to be utilized. Aside from her science research, Sohayla serves as the Florida District Governor of Key Club, the world's largest high school service and leadership organization. She hopes her involvement within the community will aid and inspire the path of other youth pursuing STEM research and activism to better their futures.

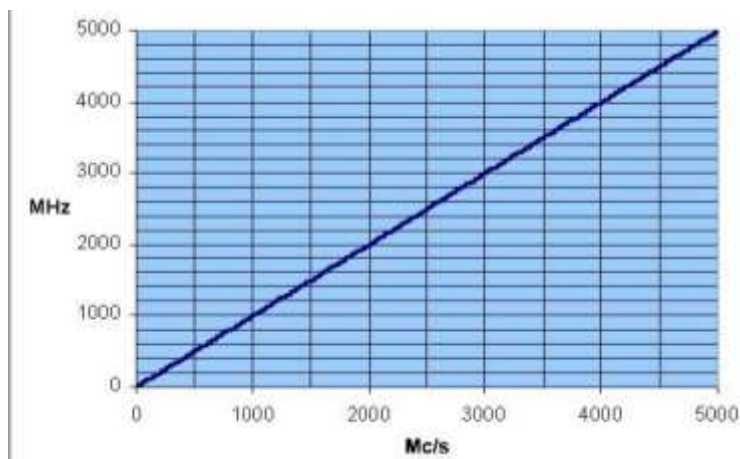
ANOTHER TALE FROM THE OLD PROFESSOR

NAMING RIGHTS

When a sports stadium or convention center is constructed, companies or individuals with enough money can have the facility named after them. This is called "naming rights". In the science and engineering world we have naming rights too.

We used to describe frequency as cycles per second which is very descriptive. It means how many cycles something completes each second. When the International Standard, SI units, was created in 1960, cycles per second was officially named Hertz, Hz. But the units for Hz is actually reciprocal seconds or "per second". What happens each second? A certain number of cycles occur; of course!

A couple of years after the decision was made to officially declare cycles per second as Hertz I had a nomogram for converting cycles per second to Hertz which I hung up in my office. But I



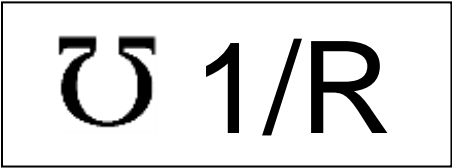
took it down because too many of my coworkers were asking me how to use it.

Why was cycles per second changed? To honor a European scientist, Heinrich Hertz, who really didn't need any more honors. Electromagnetic waves, primarily radio waves, were already called Hertzian waves. Wasn't that enough?

There is another problem with Hz. I have heard on more than one

occasion someone referring to a frequency of one hurt. Apparently, some people assume that Hz is the plural of hurt or hurts. The real hurt is when I hear someone refer to a frequency of one cycle per second as "one hurt". That only make sense. Right? A distance of one hundred centimeters is one meter while twice that distance is two meters. Before cycles per second became Hertz, a 1 Hz frequency was one cycle per second while the second harmonic was two cycles per second. Continuing that logic, the second harmonic of a 1 Hertz signal is 2 Hertzes.

But there is more. For many years the unit of conductance was the mho which is ohm spelled backwards. It was an example of scientific humor. But according to the National Institute of Standards and Technology, NIST, the mho is an "unaccepted special name for an SI unit" and indicates that it should be "strictly avoided"! Well phooey! I refuse to use the "accepted" unit of the siemens. Good old Werner already has a huge company named after him. What more does he want? I continue to use mhos and the upside-down omega symbol for conductance.



This European hijacking of SI units doesn't stop there. The unit of electrical elastance or reciprocal capacitance is daraf or farad spelled backwards. The term was coined by Arthur Kennelly who was an Irish-American and worked for Thomas Edison when he coined the term. Kennelly didn't need to name the unit after himself to gain notoriety. He already had naming rights for a layer of the ionosphere, the Kennelly/Heaviside layer. Again, NIST declares the unit daraf bogus.

Then there is "millibars" for measuring pressure. One thousand millibars or a bar is pretty close to the International Standard Atmosphere, ISA, sea level pressure which is 1013 mb. The connection between the name bar and barometric pressure is obvious.

The official SI unit for pressure is the pascal which is 1 newton per square meter and was named after the French scientist Blaise Pascal. The bar was a CGS unit and when the SI system, based on MKS units, was declared as the only official units of measure, the "old" CGS units were expunged.

The ISA sea level pressure is 101,300 pascals. When stating atmospheric pressure, hectopascals, hPa, are now used which is in line with the long-used and convenient millibar. Most people don't know what the prefix hecto means since the common prefixes are multiples of 1000 such as kilo, mega, milli, micro etc. What was wrong with millibars? I am happy to see that most weather forecasts still use the "old", "obsolete", incorrect, millibars. Hooray for the weather forecasters!

There are a few units bearing American scientists' names such as the Henry, (inductance), Jansky, (spectral flux density), and the Serbian-American, Tesla, (magnetic flux density). A few more would be nice.

But, without a doubt, the most-used scientific term named after an American is the bel to honor Alexander Graham Bell. Never heard of the bel? It's ten decibels.

Dr. Al Helfrich, a.k.a The Old Professor

PE CORNER

Ethics

(From an article in the FPBE Connections Newsletter by Ken Todd, P.E., Chair, FBPE; with permission)

From time to time, it is good to be reminded of the engineer's responsibility to act in an ethical manner. As the next PE renewal cycle approaches, licensed engineers need to have taken one hour of ethics as part of the continuing education requirement for license renewal in Florida.

Why do Professional Engineers need to take a course in ethics every renewal cycle? For one, the legislature made this a statutory requirement, much like it is in many states. I think we can all agree that practicing good ethics can be complicated in a business and legal world that is in constant change. Therefore, it is worthwhile to spend a little time reminding ourselves of the importance of practicing good ethics in our profession.

What is ethics? The American Heritage Dictionary defines ethics as a set of rules or standards governing the conduct of the members of a profession. This is especially important in the engineering profession because the practice of engineering will have a direct impact on the public's quality of life. Additionally, the ethical standards practiced by an engineer will affect the engineer's clients and employer. Therefore, it is imperative that as members of the engineering profession, we need to exhibit the highest standards of honesty and integrity, and not be guilty of misconduct.

Misconduct can be defined as including, but not limited to: being untruthful, deceptive, or misleading in any professional report, statement, or testimony, whether or not under oath. In addition, it includes omitting relevant and pertinent information from a report when the result of that omission could reasonably lead to a fallacious conclusion on the part of the client, employer, or the general public.

One of the most common types of misconduct is being untruthful. This type of an ethical violation can come via being untruthful on an application or a report, failing to disclose a conflict of interest, or advertising qualifications that are dubious. Other types of misconduct could include expressing an engineering opinion without having all the facts, the failure to use due care in the practice of engineering, or the signing and sealing of a report or set of construction drawings not done under an engineer's supervision (responsible charge) as a PE.

One way we can reduce the opportunity for misconduct is by periodically reviewing the laws dealing with practice of engineering in Chapter 471, Florida Statutes, and the engineering rules in Chapter 61G15, Florida Administrative Code.

Additionally, an engineer can read the Code of Ethics produced by an engineering organization, such as IEEE, the Florida Engineering Society, or the National Society of Professional Engineers. When faced with an ethical question, it is often helpful to "bounce" ethical situations off a trusted colleague who can assist you in making the proper decision. When this is done it will help each PE develop a solution to the "ethical problem" that is above reproach, and potentially prevent an ethical violation turning into a complaint alleging misconduct being filed against the PE.

Whether you are a PE looking to attain required CEHs, or an engineer looking to learn something new or keep current with the latest trend in the profession, IEEE has seminars that will meet your needs. And for the PEs, don't forget that the next renewal deadline is only 4 months away. Better start earning those CEHs now!

Art Nordlinger, PE, Senior Member

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 \$30, 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.

FUTURE MEETING DATES:

The dates for the fall sessions are: Oct 25 and Nov 29

EDITORS NOTES

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

ENGINEERING HUMOR



"There are better ways to log off."

2018 SECTION OFFICERS

Chair – Dr. Keith Garfield

386-226-7081 garfielk@erau.edu

Vice Chair – Richard Kent

206-369-1965 rtkentjr@msn.com

Treasurer - Dr. Jianhua Liu

386-226-7713 liu620@erau.edu

Secretary – Ron Gedney

386-478-1204 r.gedney@ieee.org

Membership Development –

Publicity/Media – Ron Gedney

386-478-1204 r.gedney@ieee.org

PACE Representative –

Dr. William Barott

386-226-8973 barottw@erau.edu

Life Member Chair – Ron Gedney

386-478-1204 r.gedney@ieee.org

Computer Society Chair – Dr. Keith Garfield

386-226-7081 garfielk@erau.edu

Student Activities, (Co-Chairs)

ERAU - Dr. William Barott

386-226-8973 barottw@erau.edu

B-CU - Dr. Xiaohe Wu

wux@cookman.edu

ERAU Student Chapter Chair- Dean Laga

lagad@my.erau.edu

B-CU Student Chapter Chair – Ashim Ghimire

Ashim.ghimire@students.cookman.edu

Webmaster – Charlie Husbands

386-760-7163 chusbands@ieee.org

SRT Project Coordinator - Charlie Husbands

386-760-7163 chusbands@ieee.org

SPARKS Editor - Allan Jusko

386-671-3706 a.jusko@ieee.org

SEPTEMBER 2018 MEETING

Thursday September 27th at the Halifax River Yacht Club
331 South Beach Street, Daytona Beach, Florida 32114
Just south of the Fire Station at the corner of Beach and Orange Streets

TOPIC– A Bioremediation Method for Oil Spills

SPEAKER – Sohayla Eldeeb
Spruce Creek High School

AGENDA

5:30 PM Greetings & Cocktails

6:00 PM Dinner

7:00 PM Presentation

Dinner Entrée Choices

Flank Steak - with sweet mashed potatoes and roasted Brussels sprouts

Pesto Chicken – Grilled chicken breast with farfalle pasta, cherry tomatoes, toasted pine nuts, basil pesto and parmesan cheese

Blackened Salmon – with sweet mashed potatoes and roasted Brussel sprouts

Dinners include a house salad, bread, coffee or tea

Members and guests \$20.00 each
Students \$5.00

IMPORTANT DINNER NOTE!

The Yacht Club is requiring us to give them a dinner and menu selection count by the Tuesday afternoon before our meeting. Since the menu items are special selections for each of our meetings and are prepared to be served at the same time, this gives the chef and kitchen time to order, receive and prepare the food items.

As always, all members and guests are welcome to attend the meeting and presentations, however any dinner requests received after Tuesday afternoon may not be accepted

Please contact Allan Jusko by Tuesday September 25th at noon to give us a count for dinner 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

Allan Jusko Editor

386-671-3706

a.jusko@ieee.org