



Valley Engineer Newsletter

JANUARY, 2017

UPCOMING PROGRAMS

- February 11, 2017 (snow date February 12), MATHCOUNTS®, Southern Lehigh High School, Center Valley
- February 24, 2017 LVEC Engineer’s Week Banquet, Holiday Inn, Breinigsville.
- February 20, 2017 “Dream Big” Screening and Reception, ArtsQuest’s Cinemas, Bethlehem



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 OF
 PROFESSIONAL ENGINEERS**

**LEHIGH VALLEY CHAPTER
 (ORGANIZED 1935)**

CARBON, LEHIGH, MONROE, & NORTHAMPTON COUNTIES

PRESIDENT’S MESSAGE

Alfred Gruenke, PE
 January, 2017

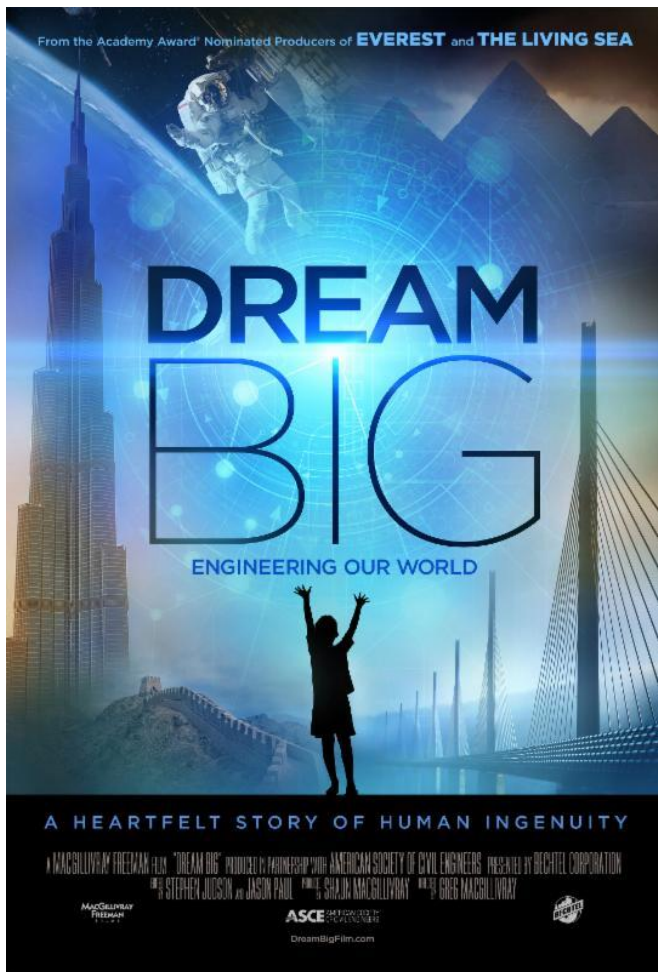
Last year was a great year, but we cannot rest on our laurels. This year will be even better.

The Lehigh Valley Engineering Council annually hosts the Engineer’s Week Banquet, held at the Holiday Inn in Breinigsville. All the engineering societies in the Lehigh Valley are represented at this event. It gives everyone an opportunity to mingle and network with other engineers in the area, while enjoying libations and hors d’oeuvres. The Keynote Speaker is Brock E. Barry, P.E., Ph.D., F.ASCE; Associate Professor and Mechanics Group Director, Department of Civil & Mechanical Engineering, United States Military Academy, West Point. The title of his topic is “Did You Really Mean to Say That? Nonverbal Communication in the Workplace”. This should be of interest to everyone, since most of our face-to-face communication is non-verbal.

Details have not yet been finalized, but there’s a good chance Air Products will again offer ice cream frozen in liquid nitrogen.

Our Chapter sponsors the Engineer of the year and Young Engineer of the Year. This prestigious award is given to individuals who not only are licensed Professional Engineers but are also involved in community activities outside of their chosen profession.

Engineer’s Week this year is more than a one-evening event. Offered this year to commemorate Engineer’s Week is a movie, “Dream Big”, by Bechtel Corporation in partnership with the ASCE. The movie is going to be released during Engineers Week on Monday February 20, 2017, at ArtsQuest’s Cinemas in Bethlehem.



I've seen the trailer a number of times, and it never fails to send chills up and down my spine. The trailer can be seen at https://www.youtube.com/watch?v=dRFK_eRKX1I

Showing schedule, ArtsQuest's Cinemas,0 February,20, 2017:

5:30 – 6:15 Registration, networking, cash bar.
 6:16 – 7:00 Screening in Cinema
 7:00 – 8:30 Reception with Taste of Musikfest hors d'oeuvres and open bar

Cost: \$40.00 per person. To register go to <http://events.r20.constantcontact.com/register/event?oeidk=a07edp5j51161cde2bb&llr=gzdb7zgab>

LVASCE is also sponsoring transportation to bring school students from the area to view this fine

movie in the following days. Trips to attend such events are not paid for by the schools, so LVASCE is raising money to pay for the transportation. They are seeking to raise \$10,000.00 towards this effort. Our Chapter has donated \$250.00, and I have asked PSPE to contribute also. Corporate sponsorships are available. If you or your organization wish to contribute, or have any other questions, contact Mike Derr at MDerr@gtaeng.com or Steve Ressler at sjressler@gmail.com. I urge you to participate.

John Nawn, President of Pennsylvania Society of Professional Engineers has sent me his PSPE Vanity license plate. It's pictured at the end of this Newsletter. 4-N-S-I-C. I must confess, dear reader, that I was befuddled. I went through every combination and permutation I could think of, but I still drew a blank. For Now Sin I Can, Four Names Should I Confess, were two of the more reasonable acronyms. So, I fessed up to John and asked for an explanation. 4-N-S-I-C stands for F-O-R-E-N-S-I-C! Forensic Engineering, John's profession. Of course! Why didn't I see that?

Again, send me your PSPE vanity license plate, with explanation if you think a dullard such as I could not decipher it.

I contacted one of our Scholarship winners from last year, Kaiti Stylianides, for an update of her scholastic activities. Kaiti responded.

Dear members of LVPSPE:

Last year I was graciously awarded the LVPSPE scholarship for aspiring engineers. I am very happy to be writing to you about my major, Mechanical Engineering with a concentration in Acoustics, which I am studying at the University of Hartford. Your scholarship has provided me with the means to start and grow as an engineer and facilitate further understanding of our field.

The University of Hartford is one of the few universities nationwide that offers an Engineering Acoustics degree for undergraduates.

Continued on page 3

I was awarded a work-study in the Acoustics Lab, which gave me an opportunity to run high level labs, participating in senior level research and similar tasks.

I would also like to let you know that I finished my first semester with a 4.0 GPA, and therefore made the President's List.

I have had a world of opportunities opened to me in various facets of engineering. I am currently a member of the Acoustics Society of America (ASA), the Society of Women Engineers, and the American Society of Mechanical Engineers. This Spring, our local ASA chapter will be holding our annual Don't Go Deaf day, where we will administer free hearing tests to the community as well as sell ear-shaped cookies.

In closing, I would again like to thank the LVPSPE for awarding me this scholarship in 2016. Your scholarship has definitely helped me start down the right path in becoming a true professional engineer. It is my hope that I will someday be part of an organization that is able to provide assistance to future engineers, such as you have done for me.

Thank you,
Aikaterini Stylianides
The University of Hartford Class of 2020
Mechanical Engineering with Acoustics
Concentration

Angelika Forndran is active in the Pennsylvania Junior Academy of Science. In that capacity, she is asking for volunteers as judges at their annual science fair.

On Saturday, February 25, 2017, junior and senior high school students affiliated with the Pennsylvania Junior Academy of Science will present their science, computer, and math projects at Easton Area High School in Easton, PA.

The application to be a judge is attached to this Newsletter. Please consider donating your time and talent to serve as a judge. Help the PJAS to provide a meaningful experience for the students as they develop interest in these disciplines. These are the engineers of the future, and they deserve our support.

UL TESTING

Around twenty members and guests of the Lehigh Valley Chapter, Pennsylvania Society of Professional Engineers gathered on a rainy evening to tour the UL facility, located on Snowdrift Road in the Iron Run Industrial Park near Fogelsville, PA.

Program Manager David Edwards and Engineering Leader Zachary Mooney were the tour guides.



David Edwards

David first gave us some basic facts regarding UL. UL is a global company. There are 120 UL inspection centers in 102 countries. It was founded after a fire at the 1893 World's Fair in Chicago. The founder of UL, William Merrill, was part of the committee to investigate a fire at that event. He established the first standard in 1903, entitled "Tin Clad Fire Doors". UL's motto is,

Continued on page16

SCHOLARSHIP SPONSORS

A great way to be involved in the LVPSPE Chapter is to contribute to the **LVPSPE SCHOLARSHIP FUND**. Please Contact the Valley Engineer Editor to sponsor scholarships for the remainder of the calendar year.

If you would like to contribute in any amount – please send your TAX DEDUCTIBLE donation to PA ENGINEERING FUND. Donations should be mailed to:

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Please note “LVPSPE Scholarship Fund” on the comment line.

Or, you may contribute via the LVPSPE website <http://www.lvpspe.org/Donations>.

Scholarship application is at <http://www.lvpspe.org/Scholarships>. Any questions regarding scholarships can be directed to

Alex Dezubay, PE
610-597-2007
Scholarship@LVPSPE.org

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Applications and guidelines are on-line now at <http://www.pspe.org/scholarships>

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The monthly Board of Direction meetings are 6:00 PM on the second (2nd) Monday of each month. Open to all members; they are held at the office of Barry Isett & Associates, 85 South Route 100, Allentown, PA.

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"Know by Test and State the Facts". UL tests a variety of industrial and consumer products, verifying its safety and performance. Over the years UL has tested and set standards for washing machines, televisions, burglar resistant safes, and home generators. The present building has been the UL home for six years. They have been in Allentown since 1989.

There is no safety testing. The sole function of the eighteen persons in the 35,000 ft.² building is to test light bulbs, fixtures, and lighting controls. It supports the international standard for energy efficient consumer products, Energy Star, and other standards. Lamps are tested for color consistency, light output, temperature, efficiency, and other factors. Lamps are tested for 6,000 hours, then prorated for life.

Interestingly, LED lights degrade over time.

The equipment to measure and record these factors is definitely outside of what most of us are exposed. One device is a Gonio photometer. It's about 12 ft. tall, with a 10 ft. rotating cross arm, which holds a very high quality mirror. The purpose is to measure light output around 360° of a light fixture. The mirror rotates around the source, directing the light onto a receptor mounted on the wall. It is in a room with black, non-reflective walls to ensure that the only light the receptor "sees" is directly from the source. One series of tests lasts 25 minutes. UL manufactures this machine in Brea, California, and is available for sale to other testing laboratories.

Another device used is an integrating sphere, which looks remarkably like a bathysphere. It is a hollow sphere with a 98% reflective white inner surface. The lamp is placed inside, and the total light output and color measured. The large one is three meters diameter; two meter and one meter lab spheres are also installed. Everything is calibrated before each use.

UL also tests for thermal shock, high voltage tests, and ballast tests. A recent addition is testing horticultural lighting, which is used in "vertical farms", raising plants with artificial light. David explained that different plants have different wave length requirements!

There is a specialized 100 ft. long tunnel for testing mine lighting and flashlights. The walls are coated with a black, non-reflective coating.

Though not covered specifically in this tour, one may well imagine the myriad of sensors and measuring devices necessary for such intricate testing. Computers, in many forms, were everywhere.

The testing is usually under contract to lighting manufacturers and retailers. The equipment can also be rented by outside parties for their own testing. Training facilities and programs are available.

The tour was well received by the Chapter members and their guests, who appreciated the mixture of high tech equipment with basic ingenuity. Thank you, David and Zach, for introducing us to the world of performance testing.

The Lowly Slide Rule

Alfred Gruenke PE

During one of my MBA classes at DeSales University a couple of years ago, there was a mention of a slide rule. Most of the class consisted of Millennials, late twenties to early thirties who grew up with calculators. Their perplexed expressions and mutterings made it clear that they had no idea what a slide rule was.

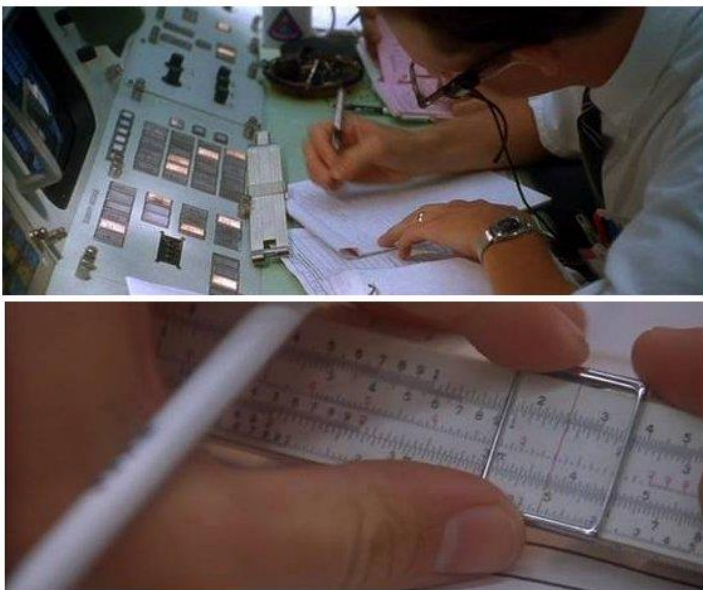
Naturally, I jumped in to enlighten the uninformed, and explained its function. I brought mine to the next class and demonstrated this wonderful device. It was viewed as a curiosity from the Dark Ages, akin to the Philosopher's Stone or the abacus. They were too enraptured by pocket calculators, which can do a lot more with minimal thought or understanding.

Then, it came up again in a recent conversation with my son in law David Arndt, a Civil Engineer graduate from Lehigh University. He asked me how accurate it was, how many significant digits, etc. I explained that the accuracy is well within manufacturing tolerances, especially for Electrical Engineers.

The normal slide rule was around 10 inches long, though there were variations. The six inch version was designed to fit into a shirt pocket (inside a plastic pocket protector, naturally).

In the early 1970s pocket calculators were introduced, wiping out slide rules forever. I believe it was the fastest replacement of one technology by another in the history of the world! But it's important to remember that we went to the moon, and back, using the slide rule. Yes, they did calculations with the computers of the day, but be assured that every engineer associated with the space program had a slide rule, and knew how to use it. In the movie "Apollo 13" when the oxygen tank exploded and the mission had to be scrubbed, calculations were made at Houston Space Center with a slide rule.

There was also a circular version; it was unique because the user never had to reverse course; change from the left "1" to the right "1". It was used by the Peter Sellers character in the movie "Dr. Strangelove, or How to Stop Worrying and Love the Bomb" in the final scene, as he tries to convince the US President as to what to do to counter the Soviets' Doomsday device.



To the moon – and back. The slide rule calculation that saved Apollo 13; from the film "Apollo 13".

To those who went to school in the BC (Before Calculators) era, the slide rule was the premier multiplying device, primarily for engineers and

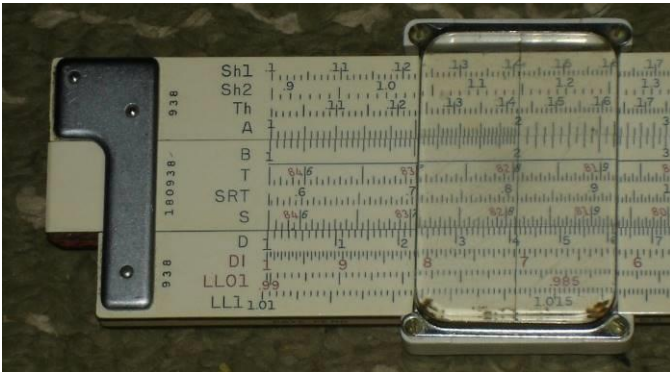
other technical types. One can't add or subtract numbers with a slide rule. That's what paper and pencil are for, though there was a type of slide rule that did just that. I understand it was used by structural steel detailers.

The normal slide rule is based on the logarithm of numbers. $\log(a*b) = (\log a + \log b)$. To multiply two numbers, add the logarithms. To divide one number by another, subtract the logarithms. Slide either the left or right "1" of the C scale of the slider over one of the multipliers on the D scale, move the cursor over the other multiplier on the C scale, read the answer on the D scale. One had to extrapolate the answer from the scales. The accuracy is around 1 part in a thousand, somewhat depending on the skill of the user to estimate distances.

Yes, I loved the slide rule, lovingly called a slipstick. My love affair started as a junior at Allentown High School in the late 1950s. I had been struggling with calculating square roots for years; I just never was able to do it right. So when my Chemistry teacher, Willard Clewell, offered an after-school session to teach anyone interested how to use a slide rule, I jumped at the opportunity. We did the usual $3 \times 4 = 12$ using the C-D scales, then went to more complex operations. Convert the numbers to single digits times 10 to an exponent. Read the answer and add the exponents. Simple.

Then, we went onto the A-B scales for calculating square roots. The A-B scale has two scales, a left hand scale and a right hand scale, located above the D scale. Convert the number to a number multiplied by an even exponent of ten. If the number has an odd number of digits, use the left-hand scale. An even number of digits, use the right-hand scale. Set the cursor (the transparent slider) to the number, read the answer on the D scale. Divide the x10 exponent by two, and voilà, the square root! The heavens opened, and the veil of darkness was lifted from my eyes. I was on my way to calculating the way engineers do. I never looked back!

For years I estimated calculations mentally by picturing a slide rule in my mind, moving the slider and cursor, and "reading" the answer. This technique was especially useful when estimating square roots.



See how simple this is? The sq. rt. of 2, 200, 20,000 (A-B) is 1.41, 14.1, 141. (D)

Most slide rules also had trigonometric functions and log scales. More sophisticated ones had specialized scales.

I was a paper boy (remember those?) for the Morning Call at that time, and had accumulated a number of "credits" from my route. I traded them for a rather good slide rule that I used for years, well into the Engineering curriculum at Lafayette College.

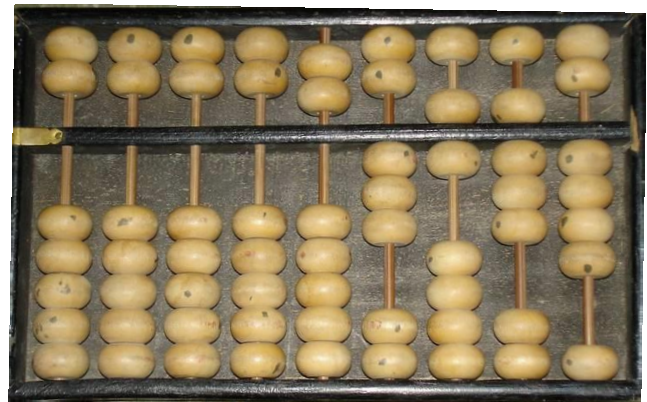


K & E Log Log Duplex Decitrig Slide Rule. $1.5 * 4 = 6$;
 $1.5 \times 10^3 * 4 \times 10^2 = 6 \times 10^5 = 600,000$

One of the Rites of Passage of Engineering students in college was to purchase a good, professional quality slide rule. Electrical Engineers used a K & E Log Log Duplex Decitrig slide rule. Decitrig means angles were in decimal units of degrees, not degrees and minutes. Mine has 22 scales. The price was a little over \$32.00. Other disciplines had other specialty scales. The instruction book was 124 pages. They always came in a very nice leather case to protect the precious contents. The Civil Engineers' case had a loop to attach to their belt, which we EE's mocked at every opportunity!

We treated our slipsticks with loving care. Before an exam, we could clean and "calibrate" them, to ensure that all the scales lined up. We all had a small screwdriver to do this. The slider had to be lubricated carefully, so that the movement of the slider and cursor was silky smooth, but firm enough so it held its position. I believe that some of us treated our slide rules better than we treated our wives!

Yes, in a world of calculators it's easy to forget the slide rule, and how ubiquitous they were. However, we lost something going from slide rules to calculators. The nice thing about a calculator is, you don't have to think very much; the bad thing is, you don't have to think very much. You just punch in the numbers and read the answer. When using a slide rule you have to be engaged. You have to think about the problem, and estimate the solution. You are more intimately involved. Errors, especially errors of orders of magnitude, quickly become apparent. Not so with calculators.



On the bottom, each bead is 1, on the top each bead is 5. The sum of the bottom and top is one digit. The above number is 3,684.

Since we are sashaying down Memory Lane, a short comment about the abacus. A generation ago it was common outside of North America, especially in the Far East. Mine was given to me by my father, who was pretty good at it. I never learned how to use it well. I keep it because, why not? Paper and pencil worked fine with me, though I can see its use when these are not available. In many parts of the world paper and pencil was too expensive, so the abacus remained in use until the recent past.

Continued on page 19

In the 1960s computer rooms often had an abacus in a glass case hanging on the wall, with the designation, "In Case of Power Loss Break Glass".

I will admit the only time I ever pull out my slide rule is to show someone how it used to be. Pocket calculators have become so powerful there is no comparison, but old loves never die. Especially first loves.

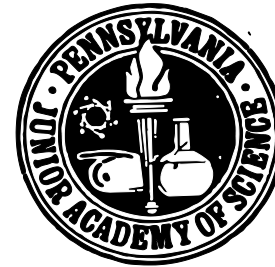
Besides, the batteries last forever. Even in the dark.

Remember, we all stumble, every one of us. That's why it's a comfort to go hand in hand.
- Emily Kimbrough

**A FEW WORDS FROM THAT VISIONARY
DR. AUGUST POLINSKE**

- A clear conscience is usually the sign of a bad memory.
- If you must choose between two evils, pick the one you've never tried before.
- A fool and his money are soon parting.
- Plan to be spontaneous tomorrow.
- If you think nobody cares about you, try missing a couple of payments.
- I'd kill for a Nobel Peace Prize.
- Borrow money from pessimists-they don't expect it back.
- Half the people you know are below average.
- 99 percent of lawyers give the rest a bad name.
- Forty two point seven percent of all statistics are made up on the spot.
- A conscience is what hurts when all your other parts feel so good.
- If you want the rainbow, you gotta put up with the rain.
- All those who believe in psycho kinesis raise my hand.
- Early bird gets the worm, but the second mouse gets the cheese.
- OK, so what's the speed of dark?
- How do you tell when you're out of invisible ink?

- If everything seems to be going well, you have obviously overlooked something.
 - Depression is merely anger without enthusiasm.
 - When everything is coming your way, you're in the wrong lane.
 - Ambition is a poor excuse for not having enough sense to be lazy.
 - Hard work pays off in the future. Laziness pays off now.
 - Everyone has a photographic memory. Some just don't have film.
 - I intend to live forever -- so far, so good.
 - If Barbie is so popular, why do you have to buy her friends?
 - Eagles may soar, but weasels don't get sucked into jet engines.
 - 24 hours in a day ... 24 beers in a case ... coincidence?
 - Who is General Failure and why is he reading my hard drive?
 - What happens if you get scared half to death twice?
 - I used to have an open mind but my brains kept falling out.
 - I couldn't repair your brakes, so I made your horn louder.
 - Why do psychics have to ask you for your name?
 - If at first you don't succeed, destroy all evidence that you tried.
 - If at first you don't succeed, then skydiving definitely isn't for you.
 - A conclusion is the place where you got tired of thinking.
 - Experience is something you don't get until just after you need it.
 - The colder the X-ray table, the more of your body is required to be on it.
 - The hardness of the butter is proportional to the softness of the bread.
 - The severity of the itch is proportional to the reach.
 - To steal ideas from one person is plagiarism; to steal from many is research.
 - The problem with the gene pool is that there is no lifeguard.
 - The sooner you fall behind, the more time you'll have to catch up.
-



Dear Friends of PJAS:

On **Saturday, February 25, 2017**, junior and senior high school students affiliated with the Pennsylvania Junior Academy of Science Region III will present their science, computer, and math projects at **Easton Area High School in Easton, PA**. Please consider donating your time and talent to serve as a judge of these presentations. **We need your help to promote the appreciation of science, technology, and math in today’s young people. Help us provide a meaningful experience for them as they develop interest in these disciplines.**

SCHEDULE OF THE DAY:

JUDGES’ CHECK IN / ORIENTATION (EASTON HIGH SCHOOL CAFETERIA)
 Refreshments served and information packets distributed at check-in.....8:00AM

Students in Rooms9:10AM

Student Presentations (7th and 8th Grades).....9:15 - 11:30AM

LUNCH (Judges, Sponsors, and All Day Assistants are given a courtesy lunch.)
 11:30AM - 1:00PM

JUDGES’ ORIENTATION (EASTON HIGH SCHOOL CAFETERIA)12:45PM

Students in Rooms1:25PM

Student Presentations (9th - 12th Grades)1:30 - 3:30PM

ESTIMATED # OF JUDGES NEEDED FOR THE 2014 PJAS MEETING:

210 Judges for morning presentations (based on 640 presenters @ 8/room with 3 judges /room)
210 Judges for afternoon presentations (based on 640 presenters @ 8/room with 3 judges /room)

If you can judge or assist in any way, please fill out the attached form. Please duplicate the Judges’ Registration Form and distribute it to colleagues and friends that might be able to judge or assist at the 2016 PJAS Meeting. Return the judges forms to: [mbasile@ salisbury.org](mailto:mbasile@salisbury.org) or Megan K. Basile, 2085 Brook Circle, Macungie, PA 18062.

Thank you for your interest and support. Please reply **as soon as possible**.
 Additional information will be sent to individuals who have sent in the Judges’ Registration Form.

Sincerely,

Megan K. Basile



REGION III PJAS
JUDGE REGISTRATION FORM
2017 PJAS Regional Meeting
Feb. 25th at Easton Area High School

(Please type or print)

NAME:
(Title) (First) (Last)

PROFESSION:

BUSINESS OR GROUP AFFILIATION:

MAILING ADDRESS:

HOME:
Address:
City, State, Zip Code:

BUSINESS:
Address:
City, State, Zip Code:

TELEPHONE:

WORK:

HOME:

E-MAIL:

WORK:

HOME:

WILLING TO JUDGE: _____ AM Session _____ PM Session _____ Both Sessions

DO YOU HAVE EXPERIENCE AS A PJAS JUDGE ? _____

IF YOU ARE A FIRST TIME JUDGE, PLEASE INCLUDE A BRIEF DESCRIPTION OF YOUR QUALIFICATIONS WITH THIS FORM.

RETURN FORMS TO: Megan K. Basile
e-mail: mbasile@salisburyisd.org
2085 Brook Circle
Macungie, Pa 18062
Telephone: 610-366-9234



Lehigh Valley Chapter
Pennsylvania Society of Professional Engineers
Lehigh, Northampton, Monroe and Carbon Counties



Minutes for the January 10, 2017 Board of Directors Meeting
6:00 pm at the office of Barry Isett & Associates, 85 S. Route 100, Allentown, PA

Attendees: Al Gruenke, Ray Szczucki, Al Dezubay, Kevin Campbell, Frank Walsh, Angelika Forndran and Chris Williams

- A. Call to Order – Al Gruenke called the meeting to order at 6:03 pm.
- B. President – Al Gruenke
- The holiday party was great. Morgan’s did a wonderful job.
 - Tour of UL Laboratories coming up on 2/17/17
 - Al attended LVEC meeting on 1/9/17
 - i. Engineers’ Week Banquet will be held on 2/24/17
 - ii. Movie “Dream Big” was created by ASCE. The film will be viewed by local students at various times beginning in late February.
 - iii. Screenings being held at SteelStacks, with donations requested to help cover costs of buses.
 - iv. Al will request a donation from PSPE.
 - v. All agreed that the Lehigh Valley Chapter should contribute \$250. Motion by Angelika, seconded by Kevin, all were in favor.
 - vi. The donation comes with admission for two to the first screening on Monday 2/20/17. Registration at 5:30, film starts at 6:15, reception/drinks afterwards.
 - December newsletter featured a thank-you letter from past scholarship recipient Alan Johnson
 - EOY & YEOY applications due by end of month. Application is on Chapter website.
 - Al is going to question the state on the issue of citizenship as a requirement for EOY/YEOY.
- C. Scholarships – Al Dezubay
- Website has been updated with the past three years of scholarship recipients.
 - Applications will be due 3/12/17. Al expects to have recommendations to the Board at the April meeting.
- D. Past President – Kevin Campbell
- Kevin is working on nomination of officers for next year.
 - MATHCOUNTS:
 - 25 schools registered with 215 participants
 - Will meet Friday 2/10/17 for setup
 - No more giveaway items. Working on re-stocking t-shirts.
- E. Treasurer – Ray Szczucki
- Current balances: +-\$16,000 in money market account and \$1,068 in checking. Additional funds in PayPal.
 - Ray recommended preparing a budget for the Chapter. We have regular income from dues, so we could make a projection of the expected income for next year based on our current membership figures.

F. State Director – Angelika Forndran

- PJAS (Pennsylvania Junior Academy of Sciences) is looking for judges for their competition on 2/25/17. Needed for either AM or PM sessions.
- Board meeting coming up on 1/28/17 in Camp Hill. Angelika will submit activity report by 1/20/17.
- Chapter needs to determine who will serve as Alternate State Director if Brian becomes president of the Chapter next year. Also, is Angelika able to serve as State Director again?
- John Nawn encouraging all to obtain PSPE license plates and encouraging younger engineers to obtain licensure.

G. Adjournment at 7:39 pm on a motion by Al D., seconded by Frank.



FOR – N – SIC