

# Engineering for a Better Life



## THE SKUNKWORKS AT NEW RINGGOLD

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### So What's the Buzz?

Some years ago it came to my attention that local bee keepers all across the United States were noticing a strange occurrence in their bee populations.

It seemed that they would inspect their bees in the afternoon and when they came out to check on them in the morning they would be almost all gone. Vanished without a trace!

Now this may not seem a radical problem, after all what's a few bees here or there. I thought as much myself until I began to hear more and more of a previously unknown affliction called Colony Collapse Disorder or CCD.

This mysterious disease would wipe out entire populations of bees. About now you may be asking so what as you shoo a buzzing bee away that's trying to get to the flower behind you in your garden.

It turns out that a lot of the foods that we eat, those that grow from the ground that is, are depended upon these industrious little guys to pollinate them and induce the growth of things like fruits,

and nuts and many other yummy things. I of course enjoy eating as much as the next person, perhaps a bit more if I was being honest.

That being said I began to take a serious look at this very important social problem. In the United States there are around thirty-three major bee keepers who are hired by large commercial farms to bring their bees onto the farms to pollinate the plants.

The farmers, or more likely the lab technicians that work for these large corporate farms layout a grid, usually two square meters and do a patient count of the number of bees which visit the plot during the time that the bee keeper allows his bees to visit the plants on the farm. The number of "lights" and times that the flowers are visited are counted and using a formulae the bee keeper is paid his wages.

These guys are really busy because as you know there is always something good growing somewhere in the United States. As these disappearances begin to affect the bee keepers efforts to pollinate the farms, the amount of

food produced is reduced.

This causes a series of rather serious events. The price of food goes up which affects the number of people who are able to afford to buy those foods, etc...

While researching the issue of CCD I discovered that the bee population as well as other populations of pollinators have been under duress by many different factors, the use of pesticides which find their ways onto the flowering plants that bees frequent, the changes in climate which affect how the bees keep their homes warm or cool during the year, viruses which affect the bees natural systems and parasites which infest them if their systems are weakened.

So where does that leave us at the Skunkworks? Well as a animated character once said "See a need fill a need." I began a study of bees from an engineering prospectus. I ignored the pundits who say that bees can't fly, its aerodynamically impossible and began a system by system analysis of the bee its self as it relates to this very important work, pollination.

More to come, stay tuned!

### Special points of interest:

- LECTURES AND CLASSES
- POLLINATORS IN YOUR BACKYARD
- ALTERNATIVE ENERGY
- ENGINEERING FOR KIDS

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# Engineering for a Better Life

## Education as a Process Instead of an End Goal



During the normal year I have privilege of teaching 200 — 250 kids from ages 6 through 18, as well as any adults who hang around to listen to the science, the historical stories and the what ifs. None of these kids are under any pressure to score high grades, or to even attend the classes that I offer at all. Yet they keep good note books and work in teams to conquer some difficult problems and they enjoy themselves while they do it!

Now as many of you know from my past articles my focus has become the education, and perhaps that is the wrong word, the possibility of exciting, perhaps is a better choice of phrasing, young people. Giving them a chance to experience what it is like to be an engineer. It is this opportunity, I feel, that should be shared with as many of our youth as possible.

In conjunction with the my institute, The Weatherly Institute for Robotics and Engineering, Bloomsburg University as well as private schools

in which I teach I have been allowed to reach out to these young people, to engage them in an immersive engineering environment and to spark their imaginations

During the year I teach such diverse courses as, Alternative Energy, “Building a Green Home”, Aerospace Engineering with a week devoted to the world of in atmospheric flight and a week devoted to space flight, another week of Basic Robotics followed by, you guessed it, an Advanced week of Robotics. I have added Structural Engineering, Electronics and Nanotechnology to the list of courses offered by W.I.R.E.

A word about process and about achieving goals. Each of the many projects that I assign the young people in my classes has an engineering lesson built into it. I do lecture, but I surround the concepts with real work. All of my classes involve a “hands on” approach that demands team work, good communication skills, conceptualization,

system development and note keeping. It is a process that begins with a series of parameters and ends up, well let’s just say may times the results are better than this teacher could have hoped for.

Does any of this matter?

Well you can ask the young people who have gone through my programs and who are now approaching adult hood and who are about to go into the real world, whether these types of courses influenced them into going into engineering careers. I bet that you will find a lot of them who would say that these courses changed their lives. I know that they will be changing our lives in the near future, for the better!



Symmetry, find out what it means to me!

## Planting for a Better Buzz

It is fast approaching Fall and the colder weather. Thoughts of the halcyon days of Summer will slip into a pleasant memory as we face the snow and bitter cold of Winter.

Yet this is the perfect time to sit down and analyze your Spring time planting designs.

While it is fresh in your mind, remember and record the successes and the failures of your gardens.

The areas that were sunny and bright most of the day and those that fell into shadow to frequently to support good growth. Those areas that were to dry and

those that were to wet and those that were just right!

Remember to, our pollinators and plan to have areas to plant bright flowers and herbs to attract them and to provide them with a food source.

Your veggies will thank you with a good harvest.



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## Alternative Energy – The Great Debate

It is hard to believe that our Nation's entire method of delivering power to our homes, businesses and factories, can be traced to a debate that took place over one hundred years ago. While this was not a debate in the traditional sense, it is one that had a profound effect on our society. Thomas Alvin Edison and Nicola Tesla, two giants in the annals of science and electricity had a feud over the proper approach to mass energy transmission. The following are some interesting historical notes that were known to have originated from these two brilliant inventors within the field of electrical engineering.

Nicola Tesla: Alternating current will allow the transmission of electrical power to any point on the planet, either through wires or through the air, as I have demonstrated.

Thomas Edison: Transmission of alternating current over long distances requires lethally high voltages and should be outlawed, to allow Tesla and Westinghouse to proceed with their proposals

is to risk untold deaths by electrocide.

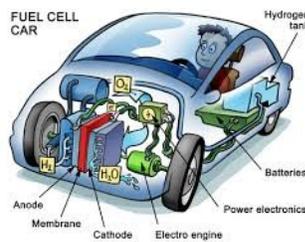
Thomas Edison: The most efficient and proper electrical supply for every type of device from the light bulb to the phonograph is direct current at low voltage.

Needless to say Nicola Tesla won the debate and as a result our power is generated from large power generation plants and brought to us over high tension power lines. The power is "dummied down" by the use of transformers on poles outside of our homes, so that we may use it with a certain degree of safety.

Fortunately, we have moved away from devices that demand large amounts of power. Our computer driven devices actually use direct current in low voltages, just as Edison described. They now take our alternating current and transform it back to direct current before using it. While the debate over revamping our "National Power Grid" rages on, remember that alternative energy generators such as wind, solar and even hydro-

gen fuel cells create direct current. This energy must then be transformed into alternating current to fit into Nicola Tesla's vision of power, at a substantial loss of energy.

Wouldn't it be nice if we could use that power as it was created, as our new computer driven equipment demands?



## The Passing of an Institution

I became acquainted with Camp Brainerd when as a Presbyterian I received a letter stating that the Camp would soon be closing its doors forever.

I was curious so I road out to the Camp in Snydersville PA. There I met with the Camp's director and after falling in love with the beautiful setting and the children who were

staying there, I offered my services. I suggested that I could teach weekend camps covering different engineering disciplines for each camp.

Well that was five years ago, while my camps were very well attended for the most part with many returning students coming back year after year in the end it was not enough to stem the

tide of high costs and to little fiscal support, the camp was closed at the end of this summer's camping season.

While I personally feel that more could have been done I understand the causal factors. Now all that remains are memories and pictures of the past. G' Bye Camp Brainerd.

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It is the goal of The Weatherly Institute for Robotics and Engineering to create a culture of Science and Technology in which young people and adults may come to learn and be inspired!

Over the years we have watched as technology has increasingly driven our culture, while the number of people who are actually taking engineering and technology courses have decreased. Even more maddening is that this knowledge base has found its way overseas and to other countries making the United States vulnerable to the whims of a global economy.

### **We are a Christian Based Organization. We Believe!**

W.I.R.E. has taken the challenge up in a small way, bringing young children, young adults and adults to the class room and exposing them to a wide range of engineering opportunities.

For ten years I have operated two distinct corporate structures. My For profit company: KG Projections, Inc. and The Weatherly Institute for Robotics and Engineering or W.I.R.E. a PA recognized non-profit.

My for profit company generated most of the monies needed for my non profit to survive and help teach the children.

Now I am introducing a third arm, The Skunkworks at New Ringgold. While not a separate company it will become the umbrella structure to support my other two enterprises and will allow me to open up a research facility dedicated to creating new technologies to help in our struggle with a changing climate and alternative energy strategies.

I intend to share some of these concepts with you my readers beginning with the Robotic Bee program. So please look for further developments in the pages of this newsletter and those to follow.

I would also like to invite you to donate as you see fit. I currently need a stereoscopic microscope with camera mount.

Thanks: Stephen Goodale

## The Real World Design Challenge RWDC 2014-2015

This year we will be once again offering an opportunity for young men and women to become involved in a unique engineering challenge.

The Real World Design Challenge, invites high school students to become involved in real engineering and design problems. Last year our team from Weatherly worked together to learn about European Corn Borers and how to recognize their appearance in a mile wide track of farm land.

The team then had to discover what regulations were in place that would allow the

design, construction and implementation of an unmanned drone.

The purpose of the drone was to arrive at the designated coordinates and to examine the field for the corn borer. That data was then to sent back to "base" for analysis and then dissemination to the farmer so that he or she could apply only the amount and in the area needed of the pesticide to control the corn borer.

While this seems like a daunting task it is done in a virtual world. Simply put the competition is done completely in two software pack-

ages, Cero 2.0 and Mathcad. The students learn how to create a complete 3D model of the craft including all internal working components and then they test its flight characteristics in Mathcad, where all of the components are analyzed and validated.

This year they will be asked to modify their original design and increase the scope of the field studies to five acre land plots.

The software, which the Institute gets for free, runs about a million dollars on the open market. We are provided with a professional in aerospace to help in the process.

## The FIRST Lego League Competition 2014—2015

Students from St. Joseph Church School Danville will be competing in this year's FIRST Lego League competition, REAL WORLD CHALLENGE to be held on November 22, 2014 at the Lansdale Catholic High School in Lansdale, PA.

The students will design and build a robot that will compete on a 4' x 8' playing field. This is a task oriented competition and the winner will be selected on the number of points accumulated over five rounds. The students will also do a research project and present it to a panel of judges.

Go Tigers!