

Engineers' News

March 2019

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www.FortWayneEngineersClub.org



Find us on



March Tour



[TekVenture](http://www.TekVenture.org)

[1550 Griffin St, Fort Wayne, IN 46803](http://1550GriffinSt,FortWayne,IN46803)

Thursday, March 21, 6:30 pm

TekVenture's new location and expanded areas of interest. March 21, 2019, at 1550 Griffin Street, near the Hosey Dam. Starting time will be at 6:30 pm.

Mandatory: Appropriate shoes or better footwear which cover toes and heels. Long pants/slacks.

Across the world, hundreds or thousands of people of all ages are now becoming actively engaged in a growing "culture of making" in no small part inspired by MAKE® magazine, the "21st-century Popular Mechanics" magazine, and "Maker Faires®", now operating on five continents. This self-conscious, creative, tech-savvy, internet-connected "Maker Nation" is propagating a Third Industrial Revolution.

The Vision of the TekVenture sees a member-driven, regionally-centered, neighborhood-friendly, non-profit organization and facility interconnecting imagination, technology, and community, by providing members access to tools and equipment they cannot afford to own, offering informal education to the public through technical workshops, and providing design, technical and prototyping services to artists, inventors, educators, and entrepreneurs.

Founded in 2006, TekVenture has spent a decade attracting thousands of people to "make things," providing community-oriented, creativity-inspiring events including six years of Chain Reaction Challenge, five years of Maker Faire@s, three years of Taste of The Arts, an on-going association with the Allen County Public Library, (a documented association that directly influenced libraries through the US,) and since 2015, operating in a permanent 13,000 sq. ft. facility at 1550 Griffin Street, all with volunteer labor, donated tools and facilities and virtually no funding.

Got something you want to make, a technique you want to learn or a tool you want to use? Come to TekVenture and start Making your future!

Most of TekVenture is intended for all ages. Expansions include theater, woodworking, and an active Fort Wayne Inventors Club. The FW Inventors Club is also potentially helpful if interested in patent law.

Future Tours

April tour: The old GE building, now called Electric Works.

Thursday, April 25, at 3:30 pm.

RSVP at Treasurer@FortWayneEngineersClub.org.

Limited to 30 people. A four-page PDF file including a required waiver will be e-mailed in reply to the first 30 who RSVP. Print and complete the waiver before arriving at the tour, because daylight will be limiting our time on the site. No facilities or artificial light will be available onsite. Expect conditions of a vandalized abandoned building with some contractors working onsite.

- Participants must be able to climb multiple flights of stairs and walk over uneven surfaces, puddles, and debris.
- Mold, mildew, lead dust, broken glass, and other hazards are likely to be present where we tour.
- **Mandatory: Appropriate shoes or better footwear which cover toes and heels, plus socks covering at least ankles. No open toes, open heels,**

slippers, flip-flops, etc..

- **Long pants/slacks and shirts with sleeves will also be required. No shorts, skirts, nor dresses.**
- **Dress appropriately to be out in the weather. There will be no heat or lights, some exposure to rain and wind.**
- Bring your own appropriate eye protection. Ordinary glasses are okay.
- The actual tour will vary based on building and contractor conditions at that time. Tunnels and other enclosed spaces cannot be visited.

PLEASE MONITOR FUTURE NEWSLETTERS FOR REQUIRED CLOTHING AND OTHER DETAILS.

Free Plane Ride for Kids

FREE AIRPLANE RIDES BY EAA-2 FOR KIDS:

Our local Experimental Aircraft Association Chapter 2 (EAA-2) has scheduled two Young Eagles flight events. These are FREE AIRPLANE RIDES for kids, 8-17 years-old. One is Saturday, May 4, from 9:00 to 1:00 at the Vintage 37 Clubhouse on DeKalb County Airport. The other is Saturday, May 11, 9:00 to 1:00 at the historic Hangar 2 on Smith Field. It is best to arrive a bit early to avoid waiting in line, and the atmosphere can get more turbulent as the day warms up.

EAA-2 has scheduled its monthly "get-togethers" for the Fridays of March 8, April 12, and May 10. These are 7 PM at the Ivy Tech Aviation Center along Cook Road in the northeast corner of Smith Field. This is typically for members but visitors are welcome and/or one can become a member during the gathering. The Ivy Tech Aviation Center typically has lots of things to look at and/or touch, including a wealth of static engines intended for teaching.

Northeast Indiana Chapter Project Management

Institute



April 24, 2019 - Running to Leadership: Team Building and Leadership Workshop

Topic: Running to Leadership: Team Building and Leadership Workshop, Speaker: Anthony Reed, CPA, PMP

Anthony Reed is a CPA, PMP, runner of 131 marathons, and Certified Running Coach. He has completed multiple IT projects on or under budget for Fortune 500 companies, governments, and large consulting firms. The project processes are closely analogous to marathons in preparation, endurance, resource limitations, interpersonal relations, and response to unexpected threats. He has completed marathons on all continents including Antarctica.

The event is intended to accommodate inexperienced as well as experienced students, employees, consultants, and executives. It will address both physical and mental preparation, motivation, and risk mitigation.

The workshop will be 8:30-4:30 and limited to the first 30 registrations. Cost is \$85.

NEIC will hold its April meeting 5:00-6:00, focusing on Work-Life Balance. Cost for the Workshop and the April meeting is \$95. Cost for the April meeting alone is \$20.

The April meeting will be followed by Purdue Fort Wayne student Teach-Back Presentations 6:15-7:15. Cost is free.

The location for all three is Walb Student Union, Room G-21. [2101 E Coliseum Blvd, Fort Wayne, IN 46805](#)

[Register Here](#)

FWEC roster for FY2018-2019

FWEC roster for FY 2018-2019:

President: John Magsam

Vice President: Open and under discussion; comments and suggestions welcome.

Treasurer: Ryan Stark (456-0809).

Treasurer Trainee: Volunteer needed.

Secretary: Marna Renteria.

First-year Board Members: Rob Cisz. Another volunteer needed.

Second-year Board Member: Dave Gordon, Morgan Miller. Another volunteer needed.

Third-year Board Member: Rod Vargo (416-0986). Craig Welch.

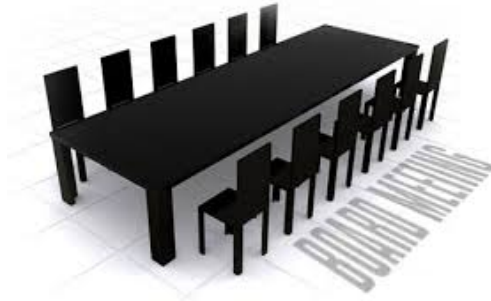
Editor of Engineer News: Maruf Ahmad.

Membership and Contact Chair: Dave Schaller.

Northeast Indiana DiscoverE Chair: Rob Cisz.

PLEASE CONSIDER STEPPING UP INTO ONE OF THE OPEN POSITIONS. Most require very little time. The economy is booming, so tasks are being distributed across more people. Outgoing individuals are experiencing increased demands outside FWEC. Historically, Board Member ages range from high school through retirement. Participation tends to return more than it takes.

FWEC Board Meetings



Fort Wayne Engineers' Club board meetings are open to all FWEC members. The next FWEC board meeting will be on Tuesday, April 2nd at 7:00 PM. Board meetings are held on the [Indiana Tech campus in the Academic Center](#) in room ACC-201.

Advertise in the Engineers' News

The FWEC provides advertising space within the Engineers' News. Advertisements are \$10 per issue and limited to ½ page of content. For submissions please contact info@fortwayneengineersclub.org.

Northeast Indiana DiscoverE Banquet

DISCOVER ENGINEERS WEEK



FEBRUARY 17-23 , 2019

The Northeast Indiana DiscoverE Committee hosted the annual Engineers Week Banquet on Saturday, February 23rd at Parkview Field, with Dave Schaller as the Master of Ceremonies.

The banquet events kicked off with the Keynote Speaker Jeffrey W. Clark. Jeff is a Director for the Raytheon Company. The very relevant, interesting, humorous, and topical presentation briefly covered some of the impacts of engineers on current society and bringing forth statistics, initiated the conversation on the shortages of engineers some industries are now facing.

Then Rick Slayback and Rob Cisz and presented the highlights of Engineers Week activities, including the Middle School and High School Bridge Building Contests, FIRST® LEGO® League, and the DiscoverE Future City Competition.

The banquet presented academic awards to local engineering students. Academic awards were donated by the FWEC and other local societies and engineering companies. Award recipients and donors are listed below.

- Nick J. Anderson, Purdue Electrical Engineering, Association for Facilities Engineering
- Jacob M. Hansel, Purdue Mechanical Engineering, American Society for Quality
- Ian J. Kissel, Purdue Mechanical Engineering, Society for Automotive Engineering International
- Carlos D. Lopez, Purdue Mechanical Engineering, Society for Automotive Engineering International
- Connor J. Malott, Purdue Mechanical Engineering, Steel Dynamics Inc.
- Elizabeth Manes, Purdue Mechanical Engineering, Oscar and Ophelia Memorial
- Ethan J. Pappas, Purdue Biomedical Engineering, PHD Inc.

- Benjamin D. Walters, Purdue Biomedical Engineering, Fort Wayne Engineer's Club



The banquet also presented the Citizen Engineer award. Jack W. Philipot was awarded the Northeast Indiana Citizen Engineer Award for 2019. Jack has volunteered multiple times over the past years as a Board Officer of the Fort Wayne Engineers' Club. He has memberships in several engineering societies including Biomedical Engineering Society, ASM International the Materials Information Society and the Fort Wayne Engineers' Club, in addition to many other volunteer activities within the Fort Wayne community.

Jack received his BS in Manufacturing Bowling Green State University in 1986. He worked for a couple of years as a Research and Development Engineer at Crane Plumbing before entering the medical device manufacturing industry in 1988. Jack began working at Zimmer, Inc. in Warsaw, Indiana as a Process Engineer in packaging and then transitioned into Knee Systems Development in 1991. In 1995, Jack accepted a position at Biomet, Inc., also in Warsaw, where he first designed hip and shoulder implant systems, then moved into marketing for extremity products, and ultimately became the marketing managing for the arthroscopy division. During this time, he also completed an MBA. Shortly thereafter, in 2005, Jack accepted his current position leading the Biomedical Engineering program at Indiana Tech in Fort Wayne.

Please join us in congratulating Jack's many contributions not only to the field of biomedical engineering, but also the compassionate giving of his time and talents.

A final note of thanks to the generosity of the Northeast Indiana DiscoverE Engineers Week Banquet [Award Donors](#), [Sponsors](#), and all the 2019 DiscoverE Engineers Committee members and associates.

We the DiscoverE Engineers Committee, recognize and celebrate the value engineers bring, as they face major technological challenges from rebuilding

infrastructure following natural disasters to combating terrorism in maintaining a safe and vibrant local, national and ultimately global economy; and rising to meet challenges of the future.

The purpose of the DiscoverE Committee is to encourage our young math and science students to realize the practical power of their knowledge and to assist engineering students and the cooperative development of engineering jobs in the local Fort Wayne area, as to improve the quality of life for people the Fort Wayne community and around the world. It is exciting to serve this worthy cause, if you want to join us please reach out via the website at <https://discovere.in/contact/>.

February Tour Summary



[Franke Plating Works Inc](http://www.frankeplating.com)

Eleven members attended this tour. Franke Plating Works has three facilities between Washington Boulevard and Wayne Street, just east of Anthony Boulevard. It is a family owned business which has evolved through generations of operations since 1930. We toured the facility designed for traditional manual labor techniques and anywhere from one to several thousand objects (i.e., pallet loads) per job order. Another building houses automated endeavors which have routinely changed and/or expanded as needed for various manufacturers' and international cost controls, product specifications, customer environmental specifications (often European protocols), and volume production requirements.



A third facility is their original well-maintained 1930 building fronting Washington Boulevard (heavily trafficked) which has served various businesses and retail uses but will soon take over as their specialty retail location for restoring individual items such as firearms, lamps, plumbing fixtures, car parts, tractor parts, and leather. The staff showed a keen interest in a wide variety of crafts and special knowledge. Gunsmithing includes the effects of historic and modern metal plating on wear and accuracy. Old brass fixtures can hide internal metal(s) which would dissolve if the wrong restoration process is used. Historic brass is often an alloy with lead, a potential source of exposure but also part of the item's appeal. More recent brass is lead-free but often not as durable. Franke's staff obviously enjoyed working with people's old stuff, despite upfront honesty about some treasured items.

Black oxide or anodized finishes are referred to or partnered with Wayne Black Oxide, Inc., or Fort Wayne Anodizing, respectively. These are separate disciplines requiring specialized workers and environmental controls.

Traditional methods require a series of dip tanks for meticulous cleaning of surfaces, inside and out. Water is widely used for cleansing and as various acids, but the object to be plated might have to be utterly dried to avoid vaporizing all or part of it during plating. Old-fashioned chrome surfaces were repeatedly mentioned as inherently having microscopic cracks which can retain or permit penetration by water, oil (the cracks often intentional for enhanced lubrication), or other metals. Some plastics inherently generate hydrochloric acid over time, limiting which metals may be associated with them. Proper cleaning and preparation is the art, science, and secret of effective metal plating.

After cleaning, plating can involve soaking the object in a caustic or acid bath

containing the metal (in solution and as visible pieces) to be layered. We extensively discussed electroless nickel, alone or in combination with other materials. Depending on circumstances, it can function as an anticorrosion factor, very smooth finish, lubricant, and more. (Much worthwhile info readily available online.)

Electrolysis is another method of plating. Up to 6,000 amps at 4-7 volts are passed through the object while submerged in an appropriate bath for the metal to be plated.

If visual appearance of the object is not important, objects can be placed in a rotating horizontal barrel containing the bath and appropriately dangling wire feeds for electrical flow. The barrel is steel for strength but coated in polypropylene to protect the steel and as electrical insulation.

If visual appearance is important, and cost allows, then old-fashioned soaking in electrified baths is used for plating. Thousands of identical small parts and fittings might be placed, automated or by hand, onto custom-designed racks. These part-specific racks conduct electrical flow from where a contact point does not visually show on the part, and up to the top of the rack. Racks are hung into the bath from a horizontal electrode. Sacrificial metal (the source for metal to be plated) hangs into the bath from an oppositely-charged rod.

Potentially, layers of different metals can be deposited by using these various methods, one layer at a time. The primary costs are labor and time, the time being required for consistent attention to various details.

A considerable range of sizes seemed available for the dip and bath tanks. The second greatest expense is the cost of plating metals and, to an extent, materials for solutions. So, within reason, smaller tanks exponentially reduce volume and therefore expense. Brief discussion indicated the change of pace is enjoyable when very large pieces are feasible, but exponentially escalating costs severely limit the size of treated parts. All of the varied tanks were arranged inside secondary containment pits, required by law to contain potential spills and leaks. The secondary containment was the length and width of swimming pools, although a uniform depth and dry. Various features inherently prevent falling in and other mishaps. Extensive investments in polypropylene, such as tanks and specialized flooring, provide very effective electrical insulation and chemical resistance.

Franke Plating Works is a rare vendor in the U.S. to offer cadmium and/or hexavalent chrome treatments because it implemented environmental controls and regulatory oversight over the decades as these developed over time. Military requirements are the primary demand for these treatments. (Ed.: My online research indicates chroming may radiate away up to 90% of heat loads, and a specific chrome paint may leave a vehicle resembling the night infrared image of vegetation.) More recent businesses tend to find the environmental tasks too daunting and costly to develop, also hard to staff, but deadly serious military demands do not go away.

Trivalent chrome is used for most nonmilitary applications involving chrome, but demand for it is relatively minimal. Trivalent chrome is inherently limited to a very thin layer which is easily scratched, therefore poor protection against corrosion and is not particularly lustrous. Hexavalent chrome can be layered as thick as needed, but still often relies on the underlying metal layer(s) for anticorrosion, and does not necessarily have a classic reflective finish. (Ed.: I remember the classic chrome on 1950's-1960's cars showed corrosion in 1-3 years in most climates and often fell off in sheets, exposing layer(s) of underlying metals intended for anti-corrosion purposes.)

Cadmium plating allows otherwise impossible corrosion control over decades (typical storage and use times for military purposes) within a myriad of critical hidden surfaces such as the threads of bolts and nuts, as well as blocking corrosion in the underlying metals themselves. Another function of various layers including cadmium and hexavalent chrome is preventing normal adhesion between projectiles (such as infantry anti-tank or anti-aircraft missiles) and their protective launch/storage containers over decades of sitting idle or transport. Cadmium will also redistribute and self-level itself as needed within adhered surfaces, regardless of petroleum or most other materials/contaminants present. Paradoxically, trace surface contamination can result in catastrophic "embrittlement" of titanium or high-strength steels, which are increasingly used in civilian and military applications. (Ed.: Consumer demand has driven cadmium use to historic levels, is almost essential for flat screen displays, night-time sensors, bright pigments now expected on public infrastructure, and many solar cell applications.)

Franke Plating Works can do most other metals and combinations as needed if cost allows. Gold can be done but alternatives are often better and much less costly.

The air inside the two main facilities is under negative pressure, drawn up initially by heat (hot water is part of some processes) into ceiling bays and then filters on the roof, by fans further downstream on the roof. The filters are monitored but end up being replaced as three-month scheduled maintenance.

Water management is its third-largest budget item. Water systems for the traditional facility and the more automated building are similar. Any initial water supply is routine City water. It is then processed through reverse osmosis systems which have evolved and expanded over the decades. Removing trace contaminants has become ever more important over the years. A quarter of the water is ultimately lost through evaporation. Used water is piped downwards to a central holding tank system. The tank controls outflow into a succession of systems that focus on reclaiming water for reuse. One of the techniques is a succession of pH changes which induce a series of precipitates, notably metals. Some precipitates are filter pressed to remove water weight, the press fluid returned to the central tank, and the

hard cake precipitate eventually (because not much is generated) processed by another company. (Any discards from the automated building can go to municipal landfill.) Water can then be pumped upwards to their reverse osmosis systems at the starting elevation in the facility. Ultimately, some wastewater is diverted a short distance to the nearby Fort Wayne water treatment plant. The wastewater function carries away normal salts at drinkable dilutions.

Environmental expectations, as well as regulations, figured prominently throughout the tour. It repeatedly arose that ever more stringent standards have paradoxically made it easier to comply, but the tradeoff is vastly greater expenses. Despite the expense, demand for metal products has driven engineering of extraction, usage, stewardship, recovery, and combining of metals to all-time highs. (Ed.: Most of the demand is ultimately consumer driven.)

We deeply appreciate our hosts, Charlie Cox (Vice President) and Mitch McAfoose (Marketing). Charlie retired after 26 years of duty and experience with the U.S. Army. Mitch and family have a history of participation with Fort Wayne Engineers Club, which has often pointed out that marketing can be an engaging career for engineers.

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