

**Imaging with  
unmanned aerial  
systems - access  
to data that we have  
not had before**



*"Past, Present, and Future of  
Unmanned Aerial Vehicles"*

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The initial ascent of Pegasus Environmental's  
DJI S900 and RIT's TetraCAM micro-MCA 6 SNAP  
sensor during a water quality mapping  
experiment carried out coincident with a  
Landsat Thematic Mapper

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**RES Mission Statement:** The RES will become the lead organization for improving the image and influence of the engineering community in the greater Rochester area by: Demonstrating a comprehensive knowledge of the region's engineering and technical capabilities; Providing the best clerical support and public relations assistance to our affiliates; Continually communicating the engineering and technical accomplishments to both the engineering and technical community and the public; Providing regular forums and networking opportunities for the exchange of ideas and discussion of issues; and, Providing programs that identify career opportunities to the region's youth and develop the skills of the practicing engineer.

News items and articles are invited. Materials should be submitted to the executive director at the society's office, 657 East Avenue, Rochester, New York 14607; Phone number (585) 254-2350, e-mail: [admin@roceng.org](mailto:admin@roceng.org)

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**Adam Cummings, PE**  
**RES President**  
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### *Unmanned Aerial Vehicles – Past, Present and Future*

It's a bird! It's a plane! ...Or is it a UFO!?!? Or even more confusing, is it a ROA, UAV, or UAS? I can still remember the first time I saw one of these Unmanned Aircraft Systems



(UAS). [Yes, this is the Internationally-recognized term for the small, unmanned drones that may soon be flying in our skies in much more frequency.] It was back around 2008, I was a mid-level engineer and my surveyor office mate tossed a magazine my way and said to check out page 43. It showed a helicopter with a LiDAR laser for surveying land and a GPS digital camera for aerial photography attached to it. We were both instantly excited and started drawing up our business case to send to the management team to purchase one of these fun new toys instead of backpacking a Total Station or GPS rover station across the next 20 acre site. We were not the only ones with grand ideas, as *Amazon* has stated that they would like to create a delivery service using UAS, realtors have begun using these machines to capture unprecedented, breathtaking videos and photos of their properties, and neighbors are using them to keep an eye on their neighborhoods.

As many of you may recall from last year's RES Gala, we were fortunate to have the experienced staff from the Harris Corporation lend a technology hand to capture footage of the Gala and the Atrium in the Convention Center like we had never seen before.

Currently, the FAA has grounded nearly all commercial drone operations while they develop the extremely important regulations to ensure the health and safety of the public, especially those traveling in our airspace. Currently, the FAA has divided the UAS Operations into three different categories with differing requirements and certifications for each:

- **Public Operations** (Governmental)  
<http://knowbeforeyoufly.org/for-public-entities/>
- **Civil Operations** (Non-Governmental)  
<http://knowbeforeyoufly.org/for-business-users/>
- **Model Aircraft** (Hobby or Recreation only)  
<http://knowbeforeyoufly.org/for-recreational-users/>

The Democrat and Chronicle recently featured a Mendon company's venture into the UAS industry (Click here for article: <http://tinyurl.com/qcmyszu>). The sky's the limit, literally. With our rich history in technology, digital photography, and aerial imagery, I am confident that Rochester may soon find itself as a hub for this up-and-coming industry.

On another personal note, I was lucky enough to work with an intern from Monroe Community College last year that shared one of his school projects. He was part of a team that constructed a UAS from parts created with a 3D Printer from a 3D CAD Design that him and his teammates created. That was not even the coolest part...his group was invited to toss out the "first pitch" at a Rochester Red Wings game, but none of the humans were able to throw the ball. Instead, they created an attachment to the drone and had the drone take the ball from the mound to the plate. It was definitely a first for me to witness!

MCC is continuing this cutting edge philosophy and launching a drone training course, with the aid of a local UAS educational company, SkyOp. Click here for more details of this unique course (<http://tinyurl.com/oqr2c2c>). The next course takes off on October 20<sup>th</sup> and space is limited.



I cannot wait to see what the future holds for all of us. There are definitely limitless opportunities for all of us to enjoy... once the FAA is able to send out the rules to keep us all

safe in the skies and on the ground.

Please enjoy the articles that our local experts have provided in this month's *Rochester Engineer*.



## RES SCHOLARSHIP APPLICATION INFORMATION

*The Rochester Engineering Society (RES) is an umbrella organization for engineering societies in the Rochester area. The goals of the society are: to advance the art and science of engineering for the general public welfare in Monroe County and the adjoining counties; to foster in practicing and prospective engineers excellence as professionals, as citizens, and as individuals; and, to promote communication and cooperation among all branches of engineering.*

Multiple scholarships, sponsored by a variety of organizations and administered through the RES, are awarded annually at a minimum of \$1,000 each to recognize outstanding engineering, engineering technology, science or technology students. These are merit-based scholarships. Scholarships from the Institute of Electrical and Electronic Engineers (IEEE) and the Society of Women Engineers (SWE) require applicants be student members of their respective organization. **Eligibility:** Applicants must meet the following qualifications:

1. Be an undergraduate student in good standing who has completed two years and/or achieved Junior standing in an ABET-accredited engineering, engineering technology, science or technology program.
2. Have an overall grade point average of 3.0 out of 4.0 (or equivalent) or better.
3. Plan to continue engineering, engineering technology, science or technology studies in an undergraduate ABET accredited program in September following presentation of the award.
4. Be a resident of Monroe, Genesee, Livingston, Ontario, Orleans, Wayne, or Wyoming Counties of New York or enrolled in an ABET-accredited engineering, engineering technology, science or technology curriculum in a college in those counties. The Rochester Chapter of IEEE allows applicants from Corning and Alfred sub-chapters.
5. Not be a previous recipient of this scholarship.

**Application:** Applicants must submit the six required items listed below, postmarked no later than **Friday, January 15, 2016**. All items must be submitted in one package or envelope. The applicant is responsible for ensuring that all the necessary data are submitted by the deadline in one package and will be immediately disqualified from judging, with no further follow-up, if these instructions are not followed. The applicant should notify those persons supplying reference letters that timely response is critical. Reference letters may be submitted in individually sealed envelopes within the application package. Deliver or mail all items by **Friday, January 15, 2016** to: The Rochester Engineering Society, 657 East Avenue, Rochester, New York 14607.

### Required Data and Instructions

**1. Certificate of Interview from a member of the Scholarship Committee** - Request an appointment for interview by sending an email to the Scholarship Chairperson, Barry Quinn, at [barryquinn@aol.com](mailto:barryquinn@aol.com). In your email, include your full name, phone number, and the day(s) and time(s) you are available for an interview. Attach your resume to the email. Contact Barry Quinn at 585-737-1117 if you have not received a reply within three days. The interviewer will provide a certificate that the interview was conducted after October 1, 2015 and before January 8, 2016 (interview deadline).

**2. Transcript** - Official copy of applicant's current transcript showing grades for the entire enrollment in current school and if a transfer student, courses taken and accepted from his/her prior college or university.

**3. Resume** - The same resume the applicant would use if applicant were applying for employment. Be sure to include the following information: name, permanent address, school address, college, degree and program, anticipated date of graduation, and any professional society memberships.

**4. Applicant's Letter** - A letter written by the applicant addressed to the Chairman of the Scholarship Award Committee of the

Rochester Engineering Society. This letter shall not be more than one typewritten page in length and should discuss the applicant's position with respect to the following:

- a. Why the applicant is studying engineering and chose his/her particular field.
- b. Why the applicant is applying for the scholarship.
- c. The applicant's involvement in professional society activities, the leadership positions held and describe active involvement in other extra-curricular activities.
- d. Statement that the scholarship will be used in engineering, engineering technology, science or technology studies in an undergraduate ABET-accredited program in September, 2015 should an award be presented.

**5. Reference Letter #1** - Letter from the applicant's faculty advisor in his/her current school. This letter should indicate the applicant's standing in the class relative to other students, his/her course load and involvement.

**6. Reference Letter #2** - Letter from a current or former employer who is not a relative, OR, a professor of engineering, science or technology in whose class the applicant has been or is presently enrolled.



# Call for Nominations

2015

Engineer of the Year

2015

Kate Gleason

Young Engineer of the Year

and

2015

Engineers of Distinction

A couple of years ago the RES Board of Directors introduced a streamlined nomination form. A simple initial form allows an individual or organization to nominate a candidate. The RES committee will then contact the nominator if the candidate progresses to the next phase. At that point, a final form will be used to gather essential details from the nominator and candidate which will be used to determine our finalists.

The RES will select and recognize the finalists for the Engineer of the Year, Young Engineer of the Year, and Engineers of Distinction Awards in a variety of public venues and media during the weeks before the Gala. The Award recipients will be introduced on Saturday April 16, 2016 during the Gala at the Rochester Riverside Convention Center.

Visit our website at [www.roceng.org](http://www.roceng.org) and click on Call For Nominations, or call 585-254-2350 ([admin@roceng.org](mailto:admin@roceng.org)) to request a nomination form.

The following information is described:

- ✓ Eligibility for Nomination
- ✓ Awards Criteria
- ✓ **Deadline for Preliminary Nominations - Monday, December 14, 2015**
- ✓ **Deadline for Final Nominations - Friday, January 8, 2016**

# Imaging With Unmanned Aerial Systems Access To Data That We Have Not Had Before

*The Past, Present, and Future of Unmanned Aerial Vehicles*

by Carl Salvaggio and Elizabeth Bondi

*Since 1984, the Digital Imaging and Remote Sensing (DIRS) laboratory has performed landmark research in remote sensing science. Since its founding by John Schott, Ph.D., the laboratory has been responsible for producing several hundred graduates at the doctoral, masters, and undergraduate level. The laboratory currently consists of 9 faculty, 15 full-time research staff, and 45 graduate and undergraduate students performing fundamental and applied research and development supporting many corporate and industrial partners (small and large), Government agencies, and National laboratories.*

From the time of the United States Civil War to now, scientists and our military personnel have used aerial photography to gain an advantage over their competition; whether that was for economic or strategic purposes, aerial and satellite photography has offered a unique view of the world never seen before. Remember when you first saw the photograph taken by the astronauts on board Apollo 8, showing the earth rise over the lunar horizon, or the very first image taken of the Earth from above our atmosphere in 1946 from a V-2 missile launched from White Sands Missile Range, these images provided a whole new view of our place in the universe.

Imaging systems carried into the air using balloons, kites, aircraft, rockets, satellites, and even the occasional pigeon (as my students often feel compelled to remind me in their thesis documents) have evolved into some remarkable feats of technology. From early mercurial photographic plates to the micro-hyperspectral systems of today, advancements in detector materials and sensor packaging continue to enable us to do more and more sensing of the world from above; a science

referred to as remote sensing.

We are now walking down a new road in our journey to gather better and better imagery from above, the quest to use personally-piloted remote-controlled fixed-wing aircraft and multi-rotor copters called unmanned aerial systems (UAS); or as they have infamously become known, *drones*.

These aircraft fly at extremely low altitudes (legally up to altitudes of 400 feet), and can be used at any time of day, any day of the year, and in most weather conditions. All it takes is a skilled licensed pilot, a fully-charged battery, and an imaging sensor, and you are in the air collecting data. With modern imaging systems that collect images in the visible wavelength region, the near infrared, the thermal infrared, radar wavelengths, and the ultraviolet portions of the electromagnetic spectra, we all of a sudden have access to more data than we ever dreamed of having from the air above. We used to have to wait for an opportunity to collect images once every 16 days over the Rochester region to study the water quality in the Great Lakes from the Landsat Thematic Mapper, and that implied we were lucky enough to have that day once every two weeks be cloud free. Now we can drive to the shores of Long Pond, pull our UAS from the trunk of our car, power up our 6-band multispectral imager, and be flying over the lake mapping total suspended solids and chlorophyll in a matter of minutes. If we have enough batteries with us, we can even do this at different times during the same day. This offers us a temporal revisit rate of these phenomena that we have never had access to before, at a spatial resolution that was unattainable in the past (on the order of



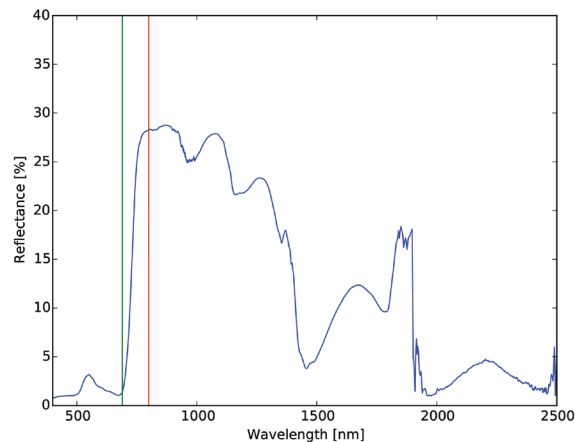
*Figure 1: The initial ascent of Pegasus Environmental's DJI S900 and RIT's TetraCAM micro-MCA 6 SNAP sensor during a water quality mapping experiment carried out coincident with a Landsat Thematic Mapper over flight at the southern end of Long Pond.*

1/4 inch or better, depending on the system). While this sounds like a scientist's dream, this newly accessible data from these low-altitude, readily-deployable systems comes with challenges regarding its use that we have not had to deal with before - but that is what makes this new data fun to work with for the science and engineering community.

A long used metric by remote sensing scientists in their study of agricultural crops has been the normalized-difference vegetation index (NDVI). NDVI came on the scene in the 1970's and was applied to satellite-scale imagery of large farms and forests to assess their health and vigor. Given the ability to collect images in the near infrared (900 nm) and red (690 nm) portions of the electromagnetic spectra, this has allowed for the computation of an index data product according to the following relationship

$$NDVI = \frac{L_{NIR} - L_R}{L_{NIR} + L_R} \quad (1)$$

where  $L_{NIR}$  and  $L_R$  represented the spectrally-integrated radiance obtained, at each pixel location, in an image with a narrow bandpass centered around these wavelength values. This index product exploited the fact that vegetation has a reflectance in the near infrared that is proportional to the amount of

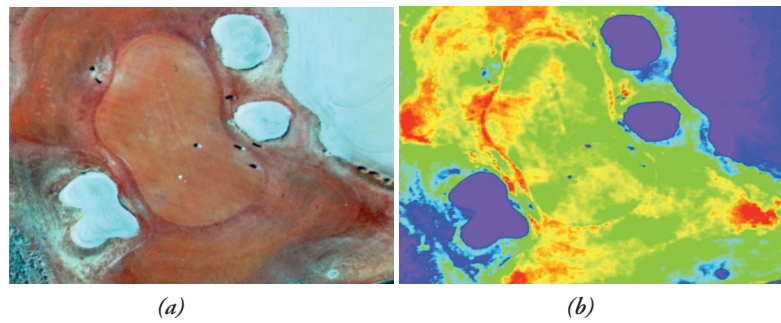


*Figure 2: Spectral reflectance of early season corn collected at Maier Farms using RIT's Spectral Vista Corporation (SVC) HR-1024i field spectroradiometer. The red line denotes the reflectance at 800 nm, the near-infrared reflectance (NIR), and the green line marks the reflectance at 690 nm, the red reflectance (R). The high reflectance in the NIR is indicative of the presence of chlorophyll.*

chlorophyll present in the sampled area on the ground, and the fact that the red reflectance of live vegetation tended to be constant for a particular species. The amount of chlorophyll present is a function of the biomass quantity as well as the health/vigor of the vegetation. This index has provided a great deal of diagnostic information to scientists and crop consultants to help improve growing practices as well as predict harvest yield. Collecting this data from systems such as Landsat, own by NASA and USGS, provided some very helpful constraints to this problem; namely, the data was collected at the same time of day and from the same camera positions every time the images were obtained of a particular region on the Earth's surface. The solar elevation angle was even nominally constant during a typical summer growing season for a particular geographic study region. With some atmospheric correction to the signal reaching the satellite using data from atmospheric sounders and atmospheric models such as MODTRAN, reliable data products have been available for these large-scale mapping missions.

Recent technological advancements in small, lightweight, globally-shuttered cameras have allowed us to recreate the spectral data we have become accustomed to from our satellite-borne workhorse sensors of the past. The TetraCAM micro-MCA 6 SNAP sensor that we fly in the DIRS laboratory has very similar spectral characteristics to that of the Landsat Thematic Mapper.

One would imagine that this can only be an improvement to the legacy processing that we have done since the early 1970's. This is true, given that one understands the unique characteristics of this data. Being able to collect any time of the day from any viewing geometry, imparts the need for careful calibration of the data obtained. The magnitude and spectral nature of the light reaching the ground changes dramatically during the day, in and out of shadows, and under cloud covered conditions; all of which are now variables in our data obtained from UAS platforms. But do not despair, with the use of the proper calibration procedures, one can convert this imagery of radiance reaching the sensor, to reflectance of the target material on the ground, under any of



*Figure 3: Assessment of the health/vigor of golf course turf; (a) is a false color depiction of the infrared (R), red (G), and green (B), and (b) is a NDVI product where red depicts healthy/vigorous turf and green depicts stressed/less dense turf. [Images courtesy of Je Sloan at the USGS]*

these conditions. This is a fundamental optical property of the material, that does not change with these changing collection conditions. Using this calibrated data, the vegetation indices that scientists and farmers have come to rely upon for their comparative studies or their crop management decisions, can now be obtained for far less cost, at much higher resolutions, and at far greater temporal frequency.

When the signs of vegetation stress from insect infestation becomes apparent, there is a very short window during which the farmer could react with the application of the proper insecticides to save their crop. The ability to check the fields everyday with UAS-borne sensors, designed specifically to measure NDVI, could mean the difference between a successful or failed harvest. However, this is true only if the data accurately represents what is happening on the ground. There are numerous systems that have become commercially available that claim to be able to help the farmer in just this way, but without the understanding of how the vegetation index products could change simply because of image acquisition differences, the producers may make ill-informed decisions, or miss opportunities to see the correct



*Figure 4: "Papa" Jeff Ring is seen here preparing for a flight to carry the RIT-owned TetraCAM micro-MCA 6 SNAP sensor on Pegasus Environmental's DJI S900 multi-coptor during a recent collaborative experimental flight over soybean fields at Maier Farms.*

*Continued on page 25*

# Rochester History

A Sampling from the Archives of the  
Rochester Engineering Society...1897 - 1961  
by Lee M. Loomis

*Continuing with the historical sampling of the earlier writings on behalf of the Rochester Engineering Society, the years following "The Great War," into and through the "Great Depression," continued to be a time of reaching out for the maturing Society, both locally and nationally. The meeting minutes describe a series of technical discussions and presentations intended to broaden the technical horizons of the membership (especially the CE's, ME's and EE's). The RES affiliated itself with a number of National technical societies, adopted local Affiliated Societies, frequently held joint meetings with them and continued taking action on a growing list of public matters. Certain issues of standardization, some crucial to public safety, became the responsibility of the RES and its affiliates. In the pervasive economic downturn of the "Great Depression," the magazine offered classified advertising for unemployed engineers, technicians and draftsmen and took other steps to try to deal with the crisis. Still, it continued its effort to shape the function, purpose and infrastructure of the City of Rochester, and beyond. Soon, war would again affect the Society, taking away many of its leaders while providing opportunities for others to step forward to fill these vacancies. In an effort to provide even greater perspective on the happenings and concerns of the day, a synopsis, featuring selected items from "The Rochester Engineer" has become an integral part of this series. The Second World War and the Korean Conflict are now history. These experiences have changed the face and, no doubt, the future of the community. The Rochester municipal leadership and the industrial community have become immersed in the cold-war, growth economy.*

**September 15, 1961 (Executive Committee Meeting, Hotel Sheraton)** Editor's note: The RES established a five-member Executive Committee (Exec Com) to act for the Board between regularly-scheduled Board meetings on all non-policy matters. At this meeting, the Executive Committee approved seven new applications for RES membership and accepted three resignations from current members. In addition, the Exec Com discussed a recent proposal from the Institute of Radio Engineers (IRE) requesting that they be granted a "special affiliation" membership with reduced fees and greatly increased services and costs to the RES. The Exec Com expressed its concern for the possibility of the IRE (568 members; 33 of whom were also RES members) dropping its affiliation with the RES altogether, but agreed that it could not accept the terms, as proposed. A delegation of RES officers was appointed to meet with the leadership of the Rochester Section of the IRE.

## **"The Rochester Engineer" (September 1961)**

This issue announced that a combination of local technical and engineering societies (total combined membership of over 4000) was planning a dinner at the Chamber of Commerce (55 St. Paul St.) on October 5, 1961, featuring Clarence H. Linder, VP and Group Executive – Electric Utility Group of General Electric Company. His presentation, entitled "The Dynamics of Change" would review the world situation, especially the effect of foreign competition on this country. The RES Education Committee presented its "1961 Survey of Continuing Education for Engineers." In the words of its report, "The Committee's survey provided three perspectives; his [the engineer's], his [the engineer's] employer's and his [the engineer's] school's." An impressive 408 completed questionnaires, out of 1,500 distributed, were returned. Some observations...Less than 20% of engineers stated that they were interested in pursuing a (post) graduate degree. Yet, 83% of these same engineers said that they recognized the need for additional education, especially among their subordinates. Over 80% of engineers reported that their employers offered financial support for advanced schooling. Over 40% of engineers reported that their employers offered

time-availability assistance for pursuing advanced studies.

## **"The Rochester Engineer" (October 1961)**

This issue, traditionally the "Radio Engineers' Number", featured "Dylogic – Tomorrow's Telephone System – Is Here Today," a detailed article by Robert R. Dobbin, Chief Engineer, General Dynamics/Telecommunication Division. The article described the new, high-speed electronic switching method for voice frequency or digital communication, applying the latest techniques in solid-state circuitry to telephony, achieving new standards of speed, efficiency and reliability. A report from the US Office of Education stated that there had been a steady decrease in the enrollment of freshman engineering students for the past four years (1957 – 1960). It went on to state that, "Unless the pattern of transfers (out of engineering) and retention rates change dramatically, the supply of engineering graduates will be at or below the present level for the next four to six years."

## **"The Rochester Engineer" (November 1961)**

This issue concluded the report on the RES Education Committee's "1961 Survey of Continuing Education for Engineers." Some additional conclusions: Engineers, and their employers as well, believe that any advanced studies should focus on science, rather than hardware, with a focus on technical, rather than management subjects. Specific advanced skill areas include physics, mathematics and electronics. The U of R announced receipt of a \$50,000 grant from the Kettering Foundation (General Motors), to be applied to its recently-announced program in bio-medical engineering.

## **"The Rochester Engineer" (December 1961)**

The RES announced that its annual Christmas luncheon would feature a presentation by the Very Rev. Charles J. Lavery, C.S.B., President of St. John Fisher College. At this Special Ladies' Day luncheon, the attendees were encouraged to bring a toy to be given to the Salvation Army for distribution to under-privileged children. This issue featured responses to the RES Education Committee's "1961 Survey of Continuing Education for Engineers" from local engineering schools. From the U of R... "part-time enrollments at the U of R in engineering and science are not nearly as high as the apparent (as reported in the RES study) study would seem to justify. If a prospective student will just call the appropriate department chairman, he [the student] can arrange a personal interview where his [the student's] needs can be reviewed in light of the U of R's offerings." And from RIT, "The Evening College does not usually offer refresher courses, but would be willing to do so, if (at least) 12 students would register for such a course. We already offer many undergraduate courses leading to Associates in Applied Science and Baccalaureate Degrees. At the moment we offer no course for graduate credit in the Evening College. However, we hope to in the future."

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*Subsequent articles in this series will describe the RES' continuing outreach to other technical societies as it considered its role in this and the larger community, along with more of the activities of the RES as it moved to be of greater service to its membership, especially those suffering from the current economic crisis, and adopted a greater role in shaping the future of the City and its environs. Noted also, will be the contributions made by RES members in the struggle to meet the challenges coming out of World War II, as well as a hoped-for period of post-war growth and prosperity. These articles will also feature an impressive array of RES activities in support of post-war re-emergence of Rochester area industry. We welcome your questions and comments on this series.*



## Dr. Walter Cooper Academy Graduates its First Sixth Grade Class, More Tutors Needed for the 2015-16 School Year

### It's time, now, to get our Tutoring Team established for the 2015-16 school year.

We have many of our 20+ RES Tutors returning, but the need is great, and we still need more. We are currently scheduling "Lunch & Learn" presentations in several Rochester area firms, to inform and inspire prospective new tutors. We need your support..can we schedule one with your firm, work group, church or family?

**The RES Tutoring Team at Dr. Walter Cooper Academy** currently includes full-time, employed Professional Engineers, recently-graduated engineers, retired engineers, retired school teachers, U of R and RIT undergraduate and graduate students, local business leaders and employees using their "flex-time" to spend a few hours a week as tutors.

Watch for an announcement soon, about the "Bergmann Associates, PC, RES Tutoring Team."

**Whether or not you think you have the time to commit to it right now**, please contact us and learn about this successful program and the opportunity it offers us to "make a difference" in Rochester's City Schools. Let us come and meet with you, your business associates, family members, friends, neighbors. Even just two hours a week of your time can make a big difference in the life of a student. Hear about the training each tutor will receive. Please contact the RES office, and let us know you're interested in tutoring at Dr. Walter Cooper Academy - School #10, 353 Congress Avenue (in the 19<sup>th</sup> Ward, one block North of Genesee Park Blvd., between Post Avenue and Virginia Avenue).

Questions??? Reach out to RES Past President Lee Loomis and the RES Tutoring Team at...

**Rochester Engineering Society, (585) 254-2350**

via website: [www.roceng.org](http://www.roceng.org) or via email: [leeloomis46@gmail.com](mailto:leeloomis46@gmail.com)

(585) 738-3079 (mobile & text)



*RES Tutor, Jaime Montoya, helps a Dr. Walter Cooper Academy Student, with a workbook problem. Jaime has enrolled in a PhD program at the U of R, and hopes to continue on the RES Tutoring Team*

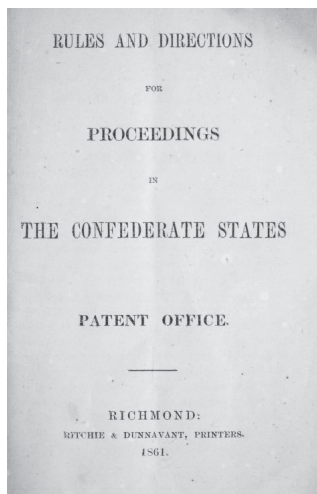
# The Limited Monopoly<sup>®</sup>

## The Confederate Patent Office – Rufus R. Rhodes, Chief Clerk

by Robert Gunderman, PE and John Hammond, PE

### The History

While much has been written about the Civil War and the Confederate States of America (and of recent some would like to forget or rewrite its history), the Confederate Patent Office has received very little attention; so little in fact that many are not aware it ever existed. On March 4, 1861, the Provisional Congress of the Confederate States authorized the filing of patent specifications, and on March 11, 1861 the Confederate Constitution provided for the granting of patents. The Confederate Patent Office closed permanently on May 5, 1865 following Lee's surrender at Appomattox on the preceding April 9<sup>th</sup>. During its brief existence, 266 patents were issued, although some historians dispute this number, claiming there were a few more patents issued in the first months of 1865. By comparison, in that same period of time, the United States Patent Office issued 16,051 patents. By all rights, the Confederate Patent Office was tiny. The CPO was established in Richmond, Virginia on the third floor of the Mechanics Institute over the Department of the Confederate Navy. In that office, business was conducted and patent models were proudly displayed in glass cases.



### The People

Rufus R. Rhodes of Mississippi, at the time a member of the Board of Appeals at the United States Patent Office, promptly resigned his post at the United States Patent Office after the election of Abraham Lincoln. In a verbose and eloquent letter of resignation, Rhodes cited philosophical differences as the reason for his resignation. For those interested, his letter can be found with a quick on-line search. It would certainly make for an interesting resignation letter to an employer in today's world. Rhodes became the first and only commissioner of the Confederate Patent Office, and was responsible for writing the *Rules And Directions For Proceedings in The Confederate States Patent Office*, published in 1861. This entire book has been digitally preserved by Duke University Library.

### Who Could Apply for a Patent<sup>1</sup>

1. Any citizen of the Confederate States, or alien, provided the government of the latter has recognized the independence of the Confederate States and is at the time in amity with them, may obtain a patent for any invention or improvement made by him that is new and useful.

### The Inventors

A list of the patents issued by the Confederate Patent Office gives the reader a sense of what was important to the confederate inventor during that time in history. The first patent was issued to James H. Van Houten of Savannah, Georgia on August 1, 1861 for a Breech-Loading Gun.

Patent Number 100 was issued to John Mercer Brooke for the iron clad confederate ship the *CSS Virginia*, better known by her former name, the *Merrimac*. (The confederacy raised the *Merrimac* to create the iron clad warship the *CSS Virginia*). Clearly most, but not all, inventions were focused on implements to help win the war.

There were many interesting patents issued by the CPO, including a patent for a process of reproducing maps by photography, the Winans Steam Gun that could throw 200 balls a minute a distance of 2 miles, a bomb disguised to look like a lump of coal (for placing in the coal bins of Federal Naval Ships), electric torpedos, and even one of the first patents related to submarines (the "Hunley submarine").

### The End

Toward the end of the war, as Richmond was being evacuated by Confederate troops, a fire was started by the Confederacy to prevent the taking of supplies by the approaching Union troops. The fire quickly spread, burning much of Richmond including the patent office building. The patent models and all records were destroyed, although some believe that various records were taken before the fire. Many years later several printed records were later found and delivered to the Museum of the Confederacy in Richmond.

The full text, description and drawings of these lost confederate patents, however, is gone forever, along with their supporting physical patent models and examination proceedings (known today as prosecution history). Who knows what secrets those long lost patents may hold, or the stories of the inventors behind each of them.

After the end of the Confederate Patent Office and the fall of the Confederacy, Rufus Rhodes moved to New Orleans and opened a practice as "an attorney at law and solicitor of patents." He died in 1870 at the early age of 52.

1 From Rules And Directions For Proceedings in The Confederate States Patent Office, Ritchie & Dunnivant, Printers, Richmond VA 1861.

Authors Robert D. Gunderman P.E. (Patent Technologies, LLC [www.patenttechnologies.com](http://www.patenttechnologies.com)) and John M. Hammond P.E. (Patent Innovations, LLC [www.patent-innovations.com](http://www.patent-innovations.com)) are both registered patent agents and licensed professional engineers. Copyright 2015 Robert Gunderman, Jr. and John Hammond



Note: This short article is intended only to provide cursory background information, and is not intended to be legal advice. No client relationship with the authors is in any way established by this article.

GRAPHIC CREDIT: The Seal of the Patent Office of the Confederate States of America. Cover of the *Rules and Directions for Proceedings in The Confederate States Patent Office, 1861*. -All images are in the public domain-

In keeping with our educational mission, you can now search for your favorite patent law topic of interest at [www.TheLimitedMonopoly.com](http://www.TheLimitedMonopoly.com).

List of Confederate Patents:					
1	08/01/1861	J.H. Van Houten of Savannah, GA for Breech Loading Gun	62	01/09/1862	R.P. Moore and N. Thompson of Box Springs, GA for Mosquito and Fly Brush Machine
2	08/01/1861	Charles E. Brown of Staunton, VA for Stirrups	63	01/09/1862	A.P. (*A.R.) Routh of Somerset, VA for Seed Planter
3	08/05/1861	George B. Sloat of Richmond, VA for Sewing Machine Stand, Design	64	01/09/1862	John B. Wand of Memphis, TN for Waterproof Cloth
4	08/05/1861	George B. Sloat of Richmond, VA for Work Box for Sewing Machine, Design	65	01/20/1862	G.W. Dolbey of Carrollton, MS for Bellows
5	08/06/1861	R.W. Habersham of Beaufort, SC for Sabre Lance	66	01/29/1862	John Wells of Holly Springs, MS for Cotton Press
6	08/08/1861	James W. Frazier of Frazierville, SC for Wheels for Steamboats	67	01/31/1862	James Peeler of Bartow, GA for Ploughs
7	08/07/1861	John M. Walden of Fort Valley, GA for Switch for Railroads	68	02/01/1862	M.G. (*G.M.) Rhodes and A. Bingham of Talladega, AL for Wooden Bottomed Shoes
8	08/10/1861	Phidello Hall of Springfield, TX for Automatic Breech Loading Gun	69	02/03/1862	G.W. Dolbey of Carrollton (*Carrollton), MS for Machine for Shrinking Wagon Tires
9	08/12/1861	Thomas W. Cofer of Portsmouth, VA for Revolving Pistol	70	01/07/1862	R. Archer of Richmond, VA for Percussion Fuse
10	08/13/1861	John D. Evans of Pleasant Hill, GA for Plough	71	02/05/1862	J.F. Finger of Marion C.H., SC (*VA) for Portable Saw Mill
11	08/15/1861	Armand Preat of Gravel Hill, VA for Lance or Pike, Attaching to Guns	72	02/05/1862	John Dove of Lauderdale (*Lunderdale) Sta., MS for Cotton Cleaning Machine
12	08/17/1861	Frederick J. Gardner of Newbern, NC for Cartridges	73	02/05/1862	A. Knapp of Mobile, AL for Mosquito and Fly Repelling Machine
13	08/23/1861	J.R. (*P.R.) Clements of Eufala, AL for Water Wheels for Mills	74	02/15/1862	William Spillman of Mobile, AL for Machine for Making Lead Pipes and Bars
14	08/24/1861	Victor Armant of New Orleans, LA for Apparatus for Clarifying Sugar-Cane Juice	75	02/21/1862	Benjamin Dennis of Scottsdale, VA for Evaporator
15	08/26/1861	J.L. Jones of Tallyhoe, NC for Carriage Wheels	76	02/25/1862	John D. Love of Wilmington, NC for Combination Bedstead
16	08/27/1861	J.D. Stewart (*Steward) of Jackson, MS for Sash Fastener	77	02/28/1862	William Conner of Natchez, MS for Cotton Tie
17	08/29/1861	W.J. Cheshire of Colquitt, GA for Plough	78	02/28/1862	Abraham Hagar of New Orleans, LA for Bagasse Furnace
18	09/02/1861	E. Boyle, T. Gamble and E. Macfee of Richmond, VA for Sword Bayonet Attaching to Guns	79	03/11/1862	C.V. Littlepage of Austin, TX for Bullet Machine
19	09/03/1861	James H. Harkut (*Carcut) of Natchez, MS for Manufacture of Cannon	80	03/07/1862	B.C. Hattox of Little Rock, AR for Tanning
20	09/07/1861	J.S. Boothby of Savannah, GA for Tanning	81	03/14/1862	T.S. (*T.C.) Copes of New Orleans, LA for Cotton Tie
21	09/14/1861	James P. Rankin of Marion, NC for Breech Loading Gun	82	03/14/1862	Thomas Dale of Russellville, KY for Device for Replacing Locomotives on Railroad Cars
22	09/16/1861	Isaac Beirfield of Newberry C.H., SC for Tanning	83	03/21/1862	P.R. (*R.P.) Clements of Eufala, AL for Looms
23	09/19/1861	Ed. Gotthiell of New Orleans, LA for Percussion Fuses	84	03/21/1862	Charles E. Stuart, J.C. Owing and J.H.C. Taylor of Alexandria, VA for Instrument for Sighting Cannon
24	09/27/1861	E.T. Ligon of Demopolis, AL for Breech Loading Firearms	85	03/24/1862	Gardner Smith of New Orleans, LA for Rail for Railroad Cars (*Curves)
25	09/28/1861	Benjamin Winter of Buckingham C.H., VA for Winnowing Machine	86	03/25/1862	John M. Morehead of Greensboro, NC for Heating Apparatus
26	10/01/1861	John R. Spilman (*Spillman) of Warrenton, VA for Cartridge Paper	87	03/29/1862	John E. Pattison of Houma, LA for Apparatus for Clarifying Cane Juice
27	10/02/1861	John R. Spilman (*Spillman) of Warrenton, VA for Device for Making Cartridges	88	04/14/1862	Augustus McBurthe of Richmond, VA for Mode of Manufacturing Scabbards
28	10/02/1861	James S. Allums of Cussetta, GA for Cotton Presses	89	05/05/1862	William Hicks of Henderson, TX for Pumps
29	10/04/1861	James Lynch of Petersburg, VA for Cannon	90	05/10/1862	E.B. Stephens, assignor to J.A. Van Lew of Charleston, SC for Portable Flat Boat
30	10/07/1861	Arthur E. Hall of South Quay, VA for Camp Bedstead	91	05/10/1862	J.W. Howlett of Greensboro, NC for Breech Loading Fire Arms
31	10/10/1861	E.J. Park of Memphis, TN for Tanning	92	05/01/1862	C.A. McEvoy of Richmond, VA for Fuse
32	10/08/1861	E.N. Davis of Holly Springs, MS for Cotton Ties	93	05/23/1862	C.A. McEvoy of Richmond, VA for Fuse
33	10/11/1861	Robert C. Bernard of Rocky Mount, VA for Gate Fasteners	94	05/03/1862	W.P. Wyley (*W.B. Wyly) and A.M. Barbee of Savannah, GA for Railroad Car Oil Box
34	10/15/1861	Joseph Thomas of Batesville, AR for Bullet Moulds	95	06/15/1862	James I. Roberts of White Springs, FL for Plough
35	10/15/1861	Daniel Oswalt of Cubahatchie, AL for Breech Loading Cannon	96	05/31/1862	J.G. (*G.J.) Peterson of Marion, NC for Fire Arms
36	09/01/1861	(*09/10/1861) Alfred G. Hearn of Arkadelphia, AR for Machine for Measuring Distances	97	07/10/1862	Robert Buillock of South Mills, NC for Plough
37	10/24/1861	Hannibal S. Blood of New Orleans, LA for Switches and Turntables for Horse Railroads	98	07/22/1862	John Cowdon (*Cawdon) of New Orleans, LA for Vessel of War
38	10/29/1861	R.C. Howe of Richmond, VA for Camp Chest and Bedstead Combined	99	07/22/1862	J.A. (*S.A.) LeToudal of Mobile, AL for Tent
39	10/30/1861	Henry C. Goodrich of Augusta, GA for Camp Cot	100	07/29/1862	John M. Brooke of Richmond, VA for Ship of War
40	10/02/1861	John P. Gorman of Charlestown, VA for Cartridge Boxes	101	07/29/1862	James E. Watson of Petersburg, VA for Combined Knapsack and Tent
41	11/07/1861	William W. Rickenbacker of Beaufort, SC for Camp Chest and Bed Combined	102	07/31/1862	John Commins of Charleston, SC for Tanning
42	11/07/1861	Cornelius Cox of Cahaba, AL for Cotton Cleaner	103	08/01/1862	John Commins of Charleston, SC for Tanning Vat
43	11/11/1861	T.W. Moore of Person Co., NC for Plough	104	08/06/1862	William S. Morris, of Lynchburg, VA for Composition for Galvanic Batteries
44	11/11/1861	M.A. McLeod of Thibodaux, LA for Apparatus for Clarifying Sugar-Cane Juice	105	08/16/1862	J.M. Jackson of Columbus, MS for Chain Link
45	11/20/1861	George W. Peabody of Columbus, GA for Waterproof Composition	106	09/25/1862	Lucien Hopson of Lampassas, TX for Projectile
46	11/21/1861	R.W. Biggs of Jacksonville, FL for Plough	107	09/26/1862	John M. Brooke of Richmond, VA for Reversible Hook
47	11/22/1861	Andrew Day of Woodville, MS for Plough	108	09/27/1862	George Henry of Columbus, MS for Breech Loading Fire Arms
48	11/26/1861	John N. Gradick of Fayetteville, AL for Washing Machine	109	09/29/1862	J.A. LeToudal of Mobile, AL for Instrument for Leveling Cannon
49	07/23/1861	L.B. Woolfork of Goodlettsville, TN for Steam Plough	110	10/01/1862	Augustus McBurthe of Richmond, VA for Waterproof Cloth MS for Breech Loading Firearms
50	11/21/1861	John Schley of Savannah, GA for Horse Power	112	10/13/1862	William Spillman of Prattville, AL for Bullet Machine
51	11/27/1861	Columbus A. Rose of Columbia, AL for Hoes	113	10/11/1862	William S. Winfield of Springfield, TN for Projectile
52	11/27/1861	(*11/07/1861) B.B. & W.H. Stephens of Dallas, LA for Corn and Cottonstalk Cutter and Puller	114	10/15/1862	(*10/14/1862) James C. Patton of Petersburg, VA for Submarine Battery
53	12/06/1861	Louise Grady of Norfolk, VA for Washing Machine	115	10/17/1862	John Hollander of Sutherland Springs, TX for Composition for Toilet Soap
54	10/07/1861	John M. White of Citrouille, AL for Breech Loading Guns	116	10/17/1862	John Hollander of Sutherland Springs, TX for Compound for Expelling Cattle Worms
55	10/11/1861	Marcus A. Tarleton of New Orleans, LA for Cotton Ties	117	10/17/1862	John Hollander of Sutherland Springs, TX for Composition for Washing Soap
56	10/14/1861	Henry Domler of Wilmington, NC for Military Cap	118	10/24/1862	James H. Douthatt of Montgomery, VA for Machine for Making Shoe Pegs
57	10/31/1861	W.B. Martin of Fayetteville, TN for Sewing Machine	119	11/08/1862	(*11/05/1862) G.H. Whitescarver of Richmond, VA for Protractor
58	01/02/1862	(*01/21/1861) Carl Laquequist of Macon, GA for Breech Loading Guns			
59	01/04/1862	J.S. Peete of Tipton, TN for Cotton Ties			
60	01/07/1862	Jacob B. and William L. Platt of Augusta, GA for Camp Cots			
61	01/08/1862	J. Nichols and J. Bennett, assignors to F. Smith of Memphis, TN for Submarine Battery			

Continued on page 16

# News From Professional Firms

## LaBella Announces New Acquisition

LaBella Associates' presence in New York has grown stronger with the acquisition of DPC Engineering.

LaBella Associates completed the merger with DPC Engineering in early September 2015. "This is an exciting time for our company as we continue to grow and expand our service area," President Robert A. Healy said. The new Elmira office, comprised of 18 employees, will not only complement LaBella's existing presence in the Southern Tier, but will also increase the firm's overall capacity to serve its clients.



*DPC Team*

DPC is an engineering firm that specializes in the design of sophisticated HVAC and electrical systems. They have worked on projects for a variety of market sectors including industrial, higher education, healthcare, institutional, pharmaceutical, and commercial clients. The team is experienced in investigations, feasibility studies, economic analysis, cost estimating, construction documents, bid negotiations, and construction administration.

Over the coming months, Vice President Michael A. Winderl, PE will work with DPC's leadership - Daniel Collins, PE and Richard Pascuzzo, PE to fully integrate the DPC team into LaBella's corporate structure. The team will be incorporated into the Buildings Engineering Division which is comprised of mechanical, electrical, plumbing and structural engineers. □



## Stantec in the Community Day

*On September 15, volunteers from Stantec spent their annual Stantec in the Community Day helping the Charles Settlement House in Rochester. Some volunteers spent time landscaping, gardening, moving furniture, and making other site improvements while others visited with the seniors. The Rochester group joined 7,300 other Stantec employees across the globe volunteering in their communities on the same day.*



# Professional Firms *Employee News*

## B&L Hires Peter Baker



*Peter G. Baker, PE*

Barton & Loguidice (B&L) announced Peter G. Baker, P.E., has joined the Rochester office as a senior managing engineer in the water/wastewater group. Baker offers more than 25 years of experience in both civil and environmental engineering. He has experience in the design, construction and management of solid and hazardous waste management facilities, stormwater conveyance and storage, wastewater treatment, odor control, and environmental compliance and permitting, with an emphasis on landfill leachate treatment.

In particular, his recent work has focused on the evaluation and testing of innovative physical/chemical leachate treatment processes. He was responsible for the evaluation, design and startup of a reverse osmosis system to treat 120,000 gallons per day of landfill leachate. The innovative process was the first system of its kind in New York State and has resulted in substantial cost savings to the facility. More recently, he was instrumental in the testing and evaluation of physical-chemical processes for the treatment of ammonia and hydrogen sulfide as well as thermal processes for volume reduction.

Baker received his bachelor of science in civil and environmental engineering from Clarkson University. He also received a masters in environmental engineering from the University of Cincinnati. □

## *Jeremy Martelle Elected President of New York Aviation Management Association Board*



*Jeremy Martelle*

Jeremy Martelle, CHA Consulting's Regional Manager of Aviation, was elected President of the New York Aviation Management Association's (NYAMA) Board of Directors at the Board's Annual Conference this September. Since

joining the board in 2012, he has served as board vice president and secretary, as well as chairman of NYAMA's Advocacy Day, corporate relations, and awards committees.

"Jeremy's enthusiasm, leadership and effort on NYAMA's board of directors and executive committee have been unmatched. He has taken lead roles on important issues of the day, and he has been proactive in advancing the interests of our membership," said outgoing President Mike Giardino, Director of Greater Rochester International Airport. "It is only natural that he is now president of the organization that he has worked so hard for. He is the right person to leads us in promoting the viability and business interests of New York State's airports."

Jeremy's involvement with NYAMA goes beyond his commitments on the board. He has testified several times on behalf of NYAMA in front of the New York State

Assembly and Senate's Joint Legislative Committee in a public hearing on the 2014-2015 Executive Budget for transportation. He advocated key initiatives to increase capital improvement funding for NYS airports as well as specific legislation for economic incentives through tax exemptions, which would benefit aviation throughout New York.

NYAMA's mission is to promote the viability and business interests of New York State's airports. NYAMA represents over 13,000 members and affiliate members, 120 commercial service and general aviation airports, fixed based operators, consultants, engineers, and aviation professionals at the state and regional levels. □

## Popli Design Group Welcomes New Employees



*Matthew Bedford*

Popli Design Group (PDG) announced the addition of the following individuals to the firm:

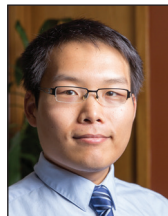
Matthew Bedford has joined the firm as a junior bridge design engineer. Mr. Bedford recently received his bachelor of science in civil engineering from the State University

of New York at Buffalo, where he received hands on experience through his coursework.

Dan Mabie has joined the firm as an architectural designer. Mr. Mabie recently received his bachelor of architecture from Syracuse University School of Architecture.



*Dan Mabie*



*Bryan Binglin Li*

He has several years of experience with rendering, graphics, and architectural applications through various studio projects.

Bryan Binglin Li has joined the firm as an architectural designer. Mr. Li recently received his master of architecture as well as his bachelor of architecture from the University of Southern California. He has several years of experience with rendering, graphics, and

architectural applications through internships and various studio projects.



*James Goddard*

James Goddard has joined the firm as a junior mechanical engineer. Mr. Goddard recently received his bachelor of science in mechanical engineering technology from Alfred State – State University of New York College of Technology, where he received hands-on experience through his coursework. □

*Professional Firms, Employee News, continued on page 24..*

# Get to the Point!

## Let's Talk

*This article is reprinted with permission from Lori Marra, Lecturer at RIT School of Communication.*

It seems like we're interacting with computers a lot more than we're interacting with other human beings. We're listening to dozens of voice mails every day. We're watching thousands of video clips on our phones. We're talking to Siri more than we are our children, spouses, families, friends and colleagues. So, let's talk. Really.

Talking is one half of the communication equation and it's an important one. It's one of the most robust ways to send our message because the listener receives our message in a much more direct way than if we texted, emailed or tweeted it. Talking is direct, and with that direct communication comes less confusion. That's really good, particularly when we're "talking" about technical and business communication. We've all sent that email or tweet that was completely misinterpreted. It can be rough. Sometimes (and more times that we probably want to admit), *talking is better*.

Of course, this is only true if you're a good talker. To be successful, you need to talk so that your audience will listen to you. If you talk, and no one is listening, you're just making noise. When you talk so that others listen, then your message is being delivered and true communication begins. When people hear you and understand, only then can you expect meaningful results.

So, let's talk about three ways you can talk so others will listen.

### **1. Always think about who you're talking with. In other words, know your audience.**

This can be tough for those of us who live our lives immersed in the worlds of engineering and technology. We have our own terms, our own approaches, and our own methods of delivering information that really work well in those worlds. But we must adjust the way we talk to people

outside the field, if we want to be heard. We do this naturally with our children and our spouses, and we can do it with other audiences too. Just think about who you're talking with and adjust.

### **2. Know the main intent of the situation.**

In the world of business and technology, minimize the chit-chat and be sure to get to your point directly. This doesn't mean you can't have a bit of casual conversation to start, but don't stay there too long. Get to the point! Conversely, recalling what we just said about our knowing our audience, don't turn a date into a business meeting. Or if your client wants to chit-chat, go with it.

### **3. Remember to pause and to check in with your listener.**

Delivering the message is the first part of the communication. Ensuring your message is being heard in the way you intended is the very core of successful communication. You won't know that if all you do is talk. Remember to pause and check in with your listeners. Ask them if they understand you and confirm that they are still with you. Then of course, you'll need to stop talking and start listening.

I'll "talk" about listening in my next article.

*RGI offers workshops in conflict resolution and communication skills. Please email me at [LisaM@rgilearning.com](mailto:LisaM@rgilearning.com) with questions or comments for a future article.*



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Lisa Moretto is the President of RGI Learning, Inc. For 21 years she has helped engineers improve their oral and written communication skills. Visit [www.rgilearning.com](http://www.rgilearning.com) or call (866) 744-3032 to learn about RGI's courses.

# get IT done

## I'm Big, I'm Bad, I'm AutoCAD®!

— André Godfrey

AutoCAD® or the numerous other Computer Aided Design (CAD) applications are what engineering/architecture firms use to provide value to their clients. In the right hands it is the magic wand behind the engineering magic. Separates you from the Muggles as it were.

From an IT perspective, AutoCAD® is a big, overgrown whiny child that requires 'more, more, and more'. More resources, more attention to maintain and it never wants to play well with others. Over the years, IT peeps learned to understand its idiosyncrasies, and develop special knowledge to serve its exceptional needs. Well, it's about to get a whole lot worse. Autodesk Revit® is even bigger and whinier.

But, I'm ahead of myself.

First, I'm sure you know that the infrastructure in the United States needs a major overhaul. And by infrastructure that probably includes just about everything: bridges, rail systems, ports, roads, dams and....well, everything.

Second, the engineering/architecture world is being driven toward Building Information Modeling (BIM) standards. And those standards are becoming more specific and defined but more importantly to the executive boardroom, adaptation is becoming a contractual obligation to win business. Particularly with government agencies who are chartered with rebuilding a significant portion of our aging infrastructure. Since these agencies fund these projects and value the benefits of BIM, they will significantly influence its usage. While particulars might be questioned, everyone agrees that the holistic approach that BIM brings to the infrastructure life-cycle is a good thing. After all, a digital document that can be shared and used collaboratively from concept, to build to possibly re-purposing, allows owner/management to make more informed decisions.

Which brings us to: Revit® building design software specifically built for Building Information Modeling (BIM), including features for architectural design, MEP and structural engineering, and construction. Revit has revolutionized how projects are being designed, constructed and managed. For the past 30-years, CAD applications have produced design plans that are essentially, 2D lines and polygons with annotations attached to them. Revit radically changes this workflow by creating a singular, intelligent 3D database. Walls, doors and windows are no longer just polygonal shapes but rather intelligent components of the overall design. For example;

there are 3D libraries of door types that a designer can use. Once a door is selected, the designer can then insert it into a wall. However, since Revit is a database driven application, the program has the ability to notify the architect that the type of door being inserted is either compliant or non-compliant with the type of wall design. This process alone, allows for more informed decisions and reduces the potential for design issues.

What does this mean for IT professionals? Well...plenty. The days of plug & play installation processes for CAD software is over. Since Revit is a database, careful consideration needs to be given to the entire process, not just a singular installation. First and foremost, Revit is a database and it needs to have a centralized location for the data, which is the project. Databases are notorious resource hogs for networks, so a thorough assessment of the existing data network infrastructure is needed. Like most databases, it too needs to be fed to work effectively and Revit® is a hungry database that can quickly gobble up an IT Director's storage capacity. Again, careful planning will be needed to raise this unruly child.

Finally, cultural change is needed. The processes that worked effectively for 2D CAD applications do not apply within the new world of 3D database driven design. IT Directors will need to modify their traditional methodologies for supporting BIM.

Like the VCR and typewriter, CAD will become a technology of the past. Are you ready for the BIM future?

### *Think about IT.*

*A big THANK YOU to Charles Hixon/Senior Project Manager/EDGE-Global Technology Solutions for providing technical insight for this article.*



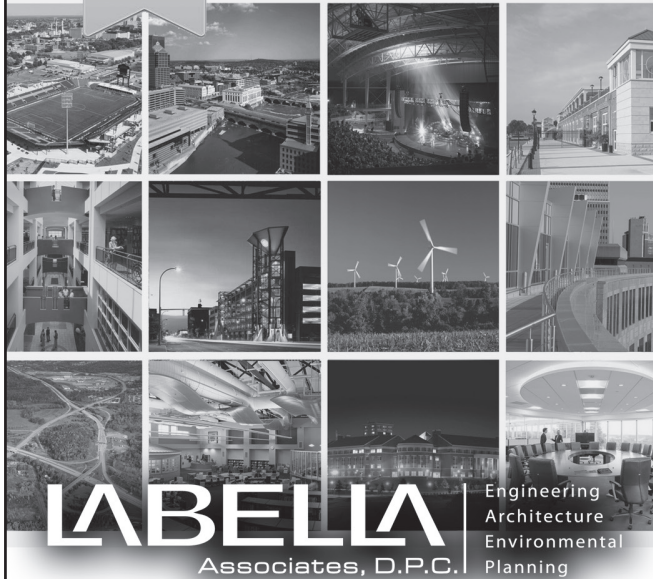
*André Godfrey is  
President/CEO of  
Entré Computer Services,  
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**Position Openings**

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**List of Confederate Patents, continued from page 11:**

- |     |            |                                                                                      |
|-----|------------|--------------------------------------------------------------------------------------|
| 120 | 11/08/1862 | (*11/05/1862) G.H. Whitescarver of Richmond, VA for Surveying Instruments            |
| 121 | 11/08/1862 | (*11/05/1862) D.R. Williams of Richmond, VA for Breech Loading Cannon                |
| 122 | 11/10/1862 | Charles Mahon of Macon, GA for Postage Stamp Case                                    |
| 123 | 11/15/1862 | C.A. McEvoy of Richmond, VA for Fuse                                                 |
| 124 | 11/13/1862 | J.E. Jenkins of Pelahatchie, MS for Plough                                           |
| 125 | 11/20/1862 | M. Bridges of Memphis, TN for Breech Loading Cannon                                  |
| 126 | 12/?/1862  | Wiley Futrell of Oxford, GA for Rotary Plough                                        |
| 127 | 12/08/1862 | J.G. Wire of New Orleans, LA for Machine for Operating Submarine Batteries           |
| 128 | 12/10/1862 | James A. Cameron of Canton, MS for Varnish                                           |
| 129 | 12/11/1862 | Nathaniel Nuckolls of Russell Co., AL for Army Canteen                               |
| 130 | 12/30/1862 | E.S. Collins of Aspinwall, VA for Wooden Soled Shoe                                  |
| 131 | 12/19/1862 | John Henson of Fork Union, VA for Hay Press                                          |
| 132 | 12/30/1862 | Joseph A. Yates of Charleston, SC for Machinery for Traversing Guns                  |
| 133 | 01/03/1863 | Alonzo C. Chinn of Mobile, AL for Projectile                                         |
| 134 | 01/07/1863 | Henry T. Beard of Emery, MS for Composition for Finishing Leather                    |
| 135 | 01/07/1863 | C.A. McEvoy of Richmond, VA for Fuze                                                 |
| 136 | 01/15/1863 | George H. Lehner of Richmond, VA for Clamps for Lathes                               |
| 137 | 01/15/1863 | George H. Lehner of Richmond, VA for Turning Lathe                                   |
| 138 | 01/15/1863 | George H. Lehner of Richmond, VA for Lathe Tool                                      |
| 139 | 01/15/1863 | Henry G. Street of Warren Co., MS for Cotton Scraper and Plough                      |
| 140 | 01/27/1863 | William S. Watkins of Houston, TX for Wind Mill                                      |
| 141 | 01/15/1863 | Lawson G. Peel of Preston, GA for Plough                                             |
| 142 | 01/20/1863 | G.S. Newman, assignor to A.P. Routt (*Rolett), of Somerset, VA for Plough            |
| 143 | 01/26/1863 | R.H. Barrett of Murfreesboro, NC for Projectile                                      |
| 144 | 01/26/1863 | Thomas Ashcroft of Talledega, AL for Machine for Making Combs                        |
| 145 | 02/02/1863 | Charles H. Winston of Richmond, VA for Method of Constructing Sulphuric Acid Chamber |
| 146 | 02/02/1863 | B.H. Washington of Hannibal, MO for Lamp Burner                                      |
| 147 | 02/14/1863 | Henry F. Cromwell of Cynthiana, KY for Gang Plough                                   |
| 148 | 02/14/1863 | J.H. Tarply of Greensboro, NC for Breech Loading Fire Arms                           |
| 149 | 02/18/1863 | D.W. Hughes of Don Juan, AZ for Breech Plug                                          |
| 150 | 03/10/1863 | J.A. Park of Sequin, TX for Tanning                                                  |
| 151 | 03/10/1863 | H. Leyden (*A. Legden) of Atlanta, GA for Revolving Fire Arms                        |
| 152 | 03/13/1863 | E.S. Cook of Laurel Grove, VA for Plough                                             |
| 153 | 03/13/1863 | Felix Walker of New Orleans, LA for Mode of Packing Cotton                           |
| 154 | 03/20/1863 | N.T. Read of Danville, VA for Breech Loading Fire Arms                               |
| 155 | 03/23/1863 | James E. Hanger of Staunton, VA for Artificial Limb                                  |
| 156 | 03/26/1863 | George H. Lehner of Richmond, VA for Sewing Machine Shuttle                          |
| 157 | 03/31/1863 | W.D. Mason of Jarratt's Depot, VA for Water Wheel                                    |
| 158 | 04/06/1863 | George H. Lenher of Richmond, VA for Lathe                                           |
| 159 | 04/16/1863 | O.L. Bayley (*Bailey) of Dallas, TX for Gang Ploughs                                 |
| 160 | 04/15/1863 | Thomas H. Bacon of Hannibal, MO for Projectile                                       |
| 161 | 04/15/1863 | Ellison Yerby of Richmond, VA for Machine for Filling Cartridges                     |
| 162 | 04/18/1863 | John J. Daly of New Orleans, LA for Instrument for Measuring Distances               |
| 163 | 04/18/1863 | C.W. Alexander of Moorfield, VA for Breech Loading Fire Arms                         |
| 164 | 04/20/1863 | John B. Norris of Clark Co., VA for Fire Tongs                                       |
| 165 | 05/01/1863 | T.L. Jones of Natchez, MS for Cotton Tie                                             |
| 166 | 05/01/1863 | T.L. Jones of Natchez, MS for Cotton Tie                                             |
| 167 | 05/01/1863 | (*05/21/1863) Robert Creuzbaur of Travis Co., TX for Wood Soled Shoe                 |
| 168 | 05/04/1863 | F.D. Lee of Charleston, SC for Spar Torpedo                                          |
| 169 | 05/06/1863 | R.S. Dunning of Atlanta, GA for Machine for Cutting Irregular Forms                  |
| 171 | 05/20/1863 | (*05/21/1863) Sylvester L. Burford of Lynchburg, VA for Wooden Shoe Sole             |
| 172 | 05/25/1863 | Alfred L. Bowen of Winchester, VA for Button Machine                                 |
| 173 | 05/25/1863 | F.F. Taber of Atlanta, GA for Process of Producing Stearine from Tallow              |
| 174 | 05/25/1863 | William Le Roy Browne of Ivy Depot, VA for Fuze                                      |
| 175 | 05/26/1863 | Charles C. Bier of New Orleans, LA for Cotton Tie                                    |
| 176 | 06/05/1863 | Isidor P. Girardy of Augusta, GA for Fuze                                            |
| 177 | 06/05/1863 | A.C. Elder of Winnsboro, SC for Churn                                                |
| 178 | 06/10/1863 | Asa George of Charlotte, NC for Revolving Fire Arm                                   |
| 179 | 06/18/1863 | S.A. Hinkel of Lewisburg, VA for Tanning                                             |
| 180 | 06/22/1863 | William H. Wilson of Staunton, VA for Match Cutting Machine                          |
| 181 | 07/10/1863 | Benjamin M. Cook of Kinston, NC for Explosive Apparatus                              |
| 182 | 07/15/1863 | Albert Bloomer, assignor to W.N. Smith of Richmond, VA for Fuze Gauge and Cutter     |
| 183 | 07/15/1863 | John Stillwell of Griffin, GA for Churn                                              |
| 184 | 07/22/1863 | Charles Knowlton of Talboton, GA for Machine for Cutting Shoe Pegs                   |
| 185 | 07/22/1863 | Phillip E. Love of Augusta, GA for Projectile                                        |
| 186 | 07/25/1863 | Miles Waterhouse and William Wheelan (*Whealan) of Charlotte, NC for Varnish         |

*Continued on page 17*



**List of Confederate Patents, continued:**

- 187 08/05/1863 A. Barbarin of New Orleans, LA for Torpedo
- 188 08/05/1863 (\*08/10/1863) Homer Holland of Charlotte, NC for Process of Producing Copperas
- 189 08/10/1863 Hughes, Pendergrass and Snow of Monroe, GA for Loom
- 190 08/10/1863 Martin B. Tyler of Richmond, VA for Hominy Mill
- 191 08/22/1863 H. Conner of Mobile, AL for Projectile
- 192 08/22/1863 H. Conner of Mobile, AL for Breech Loading Cannon
- 193 08/25/1863 A.F. Volck of Nuremburg, Bavaria for Bust of Lt. Gen. T.J. Jackson, Design
- 194 08/25/1863 R.J. White and George Lehner of Richmond, VA for Bullet Machine
- 195 08/28/1863 Robert Creuzbaur (\*Creugbaur) of Austin, TX for Wooden Sole Shoe
- 196 08/28/1863 Robert Creuzbaur (\*Creugbaur) of Austin, TX for Half Wooden Sole Shoe
- 197 08/31/1863 Robert Creuzbaur (\*Creugbaur) of Austin, TX for Torpedo
- 198 09/21/1863 Z. McDaniel of Glasgow, KY for Torpedo
- 199 09/10/1863 Thomas Morse of Richmond, VA for Breech Loading Firearm
- 200 09/15/1863 E.C. Singer of Port Lavaca, TX for Torpedo
- 201 08/18/1863 James E. Hanger of Staunton, VA for Artificial Leg
- 202 09/21/1863 Z. McDaniel of Glasgow, KY for Torpedo
- 203 09/24/1863 B.H. Washington of Hannibal, MO for Machine for Casting Friction Tubes
- 204 10/06/1863 James Peeler of Bartow, GA for Method of Repairing Cotton Cards
- 205 10/07/1863 William H. Hamilton of Mobile, AL for Candle Moulding Machine
- 206 10/10/1863 E.S. Alexander of Moorfield, VA for Spur
- 207 10/13/1863 George S. Smith of Keysville, VA for Loom
- 208 10/19/1863 Henry Fitzgerald of Norfolk, VA for Fertilizer
- 209 10/24/1863 W.N. (\*W.H.) Smith of Richmond, VA for Cap Filling Machine
- 210 10/26/1863 Isaac Mitchell of Columbus, GA for Cotton Seed Huller
- 211 10/25/1863 (\*10/28/1863) C. Williams of St. Louis, MO for Submarine Apparatus
- 212 10/29/1863 B.H. Washington of Hannibal, MO for Bullet Swaging Machine
- 213 10/31/1863 B.H. Washington of Hannibal, MO for Machine for Cutting and Serrating Friction Wire
- 214 11/05/1863 B.H. Washington of Hannibal, MO for Machine for Finishing Cannon
- 215 11/04/1863 E. Kempe, assignor to himself and Daniel Hagerty, of Richmond, VA for Grease Lamp
- 216 11/18/1863 B.H. Washington of Hannibal, MO for Automatic Lathe
- 217 11/27/1863 (\*11/21/1863) Benjamin F. Holloway of Mobile, AL for Loom
- 218 11/23/1863 B.H. Washington of Hannibal, MO for Machine for Casting Cannon
- 219 11/24/1863 Louisiana Boykin of Glenville, AL for Mode of Preserving Meat
- 220 12/24/1863 (\*12/14/1863) J.P. Shaw, assignor to W.T. Chaffee, of Richmond, VA for Horse Shoe Machine
- 221 12/29/1863 A.C. Jackson of Richmond, VA for Lubricating Compound
- 222 01/02/1864 C.F. Richbourg of Gadsden, SC for Manufacture of Bagging
- 223 01/06/1864 R.H.S. Thompson of New Orleans, LA for Projectile
- 224 01/21/1864 Harry A. Bennet of Mecklenburg C.H., VA for Churn Dasher
- 225 01/27/1864 John Scott of Ocala, FL for Truss
- 226 01/27/1864 John Scott of Ocala, FL for Projectile
- 227 02/05/1864 R.S. Sanxay and A. Gomert of Richmond, VA for Photographic Process for Duplicating Maps
- 228 02/08/1864 Thomas C. Brown of Ballsville, VA for Sugar Cane Crusher
- 229 02/10/1864 J.E. Garlington of Chambers C.H., AL for Water Boiler
- 230 02/13/1864 John R. Maben of Allen Creek, VA for Machine for Cutting Shoe Pegs
- 231 02/26/1864 C.E. Smart, Owings, and Taylor of Richmond, VA for Instruments for Fixing Sights to Cannon
- 232 02/29/1864 George W. Powell of Clay Hill, AL for Breech Loading Cannon
- 233 03/12/1864 J.E. Cargill of Columbus, GA for Ink Composition
- 234 03/16/1864 John H. and J.C. Carlisle of Ringwood, NC for Instrument for Crooking Card Teeth
- 235 03/29/1864 Y.A. Minnis of Franklinton, NC for Water Wheel
- 236 03/30/1864 J.C. Patton and E. Cuthbert of Petersburg, VA for Torpedoes
- 237 04/02/1864 M.L. Parry of Galveston, TX for Steam Condenser
- 238 04/07/1864 David S. Cordle of Richmond, VA for Chain Link
- 239 04/09/1864 J.E. Garlington of Chambers C.H., AL for Bridge
- 240 04/15/1864 J.D. Gresit of Urbana, VA for Instrument for Calculating Distances
- 241 04/18/1864 F.G. Smith of Columbia, TN for Sea-Going Vessel

Continued on page 18

**Position Openings**

# Join the LeChase Team

## Director of MEP & Controls Coordination

The Director of MEP & Controls Coordination is a full-time resource leading LeChase Construction's growing demand for increasingly sophisticated building mechanical/electrical/controls oversight activities during front-end pre-construction, design phases and construction project delivery. The position requires a seasoned specialist with experience in MEP & Controls approaches in design and implementation during construction.

Knowledge of design and construction delivery methods is important to be able to interpret critical project requirements early in a projects life cycle to assist in ensuring the project teams success through close-out. The Director shall possess specific knowledge and experience in mechanical equipment, controls & integration to successfully manage project installations, start-ups, TAB (testing & balancing), and Cx (commissioning) of complete and operating systems. It is desirable that the Director be a P.E. with design and construction background.

**Qualifications:**

1. Engineering Degree and P.E. Preferred. 10+ years on the job experience in design, and/or construction.
2. Knowledge of:
  - In-depth knowledge of the design and construction industry and the project delivery techniques
  - Must have an in-depth knowledge of design and construction documents
  - General understanding of Project Management & Construction
  - English usage, grammar, spelling, vocabulary, punctuation & technical writing
  - Basic knowledge of controls systems and how they interface with building HVAC systems and equipment

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LeChase Construction is a full-service firm with extensive experience and we pride ourselves on ensuring that our corporate culture; based on safety, quality and integrity, is evident from our office staff to each jobsite.

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Send resume & cover letter to:  
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[www.lechase.com](http://www.lechase.com)

## Position Openings



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Visit our website ([www.mrbgroup.com](http://www.mrbgroup.com)) for additional information. Resumes can be sent directly to: [resume@mrbgroup.com](mailto:resume@mrbgroup.com) or mailed to: MRB Group, The Culver Road Armory, 145 Culver Road, Suite 160, Rochester, NY 14620.

**MRB** | group



## List of Confederate Patents, continued from page 17:

242	04/20/1864	B.H. Washington of Hannibal, MO for Machine for Making Wood Joints
243	04/27/1864	J.B. Gayle of Larinburg, NC for Mode of Turning Eccentrics for Railroads
244	05/06/1864	John H. and J.C. Carlisle of Ringwood, NC for Instrument for Renovating Card Teeth
245	05/20/1864	A. Barbarin of New Orleans, LA for Torpedo
246	06/31/1864	A.D. McCoy of Livingston, AL for Combined Bed and Tent
247	01/04/1864	David Rawl of Lexington C.H., SC for Machine for Carding Cotton
248	07/11/1864	William Moon of Richmond, VA for Clock Torpedo
249	07/21/1864	James Price, assignor to J. and J.W. Tomkins of Tucker's Pond, SC for Tanning
250	08/11/1864	G.W. and J.H. Wells of Charlottesville, VA for Artificial Leg
251	07/12/1864	Anna Lewis, executrix of John Lewis, dec'd of Greensboro, NC for Machine for Ginning, Carding, and Spinning Cotton
252	08/16/1864	Albert Strasser of Montgomery, AL for Artificial Leg
253	08/25/1864	James D. Layton of Memphis, TN for Projectile
254	08/29/1864	B.H. Washington of Hannibal, MO for Stethoscopic Probe
255	09/06/1864	C. Williams of St. Louis, MO for Torpedo
256	09/07/1864	C. Williams of St. Louis, MO for Torpedo
257	10/05/1864	Richard M. Harvey of New Orleans, LA for Torpedo
258	10/06/1864	C. Williams of St. Louis, MO for Submarine Boat
259	10/25/1864	George W. Rains of Augusta, GA for Gunpowder Steaming Barrels
260	10/26/1864	J.C. Patton of Petersburg, VA for Torpedo
261	10/25/1864	C. Williams of St. Louis, MO for Submarine Boat
262	11/10/1864	D.M. Somers and H. Dabney of Lynchburg, VA for Projectile
263	11/16/1864	Thomas B. Taylor of Montgomery, AL for Machine for Making Cotton Rolls
264	11/22/1864	A.T. Purejoy of Forrestville, NC for Wooden Shoe Sole
265	11/23/1864	A.T. Purejoy of Forrestville, NC for Binding Last
266	10/17/1864	W.N. Smith of Richmond, VA for Percussion Cap Rammer

### REISSUE

RE1 10/28/1863 C. Williams of St. Louis, MO for Submarine Apparatus

*The Rochester Engineering Society relies on its many volunteers to keep us running. We continue to encourage you to join the RES and volunteer on our many committees. We need committee members for:*

#### Membership Committee

**Gala Committee** (*Save the Date of Saturday, April 16, 2016 - we are working on details now for this most important fundraiser for the RES*)

#### Scholarship Committee

#### Financial Committee

#### "Rochester Engineer" Editorial Committee

#### Constitution & By-Laws Committee

#### Program Committee

#### Strategic Planning Committee, and many more...

*We also need volunteers for the Tutoring Team, the E3 Fair, STEM Programs and the Explorer Post.*

Please go to the RES Website ([www.roceng.org](http://www.roceng.org)) and sign up on the volunteer site run by Jon Kriegel.

We also have a **Director and Treasurer** Positions open on the BOD. [Can you help?](#)

*Thank you to our many volunteers!*



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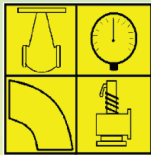
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Stritt & Priebe, Inc. was established in 1922 by John Priebe & Harry Stritt as a pipe, valve & fitting supply house. The original location of the company was on the west side of Buffalo. In 1992, the company moved to a 40,000 sq. ft. facility at 37 Clyde Ave. in Buffalo. Two more generations of Priebe family ownership followed. For over 85 years, Stritt & Priebe serviced the industrial & institutional community with piping products & steam specialties. Finally, in 2007, long-time employees Bill Victor & Joel Scott bought the company from Edgar S. Priebe.

With expanded partners & inventory, Stritt & Priebe caters to OEMs, mechanical contractors & multiple end-users like petro-chem, pharmaceutical, power generation, institutions and public utilities. The business has grown & is now expanding into the Rochester area! As your partner, we can work together to bring projects to completion on time with the highest quality standards. Let us demonstrate how a truly responsive supply house can enhance your operations.

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## RIT researchers patent improved materials and technology applications for lithium ion batteries

*New work in nanomaterials is set to improve power, storage and safety*

A research team at Rochester Institute of Technology has been awarded patents for discoveries that will improve and extend the life of lithium-ion batteries, which are used in a variety of technological applications.

Lead faculty-researchers Ryne Raffaele and Brian Landi, and Ph. D. graduate Cory Cress, received the patents for two related discoveries “Methods of making nano-composite structures” and “Methods of making, and devices containing, freestanding carbon nanotube paper.”

The research, conducted in RIT’s NanoPower Laboratories, addresses the increasing demand for better materials and more robust battery structures for electronic devices by introducing new nano-composite materials that will extend both battery life and gravimetric energy density—the energy-to-weight ratio of a battery storage system.

“The use of lithium ion batteries has proved to be a transformative technology for applications ranging from electrical grid storage and automobiles to portable electronics,” said Raffaele, RIT vice president for research and associate provost. “Both these patents exploit the remarkable properties of carbon nanotubes to improve electrical conduction within the battery and to reduce its overall mass.”

Researchers replaced conventional metal foil current collectors used in batteries with carbon nanotube sheets or “papers.”

Using lightweight carbon nanotube papers in place of conventional metal foils results in a dramatic reduction in overall battery weight without sacrificing performance, Raffaele explained.

“Additionally, carbon nanotubes can replace the normal conductive additives for the composite anodes and cathodes and actually improve performance and cycling lifetime,” he said. “These breakthrough discoveries transform not just traditional battery materials but the nano-structuring within batteries. The results represented by these patents speak for themselves; this performance exceeds that of any of the current commercial, off-the-shelf battery today.”

Carbon nanotubes are structures of carbon atoms that have better electrochemical and mechanical properties than copper, provide more strength than steel, but are significantly lighter. They are used to make integrated circuits for enhanced cell phones, or as composite materials for automobiles, because lighter vehicles are more energy efficient.

Over the past several years, the researchers have been synthesizing nano-composite materials in-house for lithium ion batteries in RIT’s NanoPower Research Labs, part of RIT’s Golisano Institute for Sustainability.

“Ours is a multi-disciplinary team consisting of chemical and mechanical engineers, physicists, sustainability graduate students and post-doctoral

researchers,” said Landi, an associate professor of chemical engineering in RIT’s Kate Gleason College of Engineering. “The idea was to be good at materials science, and we always had in mind applications which involved some kind of device, whether it was a battery, a fuel cell or a solar cell. We found devices that always required materials development, so it created an iterative cycle where you got good at the materials development and you got good at making devices. The two informed one another.

“And because we were in both ‘spaces,’ we could advance the materials for the devices faster. We are taking the ideas and applying them in real prototype cells today, made and tested at RIT. In some sense, RIT is seeing these patent inventions incorporated throughout the entire technology development process.”

Much of that development work is being done in RIT’s new Battery Prototype Center a \$1.5 million state-of-the-art facility that will conduct research and work with companies in this rapidly growing local industry. The center is part of a plan to establish a comprehensive battery and energy storage hub in the region, a priority of the Finger Lakes Regional Economic Development Council. Beyond the region, energy storage is expected to be a \$33 billion global industry, according to LUX Research. □

Go to the RES Web Site for Updated Details  
On All Meetings - [www.roceng.org](http://www.roceng.org)

## Continuing Education Opportunities

### Monday, November 9

**American Society of Heating, Refrigerating,  
And Air-Conditioning Engineers (ASHRAE)** p 35  
*Environmental Quality in High Performance Buildings*  
*1 PDH Credit Approved*

Speaker: Distinguished Lecturer Brian Monk, PE, Carrier Racan  
Place: Mario's Italian Steakhouse, 2740 Monroe Avenue,  
Rochester  
Time: 12:00 pm with buffet lunch served.  
Cost: \$25 per person.  
Reservations: Please contact Tim Duprey, [tim.duprey@pres-services.com](mailto:tim.duprey@pres-services.com) by noon, Thursday, November 5<sup>th</sup>.

### Thursday, November 12

**American Society of  
Civil Engineers (ASCE)** p 30  
*Rochester Bicycle Master Plan - Moving  
Rochester Beyond the Car*  
*1 PDH Credit Pending*

Speaker: Erik Frisch, Transportation Specialist, City of  
Rochester  
Place: Hilton Garden Inn, 155 East Main Street, Rochester  
Time: 6:00 to 7:00 Cash Bar; 7:00 to 8:00 Dinner;  
7:30 to 8:30 pm Presentation  
Cost: ASCE members \$35, Non-members \$50, Students \$10  
Reservations: Contact Tom Haccek at [ascerochester@gmail.com](mailto:ascerochester@gmail.com)  
or 585-428-6852 by November 6<sup>th</sup>.  
Parking: South Avenue Parking Garage

### Friday, November 13

**Association for Bridge  
Construction and Design (ABCD)** p 41  
*27<sup>th</sup> Annual Fall Bridge Conference*  
*Earn up to 6 PDH Credits*

Place: Millennium Hotel Buffalo, 2040 Walden Ave., Buffalo  
Price: Students \$35; Members \$110; Non-members \$160  
(includes membership through 5/31/16). Prices for all include  
breaks, lunch and cocktail hour. Late fee applied (\$25) to  
registrations made after 10/30/15. Sponsorship, Advertisement  
and Exhibitor Booth opportunities available!  
Registration: Visit the Rochester Engineering Society website at  
[www.roceng.org](http://www.roceng.org). Additional questions at John Papponetti, PE at  
585-295-6287 or [jpapponetti@labellapc.com](mailto:jpapponetti@labellapc.com).

### Wednesday, November 18

**American Society of  
Plumbing Engineers (ASPE)** p32  
*Commercial Pool Filtration Options*  
*1 PDH Credit Pending*

Speaker: Ken Bergstrom, Filtrex Inc.  
Place: Valicia's Ristorante, 2155 Long Pond Road, Greece  
Time: 12:00 noon to 1:30 pm  
Cost: \$20.00 (member or guest), check or cash at the door.  
Reservations: Contact Dave Jereckos, 585-341-3168 or  
[djereckos@ibceng.com](mailto:djereckos@ibceng.com) by Monday, November 16<sup>th</sup>.

**SAVE THE DATE**

**Tuesday,  
April 26, 2016**

**2016  
Engineering  
Symposium  
in  
Rochester**

**Details will be posted on the website  
([www.roceng.org](http://www.roceng.org)) when available!**

**Up to 7 PDH Credits Available!**

To post continuing education opportunities on this page please contact the  
Rochester Engineering Society, 585-254-2350, or email: [admin@roceng.org](mailto:admin@roceng.org)

# Engineers' Calendar

The engineering societies are encouraged to submit their meeting notices for publication in this section. The deadline for submitting copy is the 10th of the month prior to the month of publication. Please email to: [admin@roceng.org](mailto:admin@roceng.org). The meetings offering PDHs are highlighted in blue. Details about the meeting and affiliate (if in this issue) are on the corresponding page listed next to the affiliate name.

## Tuesday, November 3

### Institute of Electrical and Electronic Engineers (IEEE)

#### IEEE Excom Meeting

Place: Hibachi Sushi Buffet Restaurant, South Town Plaza on Jefferson Road (Route 252), just west of West Henrietta (Route 15), Rochester.

Time: 12:00 noon.

Comment: Any IEEE member is invited to attend. Lunch is only \$5 for IEEE members and \$3 for student members. No reservations are needed, just show up. Directions can be obtained on the website: <http://rochester.ieee.org>.

## Monday, November 9

### American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) p 35

#### Environmental Quality in High Performance Buildings 1 PDH Credit Approved

Speaker: Distinguished Lecturer Brian Monk, PE, Carrier Racan  
Place: Mario's Italian Steakhouse, 2740 Monroe Avenue, Rochester

Time: 12:00 pm with buffet lunch served.

Cost: \$25 per person.

Reservations: Please contact Tim Duprey, [tim.duprey@pres-services.com](mailto:tim.duprey@pres-services.com) by noon, Thursday, November 5<sup>th</sup>.

## Tuesday, November 10

### Rochester Institute of Technology (RIT)

#### 3<sup>rd</sup> Annual Effective Access Technology Conference

Place: Gordon Field House, RIT Campus

Time: 7:30 am to 4:00 pm

For more information about the conference go to [www.rit.edu/access](http://www.rit.edu/access)

## Wednesday, November 11

### Society for Imaging Science and Technology (IS&T)

#### Choosing a Landing Site on Mars: The 2016 InSight Mission

Speaker: Nicholas Warner, Geneseo College

Place: TBD.

Time: 6:00 pm.

Website: <http://rochesterengineeringsociety.wildapricot.org/ISandT>

## Thursday, November 12

### American Society of Civil Engineers (ASCE)

p 30

#### Rochester Bicycle Master Plan - Moving Rochester Beyond the Car

##### 1 PDH Credit Pending

Speaker: Erik Frisch, Transportation Specialist, City of Rochester

Place: Hilton Garden Inn, 155 East Main Street, Rochester

Time: 6:00 to 7:00 Cash Bar; 7:00 to 8:00 Dinner; 7:30 to 8:30 pm Presentation

Cost: ASCE members \$35, Non-members \$50, Students \$10

Reservations: Contact Tom Hacck at [ascerochester@gmail.com](mailto:ascerochester@gmail.com) or 585-428-6852 by November 6<sup>th</sup>.

Parking: South Avenue Parking Garage

## Friday, November 13

### Association for Bridge Construction and Design (ABCD)

#### 27<sup>th</sup> Annual Fall Bridge Conference

##### Earn up to 6 PDH Credits

Place: Millennium Hotel Buffalo, 2040 Walden Ave., Buffalo

Price: Students \$35; Members \$110; Non-members \$160

(includes membership through 5/31/16). Prices for all include breaks, lunch and cocktail hour. Late fee applied (\$25) to registrations made after 10/30/15. Sponsorship, Advertisement and Exhibitor Booth opportunities available!

Registration: Visit the Rochester Engineering Society website at [www.roceng.org](http://www.roceng.org). Additional questions at John Papponetti, PE at 585-295-6287 or [jpapponetti@labellapc.com](mailto:jpapponetti@labellapc.com).

## Tuesday, November 17

### Independent Entrepreneurs Council (IEC) p27

#### Cleanroom Basics – Selecting the proper cleanroom garments and proper donning procedures.

Speakers: Barbara Done, Micron Management and Carol Jones, G&KK Services

Place: SUNY Polytechnic Institute, Colleges of Nanoscale Science and Engineering's Smart System Technology & Commercialization Center (STC), 5450 Campus Drive, Canandaigua, NY

Time: Registration from 7:30 to 8:00 am; Presentation from 8:00 to 9:00 am

Registration required: There is no charge for this presentation.

Reservations are required by close of business on Friday, November 13, 2015. Make your reservations via The Rivers Organization at 585-586-6906 or [ESTG@Riversorg.com](mailto:ESTG@Riversorg.com).

*Engineers' Calendar continued on page 22...*

## Wednesday, November 18

### **Illuminating Engineering Society (IES) p33**

#### ***A Review of Energy Code Changes***

Instructor: Scott W. Copp, Sr. Project Manager with the Code Compliance Group of T.Y. Lin International  
Place: Rick's Prime Rib, 898 Buffalo Road, Gates  
Time: 12:00 Noon – 1:00 pm  
Cost: \$30 per person (includes buffet style lunch)  
Reservations: Contact Diane Montrois before Nov. 11<sup>th</sup> at 585-254-8010. Additional details on page 33 of this issue and on the website at [www.iesrochester.org](http://www.iesrochester.org).

## Wednesday, November 18

### **American Society of Plumbing Engineers (ASPE) p32**

#### ***Commercial Pool Filtration Options***

##### ***1 PDH Credit Pending***

Speaker: Ken Bergstrom, Filtrex Inc.  
Place: Valicia's Ristorante, 2155 Long Pond Road, Greece  
Time: 12:00 noon to 1:30 pm  
Cost: \$20.00 (member or guest), check or cash at the door.  
Reservations: Contact Dave Jereckos, 585-341-3168 or [djereckos@ibceng.com](mailto:djereckos@ibceng.com) by Monday, November 16<sup>th</sup>.

## Thursday, November 19

### **Genesee Valley Land Surveyors Association (GVLSA) p39**

#### ***Board of Directors/Associates Meeting***

Location: 40 & 8 Club, 933 University Avenue, Rochester  
For details and reservations go to the website at: [www.gvlsa.com](http://www.gvlsa.com).

## Thursday, November 19

### **International Council on Systems Engineering (INCOSE) p34**

#### ***An Integral Approach to Systems Engineering***

Speaker: Kevin Devaney, Systems Engineering Manager, SRC  
Place: 8 hosts available. See page 34 for details.  
Time: Meetings begins at 6:00 pm and ends approximately 7:30 pm.  
If you need details or have any concerns contacting a host email Kevin Devaney at [kdevaney@srcinc.com](mailto:kdevaney@srcinc.com).  
Website: [www.incose.org/flc](http://www.incose.org/flc)

## Friday, December 4

### **Institute of Electrical and Electronic Engineers (IEEE) p 38**

#### ***Western New York Image and Signal Processing Workshop***

Details on the conference are at <http://ewh.ieee.org/r1/rochester/sp/WNYISPW2015.html>

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## Wednesday, December 9

### **Society for Imaging Science And Technology (IS&T) p 40**

#### ***Astronomy at the Edge of the Sky: Observing the Universe in the Mountains of Chile***

Speaker: Dr. Brian Koberlein, School of Physics and Astronomy, RIT  
Place: TBD.  
Time: 6:00 pm.  
Website: <http://rochesterengineeringsociety.wildapricot.org/ISandT>

*Support Your Affiliate*

*Attend A Meeting*

*The RES website ([www.roceng.org](http://www.roceng.org)) has a calendar of events for this month's meetings and meetings that are received or updated after the print deadline. Please refer to the website for updated information. If you wish to be listed on the calendar please send details to [admin@roceng.org](mailto:admin@roceng.org).*

# Professional Firms *Employee News*

## LaBella Hires Two New Employees

LaBella Associates, D.P.C. announced the hiring of two new employees.



*Bryan Morlock*

Bryan Morlock has joined the firm as an electrical designer/drafter for the buildings engineering division, working primarily in our Buffalo office. He has over seven years of experience which includes low and medium voltage power distribution projects, exterior and interior lighting projects. Additionally, he has experience in security systems, access control, CCTV and emergency stand-by power systems.



*Jeffrey S. Nagle, PE*

Jeffrey S. Nagle, PE has joined the firm as a senior mechanical engineer for the buildings engineering division. He has over 33 years of engineering and construction industry experience in building plumbing and HVAC systems. His experience is well rounded and diverse in not only design of various systems but also installations. Jeff has extensive skills in mechanical systems and building types for K-12, higher education, healthcare, commercial, state and county, municipal and industrial industries. □

## Fisher Associates' Welcomes Two New Hires

Fisher Associates announced the addition of two new hires to the group.



*Sarah Hogan, RLA*

Sarah Hogan, RLA joins the team as a Registered Landscape Architect and project manager. Sarah brings over 11 years of experience to the landscape architecture & planning and civil/site fields. She earned her bachelor of landscape architecture at the State College of Environmental Science and Forestry in Syracuse, NY and completed her off-campus independent thesis on cohousing communities in Copenhagen, Denmark.

She has worked on a variety of projects ranging from landscape architecture and planning projects, commercial and residential development to recreational facilities including parks and trails. Sarah has also been actively involved with the Rochester

Regional Community Design Center and is a member of the New York Upstate chapter of the American Society of Landscape Architects.

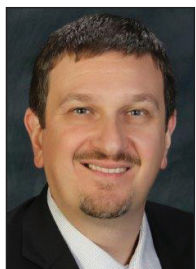
Michael Rossetti, RLA is a Registered Landscape Architect



*Michael Rossetti, RLA*

with 17 years of experience. He earned a bachelor of landscape architecture from Pennsylvania State University where he later worked as an instructor for undergraduate landscape architecture studio courses. Michael was presented with the 2003 Merit Award by the American Society of Landscape Architecture. For the last twelve years, Michael has spent his time on design work for multiple, private, high-profile clients nation-wide. □

## MRB Group Adds to Architectural Team



*Joel Cera*

The management team at MRB Group recently announced the addition of Joel Cera to its expanding architecture department.

A previous member of the MRB Group team, Cera moved out of the area almost 15 years ago.

“We’re fortunate that Joel decided to return to New York, but we’re especially pleased he chose to rejoin MRB Group,” stated President Ryan Colvin.

A graduate of the State University of New York at Buffalo, Cera earned his master’s degree in architecture from Southern California Institute of Architecture. According to Colvin, Cera’s years of experience and background will enhance the team’s knowledge and expertise in all aspects of architecture, assisting clients with projects from inception and strategic planning through design and implementation.

MRB Group’s Architecture team has more recently experienced significant growth. Colvin attributes much of the steady increase to the firm’s ability to integrate engineering support and site development

into design projects “seamlessly.”

“When we moved into the Culver Road Armory, we removed the barriers – quite literally – between our departments. Now, our staff creates collaboratively. Each team interacts freely and enhances the others spontaneously with technical and creative support,” Colvin said. “Joel Cera will add his specialized knowledge to that interaction. It’s about synergy. As a result, our clients get a broad, dynamic team – and an affordable cost.” □

*Professional Firms Employee News, continued on page 26...*



## Imaging With Unmanned Aerial Systems Access To Data That We Have Not Had Before, *Continued from page 7*

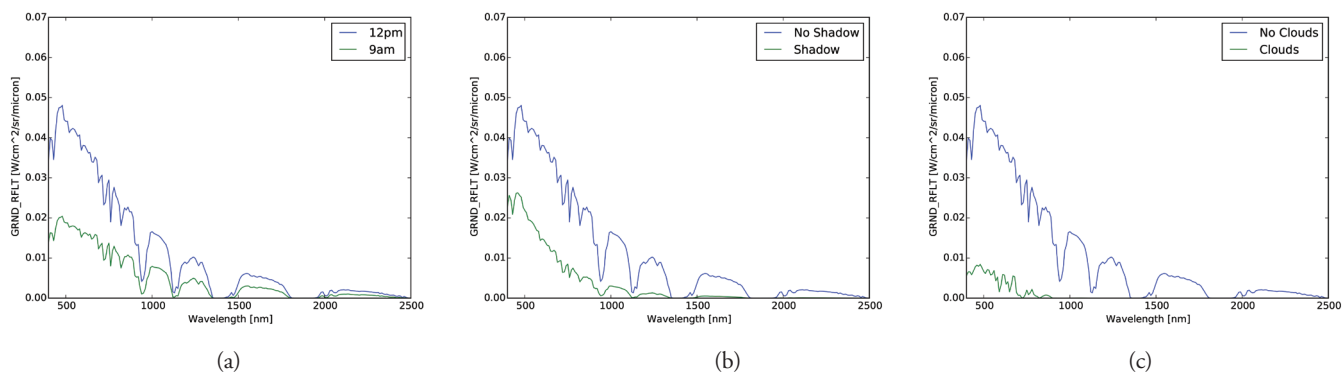
information from their drone imagery unless they follow strict protocols and procedures for collecting the data and producing the NDVI product. The delivery of inaccurate information needs to be avoided at all costs, so that the trust of these farmers in our science can be maintained and so that the economic impact of this data can be maximized.

Academic researchers, crop consultants, and producers need to work as a unified team to develop the most valuable products possible using these new collection systems. There is a great opportunity to change the way the world grows its food supply, checks the rate of deforestation in the rain forests, monitors the change in sea temperature, and investigates the condition of structures such as bridges, power lines, and rooftops. RIT is forming these relationships with local companies such as Pictometry, Agrinetix, and Pegasus Environmental, and large UAS manufacturers such as Precision Hawk to do just this. Hopefully the academic discoveries made and shared with the traditional remote sensing community, and these new data providers that are developing their imagery acquisition around UAS platforms, will continue the long history that the DIRS laboratory in the Chester F. Carlson Center for Imaging Science at RIT has had in innovating this new science and engineering.



*Figure 5: The deployment of calibration panels in a study area enables UAS imagery collected on different days to be scientifically compared, offering crop producers valuable and trusted comparative information. Undergraduate research assistants Elizabeth Bondi and Victoria Scholl assist Professor Carl Salvaggio in a recent experiment at Maier Farms.*

As a community, we are seeing things that we have never seen before with UAS-borne imaging systems. Now it is imperative that we interpret what we are seeing in a rigorous and accurate scientific fashion. If we do so, we will change the way remote sensing science is being conducted for decades to come with these remarkable new platforms. □



*Figure 6: Spectral radiance reaching the ground (a) at 9am and 12pm on a clear day, (b) at 12pm in shadow and out of shadow, and (c) at 12pm in the presence and absence of cumulus cloud cover. All spectral data modeled using MODTRAN.*

*Carl Salvaggio, Ph.D. is a Professor in the Chester F. Carlson Center for Imaging Science's Digital Imaging and Remote Sensing Laboratory in the College of Science at the Rochester Institute of Technology.*

*Elizabeth Bondi is an undergraduate research assistant and student in the Imaging Science program at the Chester F. Carlson Center for Imaging Science in the College of Science at the Rochester Institute of Technology.*

# Professional Firms *Employee News*

## TYLI's Rochester Office Announces Staff Additions

T.Y. Lin International (TYLI) announces the addition of Alben Kezhiyur and Bryant Schram to its Rochester staff.



*Alben Kezhiyur, EIT*

Kezhiyur has three years of professional engineering experience focused on building design and site infrastructure management. He earned a master of engineering degree from Pennsylvania State University and a bachelor of technology degree from the Indian Institute of Technology. Kezhiyur holds his Engineer-in-Training certificate and since joining the firm has been actively involved in the firm's work at the City of Rochester's Crossroads Parking Garage



*Bryant Schram*

and the Chase Building, a structural engineering project that TYLI is completing for Gallina Development.

Schram is a graduate of Alfred State College. He earned a bachelor of science degree in architectural technology and has experience working at SUNY Oswego as part of a small design/build/construction team overseeing multiple new construction and renovation projects on campus. His time with the firm has been spent working on projects for Star of the West Milling Company, the City of Rochester, Ontario County, and the US Army Corps of Engineers. □

## What's News

### *Arcadis Canada to Conduct Radiological Surveys for Port Hope Project, Another Step Toward a Vibrant and Sustainable Community for Port Hope Residents*

**Port Hope, Ontario** - As part of its Port Hope Project, the Canadian government awarded a radiological survey contract to Arcadis, the leading Design & Consultancy firm for natural and built assets. This contract, announced by the Honorable Greg Rickford, Canada's Minister of Natural Resources and Minister for the Federal Economic Development Initiative for Northern Ontario, is part of the larger Port Hope Area Initiative.

This long-term federal commitment was developed in response to the discovery of low level radiation in the area years after closing of a local radioactive material refining and processing operation. The Arcadis survey will continue testing Port Hope properties to identify any in need of remediation. The goal of the overall project is to assure the residents of Port Hope that residual low level radioactive waste issues have been identified and dealt with in a cost-effective and environmentally responsible manner, allowing the community to fully enjoy and embrace their surroundings. Finally, the program will create a park and waterfront area that will enhance the neighborhood with sporting

fields, gardens, and green space.

As part of the Canadian government's plan, Arcadis will continue the Port Hope Area Initiative Property Radiological Survey, which began in 2012 with a survey of 450 residential properties in Port Hope. The current contract is for the radiological survey and assessment of an additional 800 properties (residential, commercial, industrial, and institutional). This survey will identify 1) properties that have not been affected by historic operations and 2) properties that have residual historic low-level radioactive waste impacts requiring remediation. As part of the program Arcadis will develop remedial action plans and estimate costs for any impacted properties.

According to Thomas Franz, president of Arcadis Canada, "We congratulate the Canadian government for its commitment to the Port Hope area. Arcadis is proud to apply our best people and knowledge in the evaluation and remediation of radioactive materials and be part of creating a safe and beautiful community for the people of Port Hope."

Arcadis recently acquired three Canada-based firms (SENES, Decommissioning Consulting Services and FRANZ Environmental) specializing in environmental remediation, brownfields and radiological and risk assessment services, and as a result Campaign 2 will be carried out by the same project team that conducted Campaign 1.

#### *Improving quality of life*

Port Hope was previously the site of Eldorado Nuclear Limited and its private sector predecessors, which from 1933 to 1988 conducted radium and uranium refining. Properties and sites in Port Hope subsequently became contaminated from wastes of this historical operation. In 2001, the Government of Canada, the municipalities of Port Hope and Clarington signed a joint agreement creating the Port Hope Area Initiative (PHAI). The PHAI Management Office is led by Canadian Nuclear Laboratories (CNL).

For more information, please contact Debra Havins of ARCADIS at 303-471-3485 or [Debra.Havins@Arcadis-us.com](mailto:Debra.Havins@Arcadis-us.com). □



Rochester NY Chapter

# Independent Entrepreneurs Council

*"The Junction of Technology, Manufacturing & Business Development"*

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*Dennis Roote*  
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Environmental PLCC  
585-330-6986

## *Entrepreneurs Helping Entrepreneurs Succeed*

### Monthly Breakfast Series

**Date:** Tuesday, November 17, 2015

**Location:** SUNY Polytechnic Institute, Colleges of Nanoscale Science and Engineering's Smart System Technology & Commercialization Center (STC)  
5450 Campus Drive - Canandaigua NY 14424

**Time:** Registration 7:30 - 8:00 am

**Presentation:** 8:00 - 9:00~9:30 am

**Registration Required:** There is NO charge for this presentation. Reservations are required by Friday C.O.B. November 13, 2015.

Make Reservations via The Rivers Organization at (585) 586-6906 or [ESTG@Riversorg.com](mailto:ESTG@Riversorg.com)

**Topic: Cleanroom Basics - "Selecting the proper cleanroom garments and proper donning procedures."**

**Speakers: Barbara Done/Micron Management and Carol Jones/G&KK Services**

*Carol* will discuss reusable garments and differences in material performance. She will also discuss the economics of disposable vs reusable garments and what items to look for in the contract verbage before signing a contract.

*Barbara* will present some procedures for proper cleanroom protocol and testing results that prove how the lack of protocol will damage product.

Both speakers have over **50 years of combined experience** in the cleanroom industry and both are past presidents of the local Institute of Environmental Sciences Technology.

**Upcoming Talks:**

<u>Date</u>	<u>Speaker</u>	<u>Topic</u>
December 2015	Lee Drake	<i>Critical Computer Update Concerns For Manufacturing Technology - Retiring Old Technologies.</i>
February 2016	Dr. David Glocker	<i>Inverted Cylindrical Magnetron Sputtering: Technologies. and Applications</i>

*If you are a "technology based entrepreneur" and you feel that you have a topic of interest that you would like to present, contact Bob Lewis (585-385-2087).*

*Talks are the 3<sup>rd</sup> Tuesday of every month (0800-0930), Reservation Required.*

*Join us at our Monthly luncheon meeting to see how we can help you grow your business. Contact one of the persons listed to the left for time and place.*



# Association for Facilities Engineering

## Rochester Chapter No. 21

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## November 2015

To all our sponsors and supporters we wanted to take this month to say thank you to all of you that support the AFE. Over the years it has been the wonderful support of the Rochester Engineering community that has allowed the AFE to grow and expand. We have grown into one of the largest AFE chapters in America, we have expanded our scholarship opportunities to local college students and lastly we are working closely with our National offices to encourage certifications for those in the facility management fields.

In a month we will be launching a new chapter website that will have links to all of our monthly functions including the monthly facility tours, clambake, golf outing and our advertising sponsors. The website will have links to photos of the events, including our most important event “Scholarship Night” where we will once again be able to award three \$1,500 scholarships to local college students in January of 2016. Lastly the website will allow you to easily navigate to our National headquarters where you can find important information on certifications, seminars and other training opportunities. The website, once completed, can be found at [www.afe21.org](http://www.afe21.org).

We are looking forward to another exciting year of growth and once again wanted to thank all of you that make this possible. We encourage anyone who has not participated in AFE Chapter 21 to come out and see what we are all about. If you have questions please feel free to contact us with any questions or inquiries into membership.

*Thank you,  
Matthew Knights  
President  
AFE Chapter 21*



# Genesee Valley Branch American Public Works Association



Website: [www.apwa.net](http://www.apwa.net)

*Geoffrey Benway, PE*

*Genesee Valley Branch President*

*Serving Genesee, Livingston, Monroe, Ontario, Orleans and Wayne County*

***The great use of life is to spend it for something that will outlast it.***

*William James*

### Public Works Headaches

For most of the time I find public works to be challenging and rewarding. The ability to design and construct projects that provide clean water, sewers, or transportation improvement projects to the public makes me proud in my service to the community. Very few projects ever have 100% support due to impacts to homes, neighborhoods, or local roads. Every project requires a balance of needs and problems. APWA offers a book to address these issues, the *Public Works Tough Questions Book*, by Shirley Fulton and Susan Hartung. This book should be on everyone's desk! The authors provide guidance on tough questions from the public, the media, elected officials, and employees. At 104 pages, it only scratches the surface.

In my career I have had people complain about how a project impacts their health due to dust, odors, noise, or stress. It seems that one person's land use expectations do not agree with their neighbors. Public works professionals are the referees that must decide on a fair and legal resolution. Of course, most people do not want their name to be disclosed after they trash their neighbor on the phone, and then act oblivious to the past conversations. I envy the show that has a bubble around their town. If only each person had a bubble around their house.

Traffic issues are also a challenge as everyone has a driver's license. It is amazing how many people can recognize actual car speeds from the front window in their house. They also want to know why their community cannot stop people from using a public road. Others can predict that a road project will create more traffic or faster speeds after it is complete. One of my favorite complaints came from a resident who wanted us to plow a street against the flow of traffic so we would not put snow in his driveway. Traffic signage is a favorite on everyone's list of remedies recommended by citizens. Stop signs should be placed everywhere to address speeding, kids at play, cut through traffic, or excessive truck traffic.

Utility projects are not immune to second guessing. A recent sanitary sewer project had a resident ask for several plan modifications and then was upset when the project costs exceeded the engineer's estimate and the state's debt limits.

The book is a good resource to address those tough questions. It gives any public works employee a chance to think about the best option to diffuse a volatile situation with tact and compassion.

### NY Chapter Conference & Awards Dinner

Do you have an interesting project that you would be willing to share with fellow public works officials? Have a topic that you feel your staff need to find the latest technology or standard of practice? The NY APWA Chapter is looking for your feedback on critical issues, trends, and regulations to make the conference valuable to all levels of employees. Send me an email with suggestions. The 2016 Conference will be in Syracuse, NY on April 14 – 15. The NY Chapter is providing reduced pricing to allow your young professionals a chance to attend. The 2015 Conference had an outstanding session on *Leadership* that is useful to all levels of consultants and government employees. The confirmed sessions will be listed on the NY Chapter website.

### Awards Time!!

The Genesee Valley Branch is soliciting nominations for outstanding individuals and projects. Please consider submitting an award nomination form to the Genesee Valley Branch for our January 2016 Awards ceremony. All nominations are due December 4<sup>th</sup>. The Board of Directors encourages all government agencies and private consultants to think about what staff or projects should be recognized. We also want to hear from the towns, cities, villages, and counties outside of Monroe County that are part of the Branch. The award descriptions can be found at [www.APWA.net](http://www.APWA.net) and on the NY Chapter website [www.NYS.APWA.net](http://www.NYS.APWA.net). This is a great way to reward your hard working team and inspire your staff's pride in their community and hard work. Any individual or public agency can submit a nomination. APWA's award criteria are available for many positions and project types.

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*The American Public Works Association ([www.apwa.net](http://www.apwa.net)) is a not-for-profit, international organization of more than 28,500 members involved in the field of public works. APWA serves its members by promoting professional excellence and public awareness through education, advocacy and the exchange of knowledge. APWA is headquartered in Kansas City, Missouri, has an office in Washington, D.C. and 63 chapters in North America.*

Board Editorial  
By Thomas C. Hack, P.E., M. ASCE, Rochester Section Treasurer



**PDH Pending**

# **MOVING ROCHESTER BEYOND THE CAR**

Presented by Erik Frisch, Transportation Specialist, City of Rochester

**Thursday: November 12, 2015 Dinner Meeting**

**Location:** Hilton Garden Inn, 155 East Main Street Rochester NY

**Time:** 6:00-7:00pm Cash Bar, 7:00-8:00pm dinner, 7:30-8:30pm presentation

**Cost:** ASCE Members \$35, Non-Members \$50, Students \$10

**Reservations:** Tom Hack at [ascerochester@gmail.com](mailto:ascerochester@gmail.com) or 428-6852 by Nov 6

**Parking:** South Avenue Parking Garage



## **Upcoming Programs:**

Click on [ascerochester.org](http://ascerochester.org) for details.

- Dec 2015..... NYS Report Card Bayonne Bridge Proj
- January 2016..... Engineer of the Year Holiday Party
- February 2016..... ASCE Ski Day Bristol Mountain
- February 2016..... I-81 Corridor



**ASCE**  
**NEW YORK STATE**  
**INFRASTRUCTURE**  
**REPORT CARD 2015**

	2015
Aviation	C
Drinking Water	C
Solid Waste	B-
Bridges	D+
Parks	B-
Transit	C-
Dams	C-
Roads	D-
Wastewater	D
<b>NYS Infrastructure GPA</b>	<b>C-</b>



Thank you for making the 59th Annual Clambake a success!  
 315 people were in attendance on September 30th at the  
 Webster Columbus Center, and a good time was had by all!



## Special Thanks to Our Sponsors!

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Rochester, NY Chapter

# American Society of Plumbing Engineers



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

**President:**

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IBC Engineering, P.C.  
3445 Winton Place, Suite 219  
Rochester, NY 14623  
585-292-1590

**Vice President Technical:**

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**Vice President Legislative:**

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Empire State Associates  
181 Bay Village Drive  
Rochester, NY 14609  
585-602-0271

## President's Message



Our Chapter was recently recognized for Member Retention by Society. Thank you to all members that have maintained and renewed their membership with our Chapter. Thanks also to Doug Meier, VP Membership, for his hard work and dedication in pursuing new members for growth of the Chapter and ASPE.

### Did you know . . .

- Archived ASPE webinars are available 24/7? Go to [aspe.org/webinararchives](http://aspe.org/webinararchives) for a complete list. Costs may apply to view the webinars.
- ASPE Handbooks are available on-line? Log-in to the "Members Only" section of [aspe.org](http://aspe.org) to view and download various chapters from all four Handbooks.

*Alan Smith, P.E.*

Rochester Chapter President

## Meeting Notice – Save the Date

**Topic:** **Commercial Pool Filtration Options**

*Speaker: Ken Bergstrom, Filtrex Inc.*

**Date:** Wednesday, November 18, 2015

**Time:** 12:00 noon - 1:30 pm

**Place:** Valicia's Ristorante, 2155 Long Pond Road, Rochester 14606  
(just north of Route 31, Gates)

**Credits:** PDH Approval Pending  
(call or e-mail for confirmation after November 13<sup>th</sup>).

**Cost:** \$20.00 (member or guest), check or cash at the door.

**RSVP:** To Dave Jereckos (585-341-3168) or  
[djereckos@ibceng.com](mailto:djereckos@ibceng.com) by Monday, November 16<sup>th</sup>.

Future meetings: December 16<sup>th</sup>, January 20<sup>th</sup>

*(Chapters are not authorized to speak for the Society)*





## **A Review of Energy Code Changes**

With the changes to the NYS Commercial Energy Code in January 2015 and the proposed code changes scheduled for the first quarter of next year to the 2015 International Energy Code, the regulations impacting interior lighting design and controls, daylighting, and exterior lighting are a rapidly moving target. We will highlight the changes, hopefully dispel some of the myths and provide some insight into the various paths to code compliance available to design professionals.

### **Instructor**

Scott W. Copp is certified by the ICC as a Commercial Energy Code plan reviewer and inspector, Mechanical Code plan reviewer and inspector. He has served as Director of Development and Code Enforcement Officer for the Town of Perinton. He is now Sr. Project Manager with the Code Compliance Group of T.Y. Lin International.

**Wednesday November 18, 2015 ~ 12:00 Noon - 1:00 pm**

\$30 per person (includes buffet style lunch)

**Rick's Prime Rib**

898 Buffalo Road

**Please RSVP for this event before 11/11  
to Diane Montrois at 585.254.8010**



# Finger Lakes Chapter International Council on Systems Engineering

[www.incose.org/flc](http://www.incose.org/flc)



## Finger Lakes Chapter of INTERNATIONAL COUNCIL ON SYSTEMS ENGINEERING

[www.incose.org/flc](http://www.incose.org/flc)

### Upcoming Chapter Meeting Events

- **Thursday, November 19, 2015 November Chapter Meeting**

- Kevin Devaney, Systems Engineering Manager, SRC

#### *An Integral Approach to Systems Engineering*

This presentation looks at applying Integral Theory models to Systems Engineering. Integral Theory is a school of philosophy founded by Ken Wilber that seeks to integrate all human knowledge disciplines into a single “context-free” framework. Because of its general nature, Integral Theory has been successfully applied many different fields, including art, healthcare and ecology. The recent application of Integral Theory to the field of architecture suggests how it may also be applied to systems engineering. A major benefit of Integral Theory is that it enables us to look at the world with a broader perspective. Using this perspective, we can develop improved methods in how we design systems, solve problems, improve engineering organizations and build stronger technical leaders.

Kevin Devaney is a systems engineering manager at SRC, where he has spent 27 years in different roles, including intelligence analyst, software developer and systems engineer, mostly in the areas of radar and electronic warfare. His education includes a BS in Physics from Georgetown University, MSEE and MSCE degrees from Syracuse University, and an MA in Management and Organizational Development from Fielding Graduate University.

*(Please RSVP with your local host – refer to the list below)*

- **December - as always, no Chapter Meeting in December**

- **Meetings begin at 6:00 and run to approximately 7:30 pm**

- Please RSVP with your local host - a list of local hosts and their contact information is below; if there are any issues contacting one of them, or there are any other questions or concerns, please contact Kevin Devaney at [kdevaney@srcinc.com](mailto:kdevaney@srcinc.com).

- |                             |                                                                                                              |
|-----------------------------|--------------------------------------------------------------------------------------------------------------|
| 1. Ithaca, NY               | Wesley Hewett at <a href="mailto:wahewett@gmail.com">wahewett@gmail.com</a> , Ithaca, NY;                    |
| 2. Syracuse University      | Dr. Young Moon at <a href="mailto:ybmoon@syr.edu">ybmoon@syr.edu</a> , 220 Link Hall                         |
| 3. Xerox                    | Charles Rizzolo at <a href="mailto:charles.rizzolo@xerox.com">charles.rizzolo@xerox.com</a>                  |
| 4. Binghamton University    | Steve Czarnecki at <a href="mailto:czar@binghamton.edu">czar@binghamton.edu</a>                              |
| 5. Rome, NY                 | Bruce Rubin at <a href="mailto:bruceieeerubin@yahoo.com">bruceieeerubin@yahoo.com</a>                        |
| 6. SRC, No. Syracuse, NY    | Kevin Devaney at <a href="mailto:devaney@srcinc.com">devaney@srcinc.com</a> , 6225 Running Ridge Road, 13212 |
| 7. Lockheed Martin SI       | Shirley Kupst at <a href="mailto:shirley.kupst@lmco.com">shirley.kupst@lmco.com</a> , LMCO                   |
| 8. Rochester Inst. of Tech. | Clark Hochgraf at <a href="mailto:cghice@rit.edu">cghice@rit.edu</a> , RIT, Rochester, NY, Bld 82, Room 1150 |





# Rochester Chapter American Society of Heating, Refrigerating, and Air-Conditioning Engineers

Rochester ASHRAE website: [www.rochester.ashraechapters.org](http://www.rochester.ashraechapters.org) NOVEMBER NEWSLETTER

### President's Message

Let me start by recapping the awards that the Rochester Chapter received at the 2015 CRC, of which were handed out at our September Clambake meeting:

- ASHRAE Community Sustainability Project Plaque: **Ed Burns**
- Presidential Award of Excellence (PAOE) for Sustainability Excellence Certificate: **Ed Burns**
- Newsletter - Black Ink Award Honorable Mention Plaque: **Scott Edwards**
- Outstanding Performance Chapter Programs Honorable Mention Plaque: **Christina Walter**
- Research Promotion - Exceeding Goal Certificate, Bronze Treasury Ribbon: **Paul Kenna**
- Research Promotion – Full Circle Chevron: Rochester Chapter

I would like to thank Mr. **Andrew Randolph** of LTG, Inc. for presenting on *Chilled Beams* at our October lunch meeting. This topic was well received and enjoyed by all. Our November meeting will be held on November 9<sup>th</sup>. We have many things planned for the November meeting. ASHRAE Distinguished Lecturer, Mr. **Brian Monk** of Carrier Racan, will be presenting on *Environmental Quality on High Performance Buildings*. Mr. **Bill Walter**, ASHRAE Region I DRC (Director & Regional Chair), will visit us to share the latest news from Region and Society. Lastly, this meeting will be a Resource Promotion event, a time to recognize last year's Major Donors and to thank all for their contributions. We hope to see you at our November meeting. Come and enjoy *Making Connections!*



*Christina Walter*  
2015-2016 President  
Rochester Chapter

## November ASHRAE Meeting PDH Approved

**Date:** Monday, November 9, 2015

**Location:** Mario's Italian Steakhouse  
2740 Monroe Ave., Rochester

**Time:** 12 PM  
with Buffet Lunch Served

**Cost:** \$25.00

**Speaker:** *Mr. Brian Monk, PE, Carrier Racan*  
\*\*\*Distinguished Lecturer\*\*\*

**Topic:** *Environmental Quality in  
High Performance Buildings*

Please RSVP by noon Thursday, November 5<sup>th</sup> to Tim Duprey,  
[tim.duprey@pres-services.com](mailto:tim.duprey@pres-services.com).



### ASHRAE 2015-2016 Meeting Schedule

Date	Event	Theme	Location
Monday, 11/9/2015	Environmental Quality in High Performance Buildings (presented by Brian Monk P.E., Racan) *** Distinguished Lecturer ***	Resource Promotion	Mario's @ 12:00 PM
Monday, 12/14/2015	Control Systems - Ways to Identify Performance Issues (presented by Day Automation)		Mario's @ 12:00 PM
Monday, 1/11/2016	Operation and Applying Drives (presented by Kevin Diehl - Yasawa America, Inc.)		Mario's @ 12:00 PM
Friday, 2/5/2016	Annual ASHRAE Valentines Dinner Dance (Colgate Rochester Crozer Divinity School)	---	Colgate @ 7:00 PM
Monday, 2/8/2016	Building Load Analysis (presented by Robert Feduik, Carrier Corporation)	Membership Promotion	Mario's @ 12:00 PM
Monday, 3/14/2016	Chapter Facility Tour (University of Rochester - Strong Hospital Central Plant)	---	Strong Hospital @ 5:00 PM
Monday, 4/11/2016	Retro-Commissioning Existing Buildings (presented by Al Rodgers & Ron Sanger)	Pending	Mario's @ 12:00 PM
Monday, 5/9/2016	Annual ASHRAE Golf Outing and Picnic (Ravenwood Golf Course)	---	9:30 AM Golf 4:30 - 8:00 Picnic

Please continue to check out our website at [www.rochester.ashraechapters.org](http://www.rochester.ashraechapters.org) for information on upcoming chapter meetings, current officer list and contact information, our current newsletter and more! Or if Facebook is your preferred method of communication take a moment to 'like' us at [www.facebook.com/#!/ashraerochester](https://www.facebook.com/#!/ashraerochester).



*The Society of Women Engineers  
inspires women to achieve full potential in  
careers as engineers and leaders; expands  
the image of the engineering profession as a  
positive force in the quality of life; and  
demonstrates the value of diversity.*

[swerochester.org](http://swerochester.org)  
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c/o Rochester Engineering Society at RMSC  
657 East Ave.  
Rochester, NY 14607



**SWEet Engineer - Member Highlight: Jessica (Jess) Bull**

**Current SWE Positions:** Outreach Chair      **Other Professional Society Affiliations:** ASHRAE  
**Education:** MEng, B.S. in Mechanical Engineering from RIT; BA in Psychology from Binghamton University  
**Company:** CHA, Rochester, NY      **Job Title:** Mechanical/Energy Engineer  
**Job Description:** Conduct energy studies to evaluate system wide energy use for industrial and manufacturing facilities. Propose solutions to increase energy efficiency with low payback on investment.  
**# Years in this position:** 2.5 years      **Why my job is so SWEet:** I have the unique opportunity to work in all different manufacturing plants across NY. We get to see firsthand how products are made. Consulting is a mix of field work and desk work. The work is always different, challenging and fun! My job allows me to propose energy efficient solution to high end users. By implementing these proposed solutions, companies are not only saving oodles of money, but also avoiding unnecessary fossil fuel consumption. Essentially, I am paid to fulfill one of my life long aspirations to save the planet in whatever way I could.  
**Words of Wisdom for someone starting in my field:** Be willing to think critically, make decisions you can stand behind and accept that sometimes you may not always get it right. Failure is the key to success; listen to feedback and learn from others.

**How has your work experience prepared you for your position in SWE (or other professional society)?** I often need to reach out to clients and facility management for data collection. My networking and communication skills have become more advanced through my position. This skill is helpful in organizing Outreach events, such as the Explorer's Post.

**Do you have any hobbies?** After graduation, I started working out at a Crossfit gym three times a week and I love it! I also love cooking and trying new recipes. I'm a huge fan of Paint Nite, puzzles and just going out for dinner with my husband and/or friends.

**Something other SWE members may not know about me:** I am a balloon artist. I used to make balloon animals at children's parties. Now I do it at the company BBQ. I was an insurance agent before I became an engineer and I own a home in Johnson City, NY.

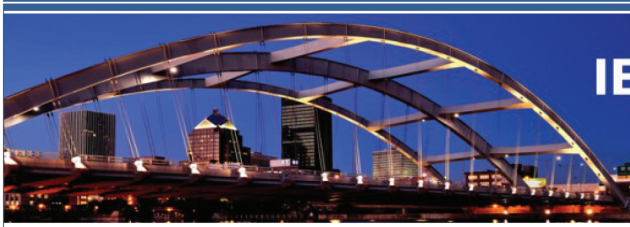


**2015 SWE Region E  
Leadership Conference**



*SWE Rochester Meet and Mingle at Splatters*

**We want YOU! Leadership Positions**  
 Check out the website ([swerochester.org](http://swerochester.org)) for the SWE Positions available. The roles and responsibilities descriptions can also be viewed. Swerochester.org has all the latest information regarding meetings & events. If you are not getting our online newsletters, let the webmaster know. Board meetings will be held on a Thursday of every month – check website for details



# IEEE Rochester Section

Serving Rochester Engineers  
for over 100 years

## November Newsletter, 2015

<http://rochester.ieee.org>

### Executive Committee

**Chair:** Greg Gdowski  
[greg.gdowski@gmail.com](mailto:greg.gdowski@gmail.com)

**Vice Chair:** Andreas Savakis  
[savakis@ieee.org](mailto:savakis@ieee.org)

**Treasurer:** Bill Fowlkes  
[william.fowlkes@kodak.com](mailto:william.fowlkes@kodak.com)

**Secretary:** Ray Ptucha  
[rwpeec@rit.edu](mailto:rwpeec@rit.edu)

**Awards:** Jean Kendrick  
[jkendrick388@frontiernet.net](mailto:jkendrick388@frontiernet.net)

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**Newsletter:** Anh Karam  
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**GRSS:** Emmett Lentilucci  
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**LIFE:** Henry Simon  
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**APS, MTTs:** Gregory Pettis  
[gpettis@harris.com](mailto:gpettis@harris.com)

**Photonics:** Bruce Smith  
[bwsemc@rit.edu](mailto:bwsemc@rit.edu)

**PES, IAS:** David Krispinsky  
[dgkite@rit.edu](mailto:dgkite@rit.edu)

**SPS:** Nathan Cahill

### New Graduate Student Scholarship. Deadline extended to November 15<sup>th</sup>!

If you are a new graduate student in the Rochester area, you are going to want to join the IEEE Society. **Only Rochester Section IEEE members can apply for the new graduate student scholarship!** Applications are open today. This is the first year that the Rochester Section will offer a \$1,500 scholarship exclusively for graduate students. Please visit our new web pages today.



### Rochester Section Celebrating IEEE Day!!

The Theme of this IEEE day was “Leveraging Technology for a Better Tomorrow”. Almost 30 members, including student representatives from RIT and UofR, joined in to celebrate this special day during our Excom meeting.



### The Rochester Section welcomes our newest members as of September 1: 11 Student members; 11 Graduate student members; and 6 Members.

Members	Graduate Student Members	Student Members
Donald Kerwin	Kofi Sarpong Adu-Manu	Henry Cannon
Daryl Maslanka	Xiaowan Dong	Selene Chew
David Morgan	Sefik Emre Eskimez	Aaron Jacob Edelman
Palghat Ramish	Sahar Hasbembeloogardi	Mitchell Gordon
Elizabeth A. Van Blargan	Breton L. Minnehan	James Guglielmo
Ming Yang	Emily Myers	Christopher R. Guzman
	Yu Wang	Kyle Myrick Kelly
	Runchen Zhao	Nicholas John Reitz
	Chi Zhang	Victor Robinson
	Minhao Zhang	Arshia Sasson
	Yuping Ren	Michelle Schmiedlin

*IEEE News Continued on Page 38*

### Senior Member News

The Rochester Section congratulates Sandhya Dwarkadas, Stephanie Ludi, Gregory Pettis, Henry Kautz, Bryan Fodness, Laurel Carney, and Martin Leisner for being recently approved as a Senior Members of IEEE. The Rochester Section has had 20 members elevated to **Senior Member Status in 2015!**

### Upcoming Events

#### **Western New York Image and Signal Processing workshop – December 4, 2015.**

The WNYISPW is a venue for promoting image and signal processing research in our area and for facilitating interaction between academic researchers, industry researchers, and students. The workshop builds off of 17 successful years of prior workshops in Western New York. The workshop comprises both oral and poster presentations.

#### **Topics include, but are not limited to:**

- Formation, Processing, and/or Analysis of Signals, Images, or Video
- Computer Vision
- Information Retrieval
- Image and Color Science
- Applications of Image and Signal Processing, including: Medical Image and Signal Analysis, Audio Processing and Analysis, Remote Sensing, Archival Imaging, Printing, Consumer Devices, Security, Surveillance, Document Imaging, Art Restoration and Analysis, and Astronomy

Prospective authors are encouraged to submit a 4-page paper (+ 5th page of references) as instructed on the workshop website. To encourage student participation, a best student paper award will be given.

#### **Important dates are:**

Paper submission opens: October 5, 2015

Paper submission closes: October 26, 2015

Notification of acceptance: November 9, 2015

Submission of camera-ready paper: November 23, 2015

#### **Workshop: December 4, 2015**

Accepted papers will be published in IEEE Xplore digital library

Please see the conference website (<http://ewh.ieee.org/r1/rochester/sp/WNYISPW2015.html>) for further details.



# Genesee Valley Land Surveyors Association

Website: [www.gvlsa.com](http://www.gvlsa.com)

## Year 2015 Officers

### President

John F. Gillen, LS

### Vice President

Roy B. Garfinkel, LS

### Secretary

Robert J. Avery, LS

### Treasurer

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## November 2015

## BOARD OF DIRECTORS

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Jared R. Ransom, LS

2014-2016

Clifford J. Rigerman, LS

Joseph J. Hefner, LS

2015-2017

Jeffrey A. Tiede, LS

Scott E. Measday, LS

## Year 2015 Meeting Dates

### November 19, 2015

Board of Directors /Associates Meeting

40 & 8 Club, 933 University Avenue, Rochester

### December 5, 2015

Annual Holiday Dinner

*Location to be determined.*

### January 20-22

2016 NYSAPLS Conference

Turning Stone Casino

## Professional Affiliations

- *New York State Association of Professional Land Surveyors, Inc.*
- *National Society of Professional Surveyors*
- *Rochester Engineering Society*

## November 19, 2015

## Board of Directors /Associates Meeting

*Program has not yet been determined.*

### 40 & 8 Club

933 University Avenue

Rochester

## 2016 NYSAPLS

## 57<sup>th</sup> Annual Conference

### “Planes, Trains, and Automobiles”

at Turning Stone Casino

Wednesday January 20<sup>th</sup>

through

Friday January 22<sup>nd</sup>

Registration is now open.

Visit [www.nysapls.org](http://www.nysapls.org) and sign up today.



## Rochester Chapter Society for Imaging Science and Technology

Website: <http://rochesterengineeringsociety.wildapricot.org/ISandT>

### Save the Dates: 2015-16 Meeting Schedule

November 11, 2015 - *"Choosing a Landing Site on Mars: The 2016 InSight Mission"* by Nicholas Warner, Geneseo College

December 9, 2015 - *"Astronomy at the Edge of the Sky: Observing the Universe in the Mountains of Chile,"* by Dr. Brian Koberlein, School of Physics and Astronomy, RIT

January 13, 2016 - *"Kodak Alarix Premium Duplex Photo Fulfillment,"* by Bob F. Mindler, Thermal Printing Technology in Imaging Consumer

February 10, 2016 - *"An overview of the Thermal Infrared Sensor (TIRS) on Board Landsat 8,"* by Matthew Montanaro, RIT

March 9, 2016 - TBD

April 13, 2016 - *RIT Student Presentations.*

May 11, 2016 - TBD

## November IS&T Meeting - **\*\*Location TBD\*\***

### Wednesday, November 11, 2015

### *Choosing a Landing Site on Mars: The 2016 InSight Mission*

*Presented by Nicholas Warner, Geneseo College*

#### **Abstract:**

The InSight lander mission to Mars is the first robotic geophysics mission to land on another terrestrial planet. The primary mission goal is to understand the interior structure of Mars (as well as other terrestrial planets) by measuring mars quakes and by acquiring a measurement of the planet's internal heat. In September of 2016 the InSight lander will descend and hopefully land safely on Mars. This talk will walk through how we choose a landing site on Mars and give details regarding both the engineering and science constraints that influence this process.

#### **Biography:**

Nicholas Warner is currently an assistant professor of geological sciences at SUNY Geneseo. He has a bachelors degree in geological sciences from SUNY Geneseo in 2000, and a masters in geological sciences from SUNY Buffalo in 2002. He taught high school earth science at Spencerport High School from 2002 to 2004. He then earned a PhD in geological sciences from Arizon State University in 2008. His research focus was on the climate history of planetary bodies (Mars more specifically) through an understanding of surface processes (20+ publications). Nicholas is originally from the Castile, NY area.





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

# Monroe Professional Engineers Society

*A Chapter of the New York State Society of Professional Engineers*

657 East Avenue, Rochester, New York 14607

*Dedicated to Professionalism in Engineering in the Interest of Public Safety and Welfare*

**2015-16 Officers:** President **Chris Devries, PE**, President-elect **David Roberts, PE**, Vice President **Chris Kamar, PE**, Secretary **Derek Anderson, PE**, Treasurer **Neal Illenberg, PE**, Membership Chair **Chris Devries, PE**

## Finding the Next Generation of Engineers

**Engineering** is the profession in which a knowledge of the mathematical and natural sciences gained by study, experience, and practice is applied with judgment to develop ways to utilize, economically, the materials and forces of nature for the benefit of mankind.

*- Accreditation Board for Engineering and Technology (ABET)*

The advancements and achievements of humankind to this point in our history are largely credited to the work of engineers and scientists. Therefore, it can be concluded that the continuation of our development, technology, ideals, and even our species will be dependent on future generations of engineers and scientists. From where will these next great innovators, inventors, and designers come from? From students who at this time are just getting exposed to the possibilities that come from pursuits in science, technology, engineering, and mathematics (STEM).

This is why each year, the Monroe Professional Engineers Society sponsors several events that reach out to young students to help them find their potential in these areas of study. One such event is the **MATHCOUNTS** competition. Since 1983, MPES has sponsored this event and helped literally thousands of students discover their aptitude in mathematics.

For the past 15 years **MATHCOUNTS** has been organized and managed by MPES member William P. McCormick, P.E. Following the next **MATHCOUNTS** event, scheduled for February 6, 2016 at RIT, Mr. McCormick will be stepping down from his position as chairperson for this event.

First, on behalf of MPES and the local engineering community in general, I'd like to express our gratitude to Mr. McCormick for his willingness to lead this event for all these years.

Second, I want to implore each individual within the local engineering community to consider whether they could succeed Mr. McCormick in leading the **MATHCOUNTS** event in the future. It is not a big time commitment. It simply involves one Saturday in February and few hours beforehand communicating with teachers and organizing the event venue.

You don't need to be a member of MPES to participate. You simply need to have an interest in science & engineering and in helping the next generation to shape our future. If you would like more information on getting involved with and possibly leading the **MATHCOUNTS** event, please contact me at [dcrobertspe@gmail.com](mailto:dcrobertspe@gmail.com).

*Respectfully,*  
**David C. Roberts, P.E.**  
*President-elect*  
**MPES**

# Intelligent eyes in the sky

## *How UAVs will empower everyone from Architects to Zoologists*

*by Breton Minnehan, RIT Student*

It is not often that a new technology is the subject of front page stories for almost every major news outlet, and when such instances arise they usually signal a potential game changing innovation. The recent demilitarization of Unmanned Aerial Vehicles (UAVs), also known colloquially as drones, is one of these instances. In a matter of just a few years, UAVs transitioned from multi-million dollar pieces of military equipment to products that can be purchased for a few hundred dollars at any local hobby shop. This transition was a result of advances in several fields including miniaturization of flight electronics and motors, increased energy storage density, advances in real-time control theory and improved design of remote controlled hobbyist aircraft. The resulting inexpensive UAVs have a huge potential to positively impact countless fields.



There are two road blocks in the way of UAVs, first the high learning curve of operating UAVs, and second is the required post processing of the collected data. Although modern control systems have greatly reduced the complexity of operating UAVs, most UAVs require a significant amount of training time to be controlled reliably while ensuring the safety of everyone. Another complication to using UAVs for everyday tasks is that often the raw data, usually in the form of motion videos, must be post processed in order to extract useful information for the users. This post processing usually requires a significant amount of time from area experts, and is therefore quite costly. Solving these two problems would help to enable future autonomous UAVs to perform tasks such as delivering packages, monitoring crops, and performing infrastructure inspections on their own. While other groups work on the autonomization of UAVs, the team in the Real Time Vision & Image Processing Laboratory (RTVIP) at RIT is focusing on the processing and understanding of UAV data.

One of the interests of the RTVIP group is on developing algorithms that combine the frames of video collected from the UAV to form a single contextual image of the scene. The resulting image can be used for many applications ranging from monitoring crops and road conditions to wilderness surveying. This process, known as video mosaicking, has potential to benefit both remotely operated and autonomous UAVs.

For manually controlled vehicles video mosaicking is a process that provides a greater context for the information in each video frame, providing a more convenient method for data analysts to make direct comparisons between areas in the observed scene. One



*The Unmanned Aerial Vehicle at  
RIT's Real Time Vision & Image Processing Laboratory*

potential application of UAVs is for inspecting crops on a farm. The view from above can provide additional information of the relative health of the crops that is not easily observed from the ground. The current workflow for UAV data analysts involves first geo-locating the observed area in each frame then drawing inferences on the relative health of each area. A particular disadvantage to the current workflow is that the analysts cannot easily compare the health of various areas on the farm that are captured at different times on the flight. Video mosaicking provides a method for comparison by

providing a high-level overview of the field, while maintaining a high resolution, should the operator wish to inspect a given area in greater detail. This allows the operator to quickly determine the relative health of the crops and identify areas of concern.

Autonomous vehicles can use the process of video mosaicking to improve the robustness of their navigation systems through a process known as visual odometry. This method is based on the assumption that the ground is relatively flat, and the motion of the camera between frames can be determined based solely on the frame's alignment with the previous frames. Most UAVs currently rely on a combination of a GPS receiver and an Inertial Measurement Unit (IMU) to provide information on the global position and

vehicle motion, respectively. However, these two subsystems can be quite heavy, and may produce noisy signals that result in poor localization. By adding in a third subsystem for motion estimation based on visual information, the system could potentially be made significantly more robust.

Video mosaicking is one of the oldest topics in computer vision. Its roots can be traced back to photo panorama generation algorithms developed in the 1980's. Most video mosaicking algorithms are based on one of three general approaches: full frame appearance alignment methods, feature matching methods, and point tracking methods. Mosaicking methods based on point tracking have seen a recent surge in interest as a result of advances in the field of visual point tracking. These approaches use efficient point tracking algorithms to track a set of points over the course of the video. The movement of the points between two consecutive frames are then used to determine the alignment of the most recent frame to the previous frame. The issue with many of the tracking based mosaicking methods is that they often sacrifice tracking accuracy to run at real time rates. Thus, the results from tracking based mosaicking can suffer from misaligned frames due to the sub-par tracking methods used.

The RTVIP team recognized the potential of the point tracking methods, but a more robust tracking method was required to achieve accurate results on long videos, consisting of multiple minutes or more. Fortunately, the team recently finished developing a visual object tracking algorithm that was ideally suited for video mosaicking. The tracking method, known as Robust and Efficient tracker using Binary dEscriptors and Locality constraints (REBEL), was originally developed as a robust visual tracking method designed to be run on mobile devices. The tracker is both computationally efficient and has the increased robustness required in applications. The REBEL tracker can robustly track between 25 and 50 points at 30 frames per second on most modern desktop computers with a much higher accuracy than the methods previously



*Resulting Mosaic generated from flight over RIT*

employed for tracking based video mosaicking.

Another common problem for many video mosaicking algorithms is that they tend to accumulate error as a result of cascading the alignments from frame to frame. Our group replaced this cascaded alignment methods with a more long term solution that tied each tracked point to a location in a virtual ground plane. Using this method each tracked point corresponded to its own landmark, which could be used to align the frames independently of each other. This mosaicking process proved to be significantly more robust to instances of corrupted or misaligned frames in long-duration alignment tasks.

Unfortunately, there is currently a lack of publicly available datasets for video mosaicking, therefore the team decided to assemble their own fixed wing UAV to generate data to test their algorithm. The aircraft assembled was a 2.4 meter wingspan airframe that was controlled using the popular ArduPilot Mega 2.5 flight controller. The high definition video data was collected from front mounted GoPro camera. This configuration provided a stable platform that, once airborne, could autonomously fly a pre-programmed flight pattern to collect the desired imagery. The operation of this aircraft was halted after recent restrictions were released by the Federal Aviation Administration and the platform remains grounded.

As is the case with many of the leading technological innovations, Unmanned Aircraft have a high potential to impact the lives of people and society as a whole. Similarly to the personal computers in

the 1980's, the greatest impediment to their widespread adoption is technology that allows for ease of use by the average consumer. The pace of innovation is accelerating and technological building blocks are falling into place towards future systems that allow anyone to easily pick up a UAV and use it as if it was any other tool in at their disposal. The UAVs of the future will be as commonplace as personal computers in homes and businesses.



*Mosaic resulting from challenging flight over field with straight lines to test the accuracy.*

*Breton Minnehan graduated cum laude from Rochester Institute of Technology in 2014, receiving his BS and MS degrees in computer engineering. He is currently pursuing his Ph.D. in Engineering at Rochester Institute of Technology and works as a research assistant in the Rochester Institute of Technology Real Time Vision & Image Processing Laboratory. His research interests focus on object detection and tracking, scene reconstruction, as well as developing advanced computer vision techniques for Unmanned Aerial Vehicle applications.*

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