THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS®

Central Oklahoma Section Newsletter

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The Central Oklahoma Section Newsletter is nominally published nine times per year to convey monthly meeting dates, meeting topics, section activities, and/or other ASME information to its membership.

PROGRAM: **Program and TOUR of the OSU Institute for Agricultural Biosciences (OSU-IAB)**

HOST AND SPEAKER: **Dr. Randy Allen, Director, OSU-IAB, Ardmore, OK**

DATE: Thursday, August 28 **LOCATION**: 3210 Sam Noble Parkway, Ardmore, OK

The **Oklahoma State University Institute for Agricultural Biosciences** research initiative enables OSU to more effectively assist producers through the development of new or improved crops and crop production systems.

Ardmore was selected for the institute's location to enhance collaboration with the Samuel Roberts Noble Foundation scientists. Research focuses on basic and applied aspects of crop improvement through molecular biology, genetics, plant breeding and crop management. In addition to research laboratories and plant growth facilities, the IAB includes an auditorium and conference rooms equipped for worldwide conferencing and distance education programs.

The IAB became operational in August, 2011, with research laboratories of professors Randy Allen and Million Tadege occupying the south wing of the facility. Program support leader Dr. Todd Baughman joined the OSU-IAB in October, 2011. Dr. Allen will give a brief presentation about the OSU-IAB facility and provide an overview of agricultural biotechnology, including some of the ongoing research projects at the institute.

Please join us for this meeting on August 28! PDH certificates will be available for attendees.

Time: 6:00 - 6:30PM: Meet & Register at the OSU-IAB Center in Ardmore
6:30 – 7:00PM: Catered Meal 7:00 – 8:00PM: Introductions and Speaker Presentation
8:00 – 9:00PM: Tour of OSU-IAB Research Facilities

Cost: $10 for Sr. members, $5 for Student Members. Please place your reservation with Albert Janco (Ph: 405-848-1991 (leave message); e-mail: JANCOA@asme.org) by Tuesday, August 26 at NOON.

ADDITIONAL AUGUST MEETING INFORMATION

Randy Allen, Ph.D. is a Sitlington Endowed Professor in Agricultural Biosciences and serves as Director of the Oklahoma State University Institute for Agricultural Bioscience. He earned his Ph.D. in Biology at Texas A&M University and, after postdoctoral training at Washington University in St. Louis, took a position as Assistant Professor at Texas Tech University.

After serving nearly 20 years at Texas Tech, in 2008 Dr. Allen accepted the aforementioned Sitlington Endowed Chair position at Oklahoma State University. His lab was relocated to the Noble Foundation in Ardmore until the completion of the OSU-IAB facility in 2011. At that time he accepted the responsibility of directing the Institute.

Dr. Allen's research is in the area of plant molecular biology and biotechnology. The primary research aim is to understand how plant cells acclimate to environmental stresses such as water deficit and extreme temperatures. Toward that end Dr. Allen's lab has developed dozens of transgenic cotton varieties to evaluate the functions of specific genes. His research group has also worked on insect and disease resistance genes and on genes involved in the determining the quality traits of cotton fibers.

Dr. Allen has authored approximately 80 peer-reviewed publications and mentored 20 Ph.D. students. He holds several biotechnology patents and his group has worked with various industrial partners to develop the VIP3 insect resistance technology along with methods to improve plant stress tolerance and the quality of cotton fibers.

RELATED FEATURE: Noble Foundation Championing Unmanned Aerial Vehicles to Advance Agriculture

By Corey Moffet, courtesy

http://www.noble.org/ag/research/uavs-advance-ag/

Small UAVs have the potential to improve agricultural management.

Unmanned aerial vehicles (UAVs), more commonly referred to as drones in a majority of media outlets, have played an important role in U.S. military operations. These sophisticated flying machines have proven their utility in this arena, albeit at a huge price. Now the UAV industry is looking to expand into the civilian world, and the agricultural sector is expected to play a large role in this expansion.

Currently, the Federal Aviation Administration (FAA) is determining how unmanned aircraft systems (UAS) might be safely integrated into the national airspace system. The FAA uses the acronym "UAS" to include the UAV and all the associated support equipment, such as control stations, data links, telemetry, communications and navigation equipment. Often the image that comes to mind when thinking about UAVs or drones is something like the iconic Predator with its nearly 60-foot wingspan and a loaded weight of more than 1 ton. This type of UAV will occupy the same airspace routinely used by general and commercial aviation.

The challenge the FAA has in figuring out how to safely integrate these large UAVs into the national airspace is not trivial. However, agriculture can benefit from UAVs much smaller than the Predator. A system with a takeoff weight less than 55 pounds is classified as a small UAS by the FAA, and the agency has made it a priority to propose new rules governing their use. These UAVs are more of the scale and type that are legally flown now at elevations of 400 feet above ground level and lower by hobbyists for recreational purposes. Many of these UAVs, like the one pictured, can be easily disassembled and transported in a case the size of a large briefcase.

Like other classes of aircraft, small UAVs can be fixed wing or rotary wing. The fixed-wing aircraft tend to be more stable and require less power to stay aloft than the rotary-wing craft, but they are also less agile. Many UAVs use an autopilot system to sense their position and altitude, and make necessary corrections to stay upright and on path. Once this type of UAV is airborne, the operator has little or nothing to do with the flight. Flight plans are typically designed using software on a laptop computer, and the flight path is communicated over a data link to the UAV. When the flight is complete, the UAV returns to a spot the operator has designated for safe landing. Some rotary-wing aircraft can return to the very same spot where they began flight. Initially, UAVs will be useful for agriculture because of their ability to deploy meaningful sensors, making it easy for users to observe resources from a vantage point not previously feasible.

In some ways, UAV technology is positioned where personal computer technology was in the late 1970s. Computers at that time were large and very expensive, but they had proven useful in government and business. The personal computer was mainly of interest to hobbyists and produced few real-world benefits. Many believed the personal computer would remain a curiosity of this small group of enthusiasts. At that time, it would have been hard to believe that one day many families would own multiple computers or even imagine the now ubiquitous smartphones and tablets. The high cost and difficulty of using a personal computer in the 1970s were big adoption hurdles.

For the UAV today, the hurdles are regulatory (though for the small UAS, these should be overcome soon), cost and the lack of simple tools that can use sensor data to help producers make decisions. In crops such as corn and soybean, a number of tools are already available, and the development of similar tools for rangelands and forage crops will follow. If UAVs follow a similar path as the PC, low cost and useful tools will come - perhaps in ways we can't even imagine now.

MEMBERS NOTE: Please Renew Your ASME Membership!

Dear ASME Members,

This week, you should be receiving your 2014 - 2015 Membership renewal notice in the mail. Your renewal notice also serves as an opportunity for you to manage your professional profile, join ASME interest groups, and update your contact information.

If you would rather not wait for the mail to come, you can renew your Membership now. We've made it easy to renew - just click on the green button above and renew via our convenient online form. Begin at **https://www.asme.org/about-asme/professional-membership/renew?cm_re=Membership-_-Left%20Navigation-_-Renew** , log in, and fill out the form. You can also call us to renew at: (800) 843-2763 or +1 973-882-1167 between the hours of 8:00AM and 5:30PM US eastern time.

ASME Membership gives you the tools, professional training, information and connections you need to succeed in your career. We look forward to your continued loyalty to ASME, your professional society. Please renew your membership today.

Warmest Regards, **Michael Kreisberg**, Director, ASME Membership Development

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MEMBERS NOTE: ASME Organizational Changes Coming

Dear Colleagues,

This is a critical yet exciting juncture for ASME as we look forward to where we want to go over the next decade and beyond. ASME means many things for many people, depending on where and how you connect with our Society. There are thousands of activities, all of which are important to those who engage in them. As a diverse Society, we must also, however, contend with limited volunteer and staff resources, as well as the funds required to maintain and excel at so many initiatives.

Additionally, as we all know, the world is changing rapidly around us. Meeting the needs of our stakeholders is very different today than it was in the year 1900, 1950 or even 2000. ASME must find a new pathway for our future. And that has been the focus for much of our work on the Board of Governors recently. We have been discussing what we call "Pathway 2025." This Pathway moves all of ASME toward improving the quality of life for humanity. Some key components of that plan include:

- Strengthening capabilities in identifying and delivering on the engineering knowledge, information, and networking needs of individuals, industrial markets, and governmental and academic entities.
- Supporting creation of integrated content addressing emerging technologies and/or stakeholder-based needs; and disseminating content using contemporary and evolving processes, tools and platforms, including digital delivery channels.

- Attracting and fostering growth in individual engagement with ASME; building a strong cadre of contributors dedicated to furthering ASME's mission.
- Expanding global mission impact through multiple paths of engagement with ASME, including generation of locally relevant technical content and networks, as well as expanding and improving engineering education. Assessing opportunities and managing all international activities with appropriate business discipline and acumen.
- Aligning organizational structure and culture with strategic directions.

In the spirit of the last bullet point, we asked leaders and other representatives from the Knowledge and Community and Institutes Sectors to come together to create a new structure that would better align the Society with guiding principles established by the Board. That Task Force has been working diligently over the last year, updating the Board frequently on their progress. The Task Force began communication about the reasons for the change last fall, beginning at the ASME Congress. They coined the term ONE ASME, not to describe the new Sector or their reorganization per se, but rather to describe the desired end state for all of ASME: E Pluribus Unum. Out of Many, One.

The Task Force reached out to many groups and individuals during the transition, but they were limited in how much information they were at liberty to provide until the Board had a chance to review the work with them and take action. The good news is, that just happened. On April 25th, the Board gave thoughtful consideration and voted to endorse the proposal of the Task Force, including the new structure.

Many of you will wonder what this means to you and the unit in which you participate. First, we want to assure you that none of the Sections, Divisions, Institutes, or Affinity Groups are being dissolved. They will retain their name and committees. Current ASME custodian funds and consolidated bank accounts will remain; however, there will be some limits placed on the use of these funds, as we need to ensure they are used strategically to provide the most impact for the Society. The reporting structure is now more streamlined and, over the coming year, the leaders of the new Technical Events and Content (TEC) Sector will be working with you to provide additional impactful and engaging activities and opportunities. Members of the transition team will also begin to reach out to you shortly to communicate:

- The details of the reorganization and what it means to the groups in which you participate and for components of the existing structure.
- How you will be able to utilize the new Group Pathways and Support (GPS) system to navigate through the new processes and eventually link to many new opportunities for engagement.
- Upcoming live and virtual training events to take place over the next year, beginning with the ASME Annual Meeting in Portland this June.
- A call for volunteers for the new leadership positions in the new Sector.

This is just the start of a sustained communication and transition effort. We understand that change is sometimes difficult. ASME's Board is fully behind these important and necessary changes, which will help ensure the vitality and relevance of our Society to its broad range of stakeholders for many years to come. As this transition is so critical to our success, we will appoint a small group of Governors to work with the transition team to ensure this communication and transformation goes as professionally and effectively as possible.

We are excited about where ASME is going. As we move down the Pathway, we think you will be too. The key component in a plan that creates engaging and impactful new products and programs is the person that builds and uses them. At the end of the day, how you participate and the benefits you receive from that participation, will be solely in your hands. We hope you use this opportunity to embrace these changes and join us as we move as ONE ASME down the path to creating a brighter future for engineers, engineering and humanity.

Sincerely, Madiha Kotb, President, 2013 -2014, ASME Board of Governors

EDITOR'S NOTE: Stay tuned as all of this is not final. According to our Section's executive committee members, ASME has offered few specifics on this plan. It's unfortunate that these re-organizational measures have already been approved and are on their way to being implemented without much input from ASME Members or Sections.

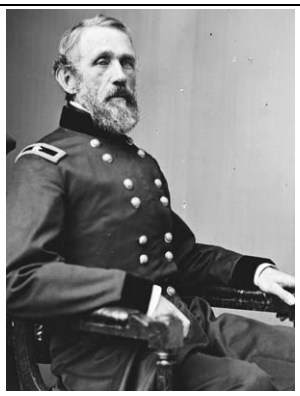
HISTORICAL VIEW: Defense of the Union

The Sesquicentennial of the Civil War continues this month with the anniversary of a pivotal battle decided in part by the work of 15 Army engineers. (by Matthew McLaughlin)(abridged for length)

(courtesy NSPE: http://www.nspe.org/resources/pe-magazine/july-2014/defense-union#sthash.zktcdEWl.dpuf)

Now in its fourth year, the sesquicentennial of the Civil War continues this month with the 150th anniversary of the Battle of Fort Stevens, a Confederate attack on the nation's capital of Washington, DC, with arguably as much potential to change the outcome of the war as the Battle of Gettysburg in July of the previous year.

When Robert E. Lee led his Army of Northern Virginia on its second invasion into the North in the summer of 1863, he did so in part to weaken the North's resolve and strengthen its peace movement. When the Confederate general ordered Lt. Gen. Jubal Early to threaten Washington in the summer of 1864, he again did so in part to strike a political blow to the antislavery Republican Party and President Abraham Lincoln, who was up for reelection that year against a Democratic Party running on a peace platform.



JOHN GROSS BARNARD WAS CHIEF ENGINEER OF WASHINGTON'S DEFENSES FOR MOST OF THE CIVIL WAR.
CREDIT: BRADY NATIONAL PHOTOGRAPHIC ART GALLERY

Thankfully for Lincoln and the Union cause, a number of contributing factors prevented Early from taking the capital, among them the city's massive fortification and defense system designed by just 15 Army engineers.

"The defenses of Washington, by far, were the biggest effort the engineers had during the war," says Army Corps of Engineers Historian James Garber. "By the time we really got into the war, to First Manassas [Bull Run], there were only 30 engineers left. Fifteen of those were used to build the defenses of Washington. They rotated in and out, but approximately 15 were used throughout the process."

At the start of the Civil War there were 120 Army engineers, but some, like Lee, resigned their commission and joined the Confederacy, and many more took leave to lead the Northern States' volunteer forces. Despite this and other challenges, half of the remaining Army engineers led by Chief Engineer Brig. Gen. John Gross Barnard transformed Washington from a city with only a single river fort to the most heavily fortified city in North America, if not the world.

By the close of the Civil War, Washington's fortification and defense system included 68 enclosed forts with 807 mounted cannons and 93 mortars, 93 unarmed batteries with 401 emplacements for field guns, 20 miles of rifle trenches, three blockhouses, 32 miles of military roads, a telegraphic communication system, and other additional supporting infrastructure, according to a report by Barnard later in his career.

"From a few isolated works covering bridges or commanding a few especially important points, was developed a connected system of fortification by which every prominent point, at intervals of 800 to 1,000 yards, was occupied by an enclosed field-fort, every important approach or depression of ground, unseen from the forts, swept by a battery for field-guns, and the whole connected by rifle-trenches which were in fact lines of infantry parapet, furnishing emplacement for two ranks of men and affording covered communication along the line, while roads were opened wherever necessary, so that troops and artillery could be moved rapidly from one point of the immense periphery to another, or under cover, from point to point along the line," the then colonel of engineers and brevet major general wrote in 1871.

Defending the Capital: Before the Civil War even began, there was concern over protecting Washington, and Army engineers had begun surveying for possible defenses. Additionally, a strong fortification and defense system was seen by some as a means of freeing up more men for offensive action against Confederate forces, and Washington was also a city that was home to resources critical to the war effort. Given the capital's importance, Army engineers began working to protect Washington before both the war and any discussion of a formal fortification and defense system.

Matters were complicated by both the political climate and Washington's topography—the city is surrounded by low hills, effectively sitting in a shallow bowl. From Virginia's nearby hills, an enemy army could easily shell the city, making it apparent to the engineers that parts of the state would need to be occupied.

When the federal government received word of Virginia's secession in May 1861, engineers and three columns of infantry immediately crossed into Virginia to capture the high ground around the capital—building two forts and surveying for additional fortifications.

As time and the war marched on, Confederate forces demonstrated they were a greater threat than originally thought. By the summer of 1862, 48 forts and batteries protected the city, but Barnard continued to advocate for even stronger defenses. He not only wanted to improve military roads and communication lines but the defenses to the north of Washington. He wanted to turn haphazard defenses around the capital into a true fortification and defense system.

Battle of Fort Stevens

Work on Barnard's proposed expansion began in 1863 and was serviceable by the spring campaign season, but while Lee took the fight into the North a second time that year, Washington's defenses went untested. At the very least, they seemed to be an effective deterrent against Confederate attack. That is until the summer of 1864.

With the promotion of Ulysses S. Grant to General-in-Chief of the Union armies in March 1864 came new tactics, including the destruction or disruption of resources and activities that could support the Confederate war effort and the pulling of even more men from Washington's defenses for attacks in the South.

In order to strike a political blow to President Abraham Lincoln and the antislavery Republican Party in an election year, Lee in June ordered Early to drive Union forces out of the Shenandoah and threaten or take the meagerly defended Washington. After accomplishing his first task, Early began what would be the last major invasion into Union territory, and on July 11 he and more than a quarter of Lee's Army of Northern Virginia stood before the northern perimeter of Washington's fortification and defense system at Fort Stevens.

SOLDIERS (TOP PHOTO) POSE FOR A PHOTO INSIDE FORT STEVENS, WHICH IN JULY 1864 STOOD BETWEEN CONFEDERATE LT. GEN. JUBAL EARLY AND WASHINGTON. CANONS (BOTTOM PHOTO) LOOK OUT OVER THE NATION'S CAPITAL AT A PARTIAL RESTORATION OF FORT STEVENS TODAY. ENGINEERING DRAWINGS FOR FORT ETHAN ALLEN (LEFT) FROM JOHN GROSS BARNARD'S 1871 REPORT ON WASHINGTON'S DEFENSES CREDIT: LIBRARY OF CONGRESS.

The march to Washington was not as fast or as easy as Early may have hoped for. Meanwhile, Washington was in a panic, putting everyone it could manage into the northern defenses of the city. Despite seeing Washington's defenses weakly manned, Early hesitated to order a full assault against the capital's fortifications by his own battle-weary forces. Instead Confederate troops spent the day reconnoitering the area and skirmishing with Union troops at Fort Stevens.

Thanks to the military roads of the Army engineers' fully realized defense and fortification system, reinforcements from the VI and XIX Corps that arrived at the Washington Navy Yard that afternoon already lined the parapets of the city's northern defenses by dawn the next day. Heavy skirmishing continued July 12, but upon seeing the Union reinforcements, Early again decided not to order an assault on Washington's defenses. Despite this, July 12 was not without Confederate opportunity to change the course of the war.

President Lincoln, who had travelled to Fort Stevens with his wife and other officials to see the fighting that day, allowed his curiosity to get the better of him during the battle. Looking for a better view of the fighting, the 6'4" president stepped onto the parapet of the fort, an obvious target for Confederate sharpshooters.

Many individuals claimed to be the one to encourage President Lincoln down from the parapet, according to the National Park Service. The most notable individual was a young officer and future justice on the US Supreme Court Oliver Wendell Holmes Jr., who reported shouting "get down, you damn fool!" Despite all that could have happened with the president standing atop the fort, Lincoln survived the battle and Early withdrew his troops late that night. Washington's defense and fortification system had succeeded, despite being stripped of soldiers by Grant.

"Early attacks right at the worst possible time for the defenses of Washington," says Walton Owen, assistant director and curator of the Fort Ward Museum and Historic Site. "And yet the system is strong enough that it is able to maintain itself."

Following the war, Early found himself defending his decisions at the Battle of Fort Stevens. He responded to his critics on several occasions, writing that Washington's fortification and defense system was such that almost any manner of defenders could have withstood an assault.

Early wrote in an 1881 letter "I can conceive of no reason why 'quartermaster's men,' 'teamsters,' and 'citizen volunteers' should not have been capable of resisting an assault made by an attacking force that had to move over abattis, across ditches, and over infantry parapets, when they were so effectively shielded by the works behind which they were ensconced. The idea, therefore, that I could have entered Washington by a vigorous assault on the works on my arrival is without any well-grounded foundation."

Barnard also quoted Early in his 1871 report as saying "examination showed, what might have been expected, that every appliance of science and unlimited means had been used to render the fortifications around Washington as strong as possible."

While other factors no doubt contributed to the outcome at Fort Stevens, it is clear that without the work and determination of Army engineers, July 11 and 12 of 1864 could have ended very differently, as could have the entire Civil War. Following the successful defense of the capital, Grant's hold on Lee and several conclusive Union victories secured Lincoln his reelection and eventually led to Union victory in the war.

ENGINEERING DRAWINGS OF FORT WARD (RIGHT) WERE USED TO PARTIALLY RESTORE THE FORT, NOW PART OF THE FORT WARD MUSEUM AND HISTORIC SITE (LEFT) IN ALEXANDRIA, CREDIT: JOHN GROSS BARNARD'S REPORT ON THE DEFENSES OF WASHINGTON

EDITOR'S NOTE: What a legacy we enjoy as engineers! These men, with crude means, accomplished amazing feats that survive to this day. What legacy will we leave behind to youngsters entering the engineering profession?

Local Job Opportunities

Design/ Project Engineer: Location/City : OK – Oklahoma City

Family-owned small business is seeking a Design Engineer to join their team. In business for over 40 years, this company designs and manufactures cutting edge medical equipment for national and international customers.

Job Duties and Responsibilities

- Develop 3D models and drawings
- Develop shipping lists and installation instructions

Qualifications

- Bachelor's degree in Engineering
- New graduates are welcome to apply (up to 3 years experience)
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https://www.asme.org/kb/courses?cm_re=Shop%20ASME-_-Left%20Navigation-_-Courses

Many of these courses are on-line to take at your convenience. Good Luck!

Chair's Corner

As the newly installed ASME-COS Chair-person, I wish to extend a personal invitation to ALL members, students, and invited guests to attend our upcoming August 28th Section meeting. This month's speaker will be Dr. Allen who will present current research projects at the OSU Agricultural Bioscience Research Center in the Ardmore, OK campus.

This should prove to be an exciting, informational, and good excuse to get out of town to see the exciting things that are happening all around this great state of Oklahoma. Details and driving instructions are provided in this newsletter. Finally, I encourage ALL members to contact any of our ASME-COS officers (contact info. listed in any newsletter header) for ANY plant tour possibility you may want to explore. Remember this ASME-COS is for your benefit too.

We look forward to beginning our 2014-2015 program year with this August 28 meeting and tour. We look forward to seeing you there in Ardmore!

Tom Betzen
Chair, ASME Central Oklahoma Section

Future ASME-Central Oklahoma Section Events

Date	Location	Program Topic and Speaker
Thursday August 28, 2014	OSU-IAB Center; 3210 Sam Noble Parkway, Ardmore, OK	Meeting & Tour: OSU Institute for Agricultural Bioscience Dr. Randy Allen,Director, OSU-IAB
Thursday Sept. 25, 2014	TBD	Dr. Tom Landers, Dean, OU College of Engineering

Please visit our Section website:
https://community.asme.org/central_oklahoma_section/default.aspx
IT'S BEEN REVAMPED. Check event updates and other useful information!