



## Alumni Achievement Award Winner

*Shaun Clair, BS '06 - 2013 Penn State Alumni Association Alumni Achievement Awardee - for extraordinary professional accomplishment by alumni under the age of 35.*



Shaun Clair knew exactly how to customize his degree to meet his interests. He studied abroad at Sydney University, Australia, as a sophomore; led a brotherhood of 98 members, coordinated a \$300,000 annual budget and worked with an alumni team on a \$2 million

sound crew and as a runner for six other crew members. Then began his meteoric rise through the ranks – as sound engineer, engineering coordinator, entrepreneur (who successfully pitched a new sound technology AERMONIX to venture capitalists and investors), and project manager for AERMONIX, which is delivered to concertgoers via a smartphone application.

Shaun diversified the company into markets beyond audio. In 2010, he was instrumental in Clair Global's acquisition of Wireless First and GTO Live, creating the new company, Clair Broadcast, for which he was named chief executive officer. Today, Shaun oversees: Clair Wireless specializing in wireless sales and rentals for live entertainment television (ABC, NBC, and MTV) worldwide; and Clair Backline Services covering events such as the Jerry Lewis MDA Telethon and the NBA All-Star Game.

Upon graduation, Shaun became a "Roadie" with Clair Global, touring with Grammy Award-winning band the Police.

Capital Campaign Renovation Project as president of Acacia fraternity; and served as executive vice president for the Interfraternity Council. When it came to his senior thesis, Shaun knew immediately what he wanted to do – acoustics! He chose graduate courses in acoustics theory, a course in audio engineering, a course on Systems Installation for Theatre Applications, and wrote his thesis on Testing and Analysis Methodology of a Loudspeaker. Reflecting on his audio course, Shaun states "I organized a study group that met about once a week and discussed the progress or lack of progress we were having with the homework. At first the students thought I was a teaching assistant, but they soon realized that I was just a student who realized that getting a group of heads together is always better."

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A proven innovator, Shaun designed ¼-scale tractors with the Penn State Pullers and danced 48 hours for THON. What will he do next?



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## Message From the Chair



As Spring finally arrives in Happy Valley, we are looking forward to graduating another class of more than 40 students, with careers split equally between graduate school and industry. Congratulations to Class Marshall Xuerong

Xiao, who is graduating with a 4.0 GPA and will attend Stanford University to pursue a Ph.D. in electrical engineering. Three students are going to the Boeing Company. Selected industrial positions include Breakaway Technologies Inc., Goodyear, Picatinny Arsenal, Sensata Technologies, and the SI Organization. One student is planning to start his own photography business.



Xuerong Xiao

This summer, Gary Gray is teaching Dynamics on-line. If you are interested in brushing up, please contact Deb Zimmerman at [dlz1@psu.edu](mailto:dlz1@psu.edu).

Congratulations to ESM professor Al Segall on being elected Fellow of the Society of Tribologists and Lubrication Engineers. Al also received the Penn State Engineering Alumni Society's (PSEAS) Outstanding Advising Award for guiding approximately 130 students in our graduate program. Corina Drapaca was recognized with a PSEAS Outstanding Teaching Award for her development of courses to support the Center for Neural Engineering, and Melik Demirel received a PSEAS Outstanding Research Award for his research on thin films, biomimetic materials and novel bioarchitectures.

We are looking forward to seeing alumni at our Golden Decade Reunion on May 30. There's still time to sign up at [www.esm.psu.edu/reunion](http://www.esm.psu.edu/reunion).

Have a wonderful summer and send us your news!

*Judith A. Todd*

Dr. Judith A. Todd, Department Head and P. B. Breneman Chair

## Undergraduate Spotlight: Felix Aronovich

Flipping and twisting his way across the 2012 London Olympics, engineering science senior Felix Aronovich, competed in Men's Gymnastics representing his home country Israel. When he's not training, Felix is working with his thesis adviser, Mark Horn to investigate the growth of silicon dioxide. He is using a new technique called bias target ion beam deposition to deposit dielectrics, silicon dioxide and silicon nitride on semiconductor devices for microelectronics.



## Graduate Spotlight: Xiaoyun Ding

Xiaoyun Ding received a 2013 Baxter Young Investigator Award, given "to stimulate and reward research that can be directly used for critical care therapies and the development of medical products." Xiaoyun and colleagues in Dr. Tony Huang's research group have developed acoustic tweezers that can manipulate single cells and even whole organisms such as *C. elegans* using sound waves. The non-invasiveness, simple structure, low-cost and low power consumption of these acoustic tweezers underpins a new generation of lab-on-a-chip devices for health care applications.



## Alumni Spotlight: Mark Kotancheck

Mark Kotancheck, BS '81 launched Evolved Analytics LLC in 2005 to solve real-world problems targeted at data-driven understanding of complex, unknown, nonlinear systems. Customers around the globe consider applications such as: "Who should be admitted to law school?"; industrial facility energy management; analog device design; cancer treatment design; new product development; financial portfolio design; and process monitoring and control. In a world deluged with data, advances in genetic algorithms, computing power, and analysis infrastructures are implemented to extract value from massive data sets.



## Remembering John Mentzer

Celebrating a commitment to engineering education, Dr. Mentzer joined the faculty as associate professor of electrical engineering at Penn State in 1954. By 1956, he was appointed professor of engineering sciences and head of the first honors program in the college. In 1974, the Engineering Science Program was merged with the Department of Engineering Mechanics and named the Department of Engineering Science and Mechanics. Dr. Mentzer was appointed head of the new department, a position he held until his retirement as professor emeritus of engineering science in 1981. He served as a consultant to industry, mentored students, and remained active with ESM. Friends may honor Dr. Mentzer's memory with a contribution to the John and Bernice Mentzer Endowed Award at <https://secure.ddar.psu.edu/GiveTo/>. Designate your gift to the category "Other" at the bottom of the list and write in John and Bernice Mentzer Endowed Award in Engineering Science and Mechanics.



## Anthony Griffo Reflects

It's been nearly 15 years since I left ESM for a position at Smith International, now Schlumberger, a leading oil and gas service provider in Houston, Texas.



ESM provided me with a wealth of academic and personal experience that has sustained my professional career. For example, I worked with Payload Operation Command (POC) in Huntsville, AL, during Space Shuttle mission STS-83. Professor German and I were the academic liaisons with POC specialists, tracking real time data on micro-gravity conditions during our liquid phase sintering experiments.

My time at Schlumberger offered a wealth of materials engineering challenges in the area of ultra-hard materials, such as tungsten carbide-cobalt and synthetic diamond. The oil and gas drilling industry is driven by performance improvements to reduce nonproductive time (drilling not producing). I have 34 U.S. patents in material development for improved drilling performance.

In my current role as director of quality for Smith Bits, I implement project management discipline and process improvements to bring effective solutions to our global organization. I coordinate these quality assurance and process improvements with operations in America, Italy, and China, as well as repair operations with shops in Canada, Brazil, and Indonesia.

I would like to express my gratitude to our ESM professors for the role they played in shaping my future so long ago. At Penn State, I had a great time, developed as an individual, and built friendships that continue to this day.

## 2013 Golden Decade Alumni Reunion

Register now for ESM's annual "Golden Decade Reunion" celebration in conjunction with alumni weekend, May 30-31, 2013. If you graduated 50 years ago (1963) or earlier, or if you will be celebrating your 45th (1968), 40th (1973), 30th (1983), 20th (1993), or 10th (2003) year anniversaries, or recent graduate (2013), you will be our special guests. Alumni from all years are invited to attend. Our 50+ year alumni will be honored as ESM Golden Fellows.

Please reply to [www.esm.psu.edu/reunion](http://www.esm.psu.edu/reunion) to attend our Thursday celebration banquet (May 30) and our Friday program with lunch in the ESM department (May 31).

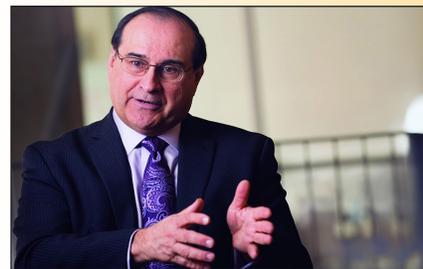


## Outstanding Engineering Alumnus Wes Blakeslee

Wesley Blakeslee, BS' 69 is executive director of Johns Hopkins Technology Transfer (JHTT). He began his professional career as an engineer and systems analyst with NASA, where he designed and wrote real-time operating systems for spacecraft testing and post-launch control, and managed a programming group.

After Law School, Wes entered private practice as a partner in a small regional firm, and in 1983 he formed his own practice in Westminster, MD. From 1983 to 1989, Wes served as director of computer development at the University of Maryland Law School, where he also taught computer law.

In February 1999, Wes became associate general counsel at Johns Hopkins University, and in 2006 was asked to head JHTT. Under his leadership, the program has had five consecutive years of record performance, increasing all metrics each year. Wes is frequently a featured speaker at international, national, state and local conferences, and on behalf of bar associations. The



Chronicle of Higher Education has cited him as a national authority on intellectual property issues. Wes serves as a consultant to businesses and universities on matters of intellectual property, business formation and translation of technology to the marketplace.

## Early Career Recognition Award

The AAB has implemented an Early Career Recognition Award for alumni who have distinguished themselves at work and/or in their community.

Nominations are sought from anyone who knows a deserving recipient; including self-nominations. Please submit your recommendations by June 15.

The form is available at [www.esm.psu.edu/alumni/honorees](http://www.esm.psu.edu/alumni/honorees).

## Mirna Urquidi-Macdonald Retires



Dr. Mirna Urquidi-Macdonald, a pioneer of energy research related to the fuel cell, oil and nuclear industries, retired from ESM after serving as a faculty member since

1991. Her expertise in electrochemistry, corrosion, and materials research has contributed to the protection of coolant circuit components in nuclear reactors, life extension of off-shore structures, cathodic protection of pipeline infrastructures, development of Li/O<sub>2</sub> batteries and fuel cells, modeling of radioactivity transport in nuclear power reactors, and, most recently, to biocorrosion.

Mirna is a highly-sought consultant/adviser, who brings a unique, interdisciplinary, engineering science perspective to industry and government panels in Mexico, Europe and the U.S. As she develops her new business, spends time with her family and travels the world, we wish every success in their new ventures to our dear friend, colleague and teacher, Mirna and her husband, Digby.



Mirna Urquidi-Macdonald and student Matt Kelly

## Are you LinkedIn?

Want to exchange professional information and engage in discussions on career opportunities? Join LinkedIn! Go to [www.linkedin.com](http://www.linkedin.com), complete your information, click "Join now." Once completed, click "Groups," type "Penn State Engineering Science and Mechanics Alumni," click "Join Group," enter your password and Jason Lyons will subsequently approve your membership. We look forward to hearing from you.

## ESM Research Highlights

### Drew Pulsifer, Alumni Dissertation Awardee



Graduate student Drew Pulsifer has been selected to receive one of the Penn State Alumni Association Dissertation Awards. This award is among the most prestigious available to Penn State graduate students and recognizes outstanding achievement and professional accomplishment.

Working with Akhlesh Lakhtakia, Drew has created emerald ash borer decoys. Introduced in Michigan from Asia in 2002, the emerald ash borer beetle has been ravaging North American ash trees threatening their survival. Although they don't carry disease, their larvae feed on the ash trees' sap, effectively killing the trees by depriving them of nourishment. Drew has created a mold of the top of the female beetle's body with an indescent green color by layering the right mix of polymers. In field tests, the artificial decoys were as good as the natural beetles in attracting overflying beetles.



Beetle Decoy

### The NACK Center becomes the national NACK Network



The Nanotechnology Applications and Career Knowledge (NACK) Center has been expanded into the national NACK Network by the National Science Foundation (NSF) and has received funding for a further three years, extending its NSF funding commitment to late 2015.

The NACK Network provides national coordination of workforce development programs designed to meet industry needs for skilled micro- and nanotechnology workers. NACK's nanotechnology workforce development partnerships include educational institutions in 16 States and Puerto Rico. Their mission is to enable core-skill nanotechnology education at two- and four-year institutions through partnerships with research universities. Program highlights include student preparation, sharing of resources such as lecture and hands-on laboratory materials, curricular development and faculty preparation workshops, and development of workforce skill standards with industry.

More than 30 undergraduate institutions in Pennsylvania alone are able to offer nanotechnology minors and degrees through partnering with Penn State. Educators from all 50 states have accessed and used NACK's materials and services, available at [www.nano4me.org](http://www.nano4me.org). President Obama's Council of Advisors on Science and Technology recently cited NACK's success for "bringing meaningful core-skills nanotechnology workforce education to technical and community colleges across the nation."





# ESM Frontiers

## Barbara Shaw: Corrosion Prevention and Green Batteries

As an undergraduate at Florida Atlantic University (FAU), ESM professor Barbara Shaw discovered that corrosion was always a hot topic in FAU's ocean engineering program. She became fascinated with the subject while working with a professor, who was an expert on the effects of corrosion on bridges.

After graduation, Shaw worked for the Navy as a civilian engineer, studying marine corrosion and coating systems for naval vessels. At that time, the Navy was seeking a way to give the steel topsides of their ships greater protection and longer lifetime than paint alone could provide. Shaw worked on sacrificial coatings, i.e. metals such as zinc, aluminum or a combination applied to the steel below a barrier coating of paint. If the paint barrier was breached, the more electrochemically active sacrificial metal corroded in preference to the steel, providing protection.

Recently, the U.S. Navy announced a new initiative - the "Great Green Fleet," with a move towards utilizing alternative fuels and energy efficient technologies. Shaw and her team were selected to research and develop thin, flexible, "green" batteries, using thin layers of vapor deposited magnesium (Mg) alloys



as the anodes and vapor deposited conductive polymers as the cathodes.

Traditional Mg batteries are made of alloys combining Mg, aluminum, and zinc. While these are the most common anode materials, significant improvements in performance could be achieved if they were produced in a totally different way.

Using thin film technology developed to produce the foil lining inside a potato chip bag, Shaw's group plans to design extremely light-weight, versatile, portable and biodegradable batteries for naval applications. These batteries could be made in a variety of flexible shapes and sizes. Through control of alloy composition, structure, and surface morphology, biodegradable Mg anodes can be combined with biodegradable, conductive polymer cathodes to produce a new generation of "green" batteries with enhanced performance and range of applications.

Spin-off research from the green batteries program now involves developing corrosion sensors using screen-printed, thin-film electrodes.

These sensors will evaluate paint degradation in areas that are difficult to access (e.g. under decking boards on the tail-gates of amphibious ships). This new program was initiated when Navy researchers saw a student thesis poster on a bio-sensor that was being developed to measure the corrosion rates of thin-film alloys implanted in animals. It was immediately recognized that the sensors could be enlarged and modified to evaluate degradation of painted steel.

Originally funded under a National Science Foundation program "Fix, Heal and Dissolve," our bio-sensor research continues and we expect to have our first in-vivo corrosion rate measurements this summer. During the past seven years, our sensor development has advanced through contributions from ESM faculty Elizabeth Sikora, Mark Horn, and Bruce Gluckman, and several undergraduate and graduate students, two of whom will be graduating from medical schools this spring.





## A Message from your Alumni Society Chair

by Dr. James Smiley, B.S. '60

Our University, College of Engineering, and the Engineering Science and Mechanics Department continue to make us proud. A couple of recent examples: The student run THON raised \$12,370,000 dollars for pediatric cancer. Researchers at the Center for World-Class Universities of Shanghai Jiao Tong University in its 2012 “The Academic Ranking of World Universities (ARWU)” ranked Penn State at No. 49 in the World! The College of Engineering was ranked 11th! The Department of Engineering Science and Mechanics continues to grow and thrive with its largest graduating class ever this spring.

I would like to offer you an opportunity to help build on these successes by becoming involved with our Alumni Advisory Board. It currently consists of 16 alumni members who meet semiannually in University Park to provide support and ideas to the ESM department. To give you an idea what's involved I'll summarize just a few of the activities of our four working subcommittees. The Communication and Public Relations Subcommittee works on ways to best communicate with our alumni, students, and industry. This includes support for this newsletter, our website, LinkedIn for ESM alumni, and help with development of department promotional materials. The Student and University Relations Subcommittee is concerned with supporting things like career fairs for students, support seminars for students, mentoring, and resume support. The Department and University Relations subcommittee helps with recruitment of high school and graduate level students, assists the department with accreditation, and works with the department on implementing the University's strategic plan. The development and alumni relations committee organizes tailgate events, works with the department on the Golden Decade reunion banquet, and supports the *For the Future* fund raising campaign. We welcome your ideas and invite you to become involved! It's a great opportunity to stay involved with a department working on the leading edge technologies, and maintain a connection with the thousands of our alumni.

## We Want You in our Society!



Glen Chatfield  
Class of '65  
Development and Alumni Relations



Mike House  
Class of '90 and '92  
Student and Industrial Relations



Abby Dodson  
Class of '12  
Department and University Relations



Jim Miller  
Class of '60  
Development and Alumni Relations



Dick Erdley  
Class of '57  
Student and Industrial Relations



Saeed Rafie  
Class of '80 and '83  
Communications and Public Relations



Mike Erdman  
Class of '69  
Student and Industrial Relations



Rick Schutz  
Class of '72  
Communications and Public Relations



David Farkas  
Class of '82  
Development and Alumni Relations



Mala Sharma  
Class of '95 and '00  
Communications and Public Relations



Barbara Faust  
Class of '64  
Department and University Relations



Jim Smiley  
Class of '60  
Alumni Society Chair



Charles Gaston  
Class of '61  
Department and University Relations



Fei David Wang  
Class of '05  
Department and University Relations



Neal Holter  
Class of '95  
Student and Industrial Relations



Howard Witham  
Class of '93  
Development and Alumni Relations

*For the future*

## ESM'S CAMPAIGN FOR PENN STATE STUDENTS

Please support ESM's activities with a gift "For the Future" at

<https://secure.ddar.psu.edu/GiveTo/>.

Designate your gift to the category "Other" at the bottom of the list and write in Engineering Science and Mechanics. We thank you for your generous support.

## Contact ESM

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