

# Materials **Matter** @Purdue

2017 Annual Newsletter



## Diffusing Knowledge

PROFESSOR EMERITUS MYSORE DAYANANDA



# A Message from the Head



## MSE Alumni, Students, and Friends!

The 2017-18 academic year is going to be one of many transitions at Purdue for Materials Engineering. There are changes in the college; we welcome Dean Mung Chiang to campus from his previous position at Princeton. The twelve new faculty we hired in the past two years are all here and starting strong (and as you can see from later in the newsletter we are still hiring in targeted areas). With Professor. Dayananda retiring, (well, switching to Emeritus, we will never let him really go) the longest serving faculty in the school will not be in the classroom this year (that was last seen in the 1960's). Our student growth has reached a point where we are offering our core sophomore courses twice a year to ensure we retain our "small school" feeling and keep students on track to graduate in four years.

I said last year that our challenge going forward is to not just be bigger, but better, and asked "How do we **build the materials community**"? This has not really changed, and that is where we continue to focus our efforts. We are adding staff to help our students and faculty succeed (one new hire is highlighted in this newsletter and new openings are expected). We are revamping our course offerings at both the graduate and undergraduate levels, with new courses, revised courses, increasing our course delivery options, and increased frequency. We continue to bring in record numbers of graduate students, and our undergraduate enrollment just keeps on growing. We are able to do this in part by securing record numbers of external research grants, and by setting new records in giving from alumni to the school. Our community of education and research influence continues to grow, and as our window decals say, "You can't make it without materials"...

I am not a historian, but I have been told Rome was not built in a day, and if we are serious about building the materials community, (on campus and around the world), it is not going to be done in a year. I hope you will join us in this challenge, and I hope that we can meet and catch up. Please check out the events we are hosting, let us know if you are coming to campus, and follow us on social media if we cannot touch base in person.

Hail Purdue,

**Dr. David F. Bahr**

Professor and Head of Materials Engineering

**PURDUE**  
UNIVERSITY

## SCHOOL OF MATERIALS ENGINEERING

The John A. Edwardson Dean of the College of Engineering and the Roscoe H. George Professor of Electrical and Computer Engineering • **Dr. Mung Chiang**

Head • **Dr. David F. Bahr**

Director of Development • **Robyn Jakes**

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We welcome your comments, opinions, and questions. Please send them to the following address:

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School of Materials Engineering

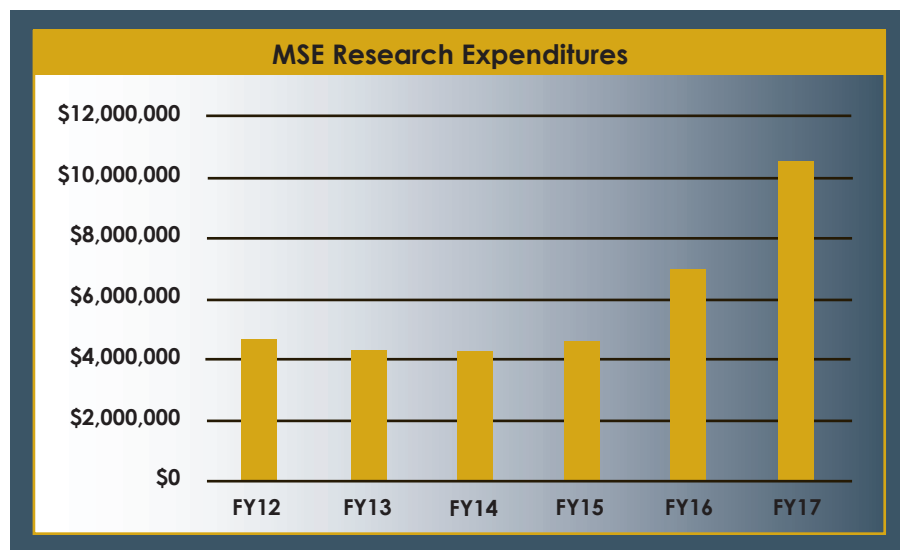
### Welcome New Faculty Member



**Dr. Davin Piercey**  
Assistant Professor,  
Materials Engineering and  
Mechanical Engineering

The School of Materials Engineering is pleased to welcome Dr. Davin Piercey to the MSE faculty as part of the pre-eminent team on energetic materials. Dr. Piercey obtained his *summa cum laude* doctorate from the Ludwig-Maximilian University of Munich under Professor Dr. Thomas Klapötke and conducted post-doctoral research at Los Alamos National Laboratory under Dr. David Chavez. His research focuses on the rational design of new energetic molecules with tailored explosive properties, new syntheses of high-nitrogen heterocycles, and the chemistry of high-nitrogen compounds. Dr. Piercey also has applied his knowledge of energetic materials in industry for the scale up of energetic materials syntheses, and served as an energetic materials consultant to the German television show *Galileo*. Dr. Piercey has published 29 peer-reviewed publications, 4 patents, 2 book chapters, and his work has been featured in the popular press including *ARS Technica* and *Chemistry World*. Dr. Piercey possesses extensive experience with the safe handling of explosives and energetic materials of all sensitivity classes and has trained numerous others in this art. In 2011 his publication of a compound containing a record chain of ten catenated nitrogen atoms was the 3rd most read publication in the ACS journal *Inorganic Chemistry* and in 2013 Dr. Piercey was chosen to represent LMU Munich at the Lindau Nobel Laureate Meeting as a young researcher"

**Research expenditures** are one of the ways that universities (and ranking organizations) use to provide a measure of how active a school is in terms of its research activities. It may be a surprise, but we report what we spend, not what we are granted (make) every year. We spend money on students (particularly graduate student stipends and their tuition), summer salary support for faculty, post-docs, equipment, travel to conferences, supplies, materials, microscopy, and a variety of other costs. As you can see, MSE at Purdue had a banner year, almost doubling our expenditures. Most of our funds come from federal research grants (like NSF, DOE, DOD, DOJ), industrial research (about 20% of our total), and private foundations.



### Recent Faculty Awards:

**John Blendell**  
2016 Seeds for Success Award,  
Purdue University

**Wayne Chen**  
Honorary Doctorate in  
Technology, Tampere University  
of Technology, Finland

**Kendra Erk**  
Reinhardt Schuhmann, Jr. Best  
Undergraduate Teacher Award

**Carol Handwerker**  
2017 John Bardeen Award  
from the Functional Materials  
Division of The Minerals, Metals  
and Materials Society (TMS)

Graduate Mentor Award,  
Purdue College of Engineering

2016 Seeds for Success Award,  
Purdue University

**John Howarter**  
Purdue University  
Presidential Safety Award

**Dr. Maria Okuniewski**  
Oak Ridge Associated  
Universities (ORAU) 2017  
Ralph E. Powe Junior Faculty  
Enhancement Award

**Kenneth Sandhage**  
2016 Seeds for Success Award,  
Purdue University

**Haiyan Wang**  
2016 American Physical  
Society (APS) Fellow



**MSE Professor  
Anter El-Azab**  
is the founding  
editor-in-chief of  
a new journal from  
the SpringerNature  
publishing group,  
"Materials Theory."

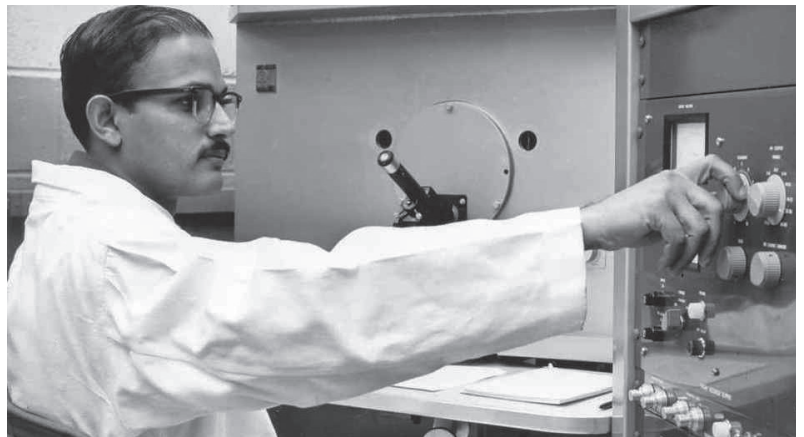
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# Diffusing knowledge



## Professor Emeritus Mysore Dayananda reflects on more than 50 years of research and teaching in the Purdue 'family.'

The young graduate student began his trip to Purdue with a 28-day sea voyage from Bombay to Liverpool. When he finally arrived in the United States, he swapped his given name (Dayananda) for his last name (Mysore, the Indian city where he was born). Quickly at home at Purdue, he gained his PhD in 1965 and fully expected to work in industry.

Instead, Dr. Dayananda received a surprise visit from professors Reinhardt Schuhmann, Jr., head of the School of Metallurgical Engineering, and Richard Grace. They asked him to join the faculty.

"I never applied for the job," he recalls. "I had no clue that I would end up at a university. But it gave me a really independent opportunity to investigate what I wanted to investigate. I also was given a toy that I wanted, an electron microprobe analyzer, as an attraction to stay here!"

As he stayed on the faculty for more than 50 years, "Purdue has been a fantastic place for me," says Dr. Dayananda, now professor emeritus of materials engineering.

Throughout his career, he and his students have studied diffusion of atoms in alloys. "How do these different species of atoms move at high temperatures, and how do they influence each other?" he explains. "For example, take an example of steel, with iron and carbon and a little bit of silicon. It turns out that carbon can be made to go faster if silicon is going in the same direction."

"We needed to understand such phenomena not only theoretically but by experimentation," Dr. Dayananda says. "Luckily for me that was a very interesting topic, and we came up with all kinds of additional phenomena in the process over the next 30 years."

Among their discoveries was a phenomenon called zero flux plane, in which diffusion of a given element can be dramatically slowed in a given region. He and his students also found similar interactions in multiphase systems (with more than one type of crystals or grains).

"I owe all my successes to my students," he emphasizes. "Only when you start sharing what you know with people who are eager to ask you hard questions does knowledge move ahead."

"Professor Dayananda has a contagious enthusiasm for research and discovery," says former student Mark Petri, Electric Power Grid Program Director, Argonne National



Laboratory. "This helped motivate me, even when there were setbacks in the laboratory. I always wanted to do my best for him, and he had great patience when I was struggling."

Most of Dr. Dayananda's research was funded by the Department of Energy (and its predecessor the Atomic Energy Commission), with a strong focus on understanding the interactions of nuclear materials with their stainless steel claddings. He also was supported by the National Science Foundation for work that included studies of superalloys, employed in jet engines and other extremely demanding applications involving silicides, aluminides, and intermetallic compounds.

In addition to his faculty duties, Dayananda, commonly called "Day," has long played a less official role as advisor to many on campus. "Students and faculty don't hesitate to come by and pick my brains on any problems," he says. "It's a very good community, and we have retained that feeling of a family environment. We pride ourselves on keeping a collectively informal environment."

In retirement, he plans to keep studying certain theoretical questions in multicomponent diffusion. "There are beautiful rules of the game that nature demands, and nature is still tricky," he says. "Once you think you've discovered some-

thing, nature will say, Hey, I've got more curve balls for you." He expects to write a few papers about these questions, and perhaps a short book covering some of the discoveries made at Purdue.

Dayananda also plans to travel with his wife, spend more time with his grandchildren, and perhaps take up golf again. In addition, he enjoys pondering intriguing intellectual questions that are informed by advances in science, such as evolving theories about the structure of the universe or about human cognitive processes.

"Purdue has been the right environment for my progress and my learning, and all my colleagues have been very supportive," Dayananda says. "I'm particularly grateful to Professor Reinhardt Schuhmann, Jr. who inspired me to come to Purdue, and Professor Richard Grace, who was my mentor and asked me to stay on the faculty."

"When you first arrived at Purdue as a graduate student, the faculty recognized something special," Dr. Grace recently wrote Dayananda. "Now you have done it all! You are a distinguished teacher, a gifted and internationally acclaimed researcher, and a close friend and confidante to your students and faculty colleagues. The best news is your new academic rank: Beloved!"

*Although I have graduated in 1998, Prof. Dayananda is someone I can always rely on for major career advice. Despite his busy schedule, he always makes time to converse about how we can improve ourselves as university faculty, both in research and teaching. It is not uncommon that his former students get together, even without him, to talk about collaboration and networking, because we were all educated by him to help and learn from each other to bring success. —Yongho Sohn, PhD, MSE, 1998*



## DR. MYSORE A. AND PREMA K. DAYANANDA FELLOWSHIP

In addition to his more than half century of service to Purdue University, in 2012, Professor Dayananda and his wife, Prema, established the Dr. Mysore A. and Prema K. Dayananda Fellowship in Materials Engineering.

The purpose of this fund is to provide graduate fellowship support to an individual student with a preference for those candidates in the broad research area of atomic transport in solids and/or microstructural investigations.

If Professor Dayananda greatly impacted your life and career and you would like to contribute to his endowment, please contact Robyn Jakes at [rnjakes@prf.org](mailto:rnjakes@prf.org) or by phone at 765-494-4094.

# The Inauguration of a New Industry-University Research Alliance

## Does your organization have a specific shot peening need or concern?

The Center for Surface Engineering and Enhancement (CSEE) at Purdue University can provide the research and support you need to advance your shot peening program. The vision of Purdue University is to be the leading industry-university research alliance for the metal surface finishing industry. The goals of CSEE are to serve consortium members' needs, establish a knowledge base, and educate the future leaders of the industry.

The research capabilities of CSEE are available to companies and government agencies. Pre-competitive research is available to member groups as well as specific and proprietary research for individual organizations. The program offers access to the test equipment, research staff, and disciplines most companies do not have.

Research will be defined by the participating groups or organizations. The research will be conducted by undergraduate and graduate students seeking industry positions and the research programs will be under the leadership of Purdue faculty members.

Purdue is very successful at establishing these kinds of collaborations. For example, the Cooling Technologies Research Center at Purdue addresses the research and development needs of members from diverse industries and product lines in the area of high-performance heat removal from compact spaces. The research and development is member-directed with a product-oriented focus.

Over 30 individuals representing 18 companies recently attended a one-day workshop to learn how their participation in CSEE will benefit their companies and help shape the research focus for the next year. Participants included shot peening equipment OEMs and end-users in aerospace, off-highway vehicles, and automotive.

The event featured technical research presentations, a poster session, and roundtable discussions. The research topics presented at the workshop included "Fatigue of Shot Peened Thin Wall Aluminum," "Laser Shock Peening," "Simulation and Validation of Stress Development During Peening of Aerospace Aluminum," and "Particle Making Technology." Workshop attendees then broke into working groups to tackle key topics—identifying key industry challenges and the requirements of the CSEE facility. The groups' findings will advance the development of the CSEE program.

CSEE is supported by annual membership fees from organizations with tiers based on size and participation levels. Robyn Jakes, Director of Development/School of Materials Engineering can answer your questions regarding membership levels and the next steps for joining CSEE. Call Robyn at (765) 494-4094 or send email to [rnjakes@prf.org](mailto:rnjakes@prf.org).



Center for Surface Engineering  
and Enhancement

***"CSEE, kicked off in 2015 with seed funding from Electronics Inc., brings together faculty and graduate students in Materials, Aeronautical, and Industrial Engineering to attack fundamental problems in surface engineering. Our focus is on understanding processing/structure/property relationships in metals during shot peening and other mechanical surface treatments. Our material focus is broad, from steel to aluminum to high-temperature alloys. We aim to create predictive models that allow members to control the performance of their surface-enhanced components."***

**Dr. David F. Bahr**  
Professor and Head of Materials  
Engineering

***"As a Purdue alumnus, I am pleased and honored to be a part of the CSEE program. As a manufacturer, I'm eager to have access to research on topics that have interested me for years. Finally, theory will become practice and we will be able to commercialize these ideas. I encourage OEMs and shot peening facilities to take advantage of the immense research capabilities of the CSEE."***

**Jack Champaigne**  
President, Electronics Inc.

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The Shot Peener magazine, Summer 2017.





## MSE Athletes Connect with Sports Technology and Entrepreneurship Class

Purdue competitive swimmers are getting an inside look at the design of high performance swimsuit materials in Professor Jan-Anders Mansson's MSE 597 Sports Technology and Entrepreneurship class.

Practice swim suits are made of polyester, but those worn for races are much more high-tech, made with special materials designed to shave all-important hundredths of a second off a swimmer's time. The fabrics are super-hydrophobic to repel water, with attention paid to reducing form drag, wave drag and surface drag.

Purdue Materials Science Engineering students **Meagan Lim** of Singapore and **Ted Curtiss** of Tennessee, who graduated this spring, are members of the Purdue swimming and diving team and were named to the Academic All-Big10. Lim's events are butterfly and individual medley; Curtiss swims backstroke. As competitive athletes, the students are well equipped to connect to the course material and provide unique perspectives on equipment and design. Curtiss, who was drawn to study engineering so he could learn more about the materials used for swimsuits, hopes to connect his athletic interests with his studies by working as a materials developer for a swimsuit manufacturer.

The sports technology and entrepreneurship class is a way for students like Lim and Curtiss to think about opportunities related to sports technology. The sports-driven market is a good one with a rapid start-up profile, according to Mansson, a distinguished professor of Materials Engineering and Chemical Engineering who is also acting on several committees related to the International Olympic Committee and International Sport Federations. The class, he says, is a good way to convey this to students like Lim and Curtiss who live with sports technology every day and just might dip their toes in—or dive into—the waters of entrepreneurship.

## Recent Staff Awards



Vice President for Human Resources, Denny Darrow, Donna Bystrom, Provost Deba Dutta

**Donna Bystrom** received the university-wide Eudoxia Girard Martin Memorial Staff Recognition Award. This award is made annually to a woman staff member who, in the performance of her duties, has demonstrated those personal qualities of heart, mind and spirit that evince a love for and helpfulness to students, staff, and faculty.



Vicki Cline, Dean Leah Jamieson

MSE Academic Advisor, **Vicki Cline**, was recognized by the College of Engineering for her work in student advising as a finalist for the Administrative Professional Customer Service award. Nominated by Professor Anter El-Azab, her dedication to helping students and working closely with faculty to keep students on track to graduation and engaged in their courses was noted as exceptional across the college.



## DEPARTMENTAL NEWS



The School of MSE is pleased to welcome **Shannon Heidrich** as Safety and Mechanical Testing Technician. This new position will offer the academic community insight to workforce preparedness, as well as ongoing problem resolution. Her primary responsibilities will target safety and training program development, and she will serve as Chair of the School's Safety Committee. After serving as an avionics technician

in the United States Air Force, she began her post-military career as an automation technician programming industrial robotics. Her career development was guided through the industrial market focusing on investigative diagnostics, best practices, and lean production. It is her primary objective to continually improve our safety standards, and lay the groundwork for an exceptionally perceptive student body.



Four MSE graduate students who are NSF Integrative Graduate Education and Research Traineeship (IGERT) fellows in Globally Sustainable Electronics recently visited northern India for two-weeks to learn about innovative practices in manufacturing and sustainable development. Accompanied by **Professors Carol Handwerker** and **Kory Cooper** and two MSE faculty members from Tuskegee, the IGERT students from MSE and other Purdue disciplines as diverse as anthropology and environmental and ecological engineering visited companies and governmental organizations that are working to improve the economic, environmental and social sustainability of their country and thereby improve the lives of the citizens of India.

## ALUMNI NEWS

### 2017 Outstanding Materials Engineer Award RECIPIENTS



**Dr. Dennis D. Keiser, Jr.**  
Distinguished Staff  
Scientist  
Idaho National  
Laboratory

*In recognition of his work in materials reliability and nonproliferation within the nuclear materials field, particularly in the area of materials for nuclear fuels.*

Dr. Dennis D. Keiser, Jr. currently resides in Idaho Falls, Idaho with his wife Becky, where he is a distinguished staff scientist at the Idaho National Laboratory, the lead nuclear energy lab for the Department of Energy. He has over 25 years of experience performing nuclear fuels and materials research, and in addition to authoring many conference proceedings papers and technical reports, he has authored or co-authored over 80 peer-reviewed journal articles and written three book chapters. He began his career at Argonne National Laboratory contributing to nuclear fuel testing at the Experimental Breeder Reactor-II located in Idaho Falls, Idaho. Currently, Dr. Keiser works on international, non-proliferation programs, specifically developing low-enriched uranium (LEU) fuels for utilization in research and test reactors around the world. These fuels will replace the current high-enriched uranium fuels that utilize materials that can also be used for nuclear weapons. From a non-proliferation perspective it is important to limit, and eventually eliminate, the use of weapons-grade materials for these kinds of applications. As part of this research,



Dr. Keiser has worked with researchers all around the world, including Argentina, Chile, Canada, South Korea, Belgium, France, Germany, Poland, Australia, Russia, Belarus, and other countries. Dr. Keiser is currently working on two International Atomic Energy Agency publications related to the development of new LEU nuclear fuels. With respect to professional society engagement, Dr. Keiser is a past Chairman of the ASM/TMS nuclear materials committee, and currently is a co-organizer of the Symposium on Materials and Fuels for the Current and Advanced Nuclear Reactors VI, which has turned into an important forum for professors, students, and others to present the results of their nuclear fuels and materials research.



**Mr. Dustin O. Ruh**  
Commercial Director  
*Arconic Forgings & Extrusions*

***In recognition of his leadership in the high performance aluminum alloy industry and for his service to the School of Materials Engineering.***

Dustin Ruh is currently a Business Development Director responsible for leading Arconic's growth strategy for titanium products. Dustin oversees market development in aerospace engines & structures with a customer focus on The Boeing Company.

Dustin joined Arconic, then known as Alcoa, in 2002 as a quality engineer at the Lafayette Operations. In 2003 he transitioned to the commercial team and relocated to assist with sales at the Arconic facility in Chandler, AZ. Since 2003, Dustin has managed aerospace product sales for Arconic in a variety of account management functions for the Southwest & Northwest regions. He was named Sales Director in 2011 where he led a team of account managers charged with business development at key accounts like Boeing, Lockheed Martin, Honeywell, and United Technologies.

In 2015 Dustin travelled to Sheffield, England assisting in the integration of Firth Rixson into Arconic. While in England, Dustin led the sales, marketing, and customer service organizations. Over 18 months, he successfully repositioned the organization to improve margins, expand technologies, and deliver growth opportunities for Arconic. Most recently, Dustin has returned to North America working with Arconic's acquisition of RTI International Metals focusing on expansion of Arconic's titanium products.

Dustin graduated from Purdue University with a B.S. degree in Materials Engineering and completed a Masters in Business from the University of Michigan. He has also studied in Sydney, Australia at the University of New South Wales.

Dustin currently resides with his wife Sara just outside Seattle in Kirkland, Washington. In his free time, he focuses on mentoring and enjoys participating in endurance sports. He is an avid Cleveland Sports fan, the city where he was born and raised.



**Dr. Janet K. Lumpp**  
Professor, Electrical and Computer Engineering;  
Director, First-Year Engineering Program  
*University of Kentucky*

***In recognition of her work in the areas of thin film growth and surface modification methods for microelectronics, and her efforts in outreach and education through her activity with the Kentucky Space Grant Program.***

Janet (Degener) Lumpp received her BSMetE and MSMetE degrees from the School of Materials Engineering, Purdue University in 1988 and 1989, respectively. Dr. Lumpp was a National Science Foundation Graduate Fellow from 1989-1992 and was also selected for the Department of Defense National Defense Science and Engineering Graduate Fellowship in 1989. She co-oped at Union Carbide, Argonne National Lab and Rockwell International. She received her PhD in Chemical and Materials Engineering from the University of Iowa in 1993.

In August 1993, Dr. Lumpp joined the Department of Electrical and Computer Engineering at the University of Kentucky. Her research involved laser micromachining a variety of materials, microelectronic fabrication, carbon nanotube filled electrically conductive adhesives and K-12 science, technology, engineering and math education. She has taught courses on electronic packaging, lasers, sensors and circuit analysis. Dr. Lumpp is committed to outreach and recruiting activities. Through an NSF CAREER Award she started an educational program called KEEP - Kentucky Electronics Education Project using microelectronics as a theme in science and math education. Efforts are targeted at teachers and students with activities including circuit fabrication projects, basic electricity, and teacher workshops. She appears regularly on PBS in the Physics episode of GED Connection.

In 2010, the University of Kentucky was selected as the new host institution for the NASA Kentucky Space Grant Consortium and EPSCoR Programs. NASA Kentucky is a statewide program awarding fellowship, scholarships and faculty research awards for projects aligned with NASA STEM priorities. Dr. Lumpp served as Associate Director until 2015 during which time she helped bring in more than \$11M for students and researchers across Kentucky.

Currently, Dr. Lumpp is Director of the First-Year Engineering Program for the UK College of Engineering. Incoming students and transfer students will take three common courses to introduce them to engineering disciplines, success strategies, engineering computing and hands-on design projects before declaring a major. Dr. Lumpp is responsible for the curriculum, faculty, teaching assistants and coordinating with recruiting, admissions, advising and the Living Learning Program.

Janet lives in Lexington, Kentucky with her husband, Jim, also a Purdue alum (BSEE'88, MSEE'89) and their youngest child, Christina. Their twins, Annika and Ben, are first-year engineering students at Purdue.

# MSE Alumnus Inducted into Co-op Hall of Fame

The Cooperative Education Hall of Fame was created in 2010 to recognize individuals who have had a significant influence on our Professional Practice Programs, as well as alumni of our programs who have demonstrated unparalleled excellence in their field. These individuals represent the very best that co-op has to offer, be it through mentoring co-op students or serving as a prime example of the opportunities that cooperative education has to offer. Individuals are nominated and approved by the Professional Practice Advisory Council, a group of Purdue faculty that aid in the oversight and implementation of the Professional Practice Programs across campus. 2016 inductees included: C. Douglas Ebersole; Bradley Maggart; Linda Davis; Jerry Matthews, and Dr. Larry Ogborn (posthumous inductee).

## Bradley Maggart

Mr. Bradley Maggart is the President of Hitachi Automotive Systems Asia and also an Executive Officer of Hitachi Automotive Systems, Ltd. In Tokyo, Japan. He resides in Bangkok, Thailand and is responsible for business operations in Southeast Asia and India. He assumed this role in June 2015 and has since launched new plant operations in India, Indonesia and Thailand.

Mr. Maggart joined Hitachi Automotive Systems in Tokyo, in October 2011 as Senior Vice President and General Manager of the Sales Management Division where he was responsible for international business development and several globalization initiatives within Hitachi including establishing a new company in Chennai, India.

Prior to joining Hitachi, Mr. Maggart served as President of Delphi Japan and Managing Director of Delphi's Electronics & Safety Division in Japan. He also served as a Senior Advisor to the Pacific Alliance Group on Private Equity Investments in the Industrial Sector, with specialization in the Automotive Industry.

Mr. Maggart began his career at Delphi Delco Electronic Systems in 1980 as a college co-op student in Kokomo, Indiana. Upon receiving his bachelor's degree in Metallurgical Engineering in 1984, he held various assignments of increasing responsibility in semiconductor engineering, operations and finance until 1994 when he was promoted to European Operations Manager, located in Germany.

In grateful recognition of outstanding career achievement and exemplary representation of Purdue University's Cooperative Education Program, Purdue University is proud to induct **Bradley Maggart** into the Co-Op Hall of Fame.



Bradley Maggart and Dr. Eckhard Groll, Director of the Office of Professional Practice and Reilly Professor of Mechanical Engineering



## STAY CONNECTED!

### Tell us what you want!

Our newsletter is meant to let you know what's going on in the school. Do you want to see more:

- Research highlights
- Student profiles
- Faculty updates
- History

Let us know! Email or call:  
Robyn Jakes  
[RNJakes@prf.org](mailto:RNJakes@prf.org)  
765-494-4094



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Purdue School of  
Materials Engineering



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# LISA VEITCH

## receives the College of Engineering DEA Award

FOR HER IMPORTANT AND PERSUASIVE CONTRIBUTIONS TO UNDERSTANDING THE MATERIALS, AND THEIR LIMITATIONS IN RELIABILITY, WITHIN THE JOINT STRIKE FIGHTER PROGRAM AND OTHER IMPORTANT SYSTEMS FOR NATIONAL DEFENSE

**A** semiconductor production line in Kokomo, Indiana, couldn't hold Lisa Veitch for long. Luckily, her post-bachelor's engineering position with Delco Electronics was close enough to Purdue that getting a master's part-time was very feasible.

After getting her bachelor's degree in ceramic science and engineering at Penn State University, Veitch opted for a master's in materials engineering. "A good friend advised that I try materials engineering because it was a hands-on discipline. I wanted the hands-on," she says.

Veitch followed up her part-time master's with full-time dedication to doctoral research for the Office of Naval Research. After that, she found herself involved in something else she wanted — a position with NASA.

"Since I was young, I was always interested in NASA. The idea of being in a spacecraft was cool, of course," says Veitch, who has a pilot's license and flies in her spare time. As a researcher at NASA Glenn Research Center in Cleveland, Ohio, which she describes as "a big old sandbox," Veitch developed ceramic matrix composite materials for engines — and received a patent.

"I got a special services award and a patent for fibers that were reinforcing materials for gas turbine engines," Veitch says. "It was a special coating for the fiber so the matrix would attach to the fiber."

After seven years at NASA, in 1996 Veitch joined the Institute for Defense Analyses (IDA) in Alexandria, Virginia. In the two decades since, she has contributed to research for several weapon systems, including the Joint Strike Fighter, Comanche helicopter and the presidential helicopter. Her assessments have been used by the Department of Defense to either restructure or terminate weapon-system programs. Looking back on the years she spent working toward her doctorate at Purdue, Veitch still expresses appreciation for the closeness of her peers — a tight-knit class of 36 grad students — and for the kindness from faculty that she was shown during a tough time.

"My mother was very ill when I was getting my PhD and taking my exams," she recalls. "I was able to take a summer off to be with her. The department really understood and supported me. Having the closeness of the department really helped me get through that and also stay focused on my work."



Dr. Lisa Veitch, Dean Leah Jamieson

### CAREER HIGHLIGHTS

<b>2005-present</b>	<b>Research Staff Member, System Evaluation Division, Institute for Defense Analyses (IDA)</b>
<b>1996-2005</b>	<b>Research Staff Member, Science and Technology Division, IDA</b>
<b>1995-1996</b>	<b>Liaison, NASA High-Speed Research Project Office</b>
<b>1989-1996</b>	<b>Materials Research Scientist, Lewis Research Center, NASA</b>
<b>1986-1989</b>	<b>Graduate Assistant, Materials Engineering, Purdue University</b>
<b>1983-1986</b>	<b>Process Development and Production Engineer, Delco Electronics</b>
<b>1983</b>	<b>BS, CERAMIC SCIENCE AND ENGINEERING, PENNSYLVANIA STATE UNIVERSITY</b>
<b>1986</b>	<b>MSMSE, PURDUE UNIVERSITY</b>
<b>1989</b>	<b>PhD, PURDUE UNIVERSITY</b>

Veitch has received many honors and awards, but it's particularly noteworthy that she is one of only two women singled out for the IDA's Andrew J. Goodpaster Award for Excellence in Research. In bestowing the award to Veitch in 2015, IDA cited her "extraordinary technical competence, creativity, objectivity and perseverance."

Veitch applies the same praiseworthy attributes to her commitment to give back — a longstanding priority for her. She has given seminars on the importance of math and science to classes at Plum Senior High School in Pittsburgh, Pennsylvania; at Penn State New Kensington; and at a variety of schools in Ohio and around the U.S.

"I've talked to over 300 high school and freshmen engineering students this year alone," she says. "I take my vacation and do it on my own." Veitch also has mentored several students pursuing engineering degrees, all of whom are now engaged in successful careers.

Outside of work and volunteering, Veitch enjoys piloting and diving. She is a certified scuba diver. If not up in the air or under the water, she enjoys playing piano and ballroom dancing.

# Undergraduate Student Profile



Gray Dragon Photography

## Christina Landon • Indianapolis, IN

### What attracted you to Purdue University and specifically, Materials Engineering?

I don't come from a family of Boiler-makers, but I come from a family well-acquainted with higher education. My mother is a teacher and my father was a flight instructor after college - my siblings and I were raised to love education and to pursue interesting opportunities.

The First-Year Engineering program at Purdue encourages students to visit each of the engineering disciplines in the buildings and labs in which they operate. The event hosted by Materials Engineering students featured a close-knit group of very intelligent individuals - they had very engaging stories to share about the equipment they had been using. I saw Materials Engineering as a good way for me to find answers to some of my favorite questions in life: "Why?" and "How?"

### What has been your greatest achievement during your time in the School of Materials Engineering?

My greatest achievement in Materials Engineering has been the extent to which I've continued to earn the opportunity to be here. I am a non-traditional student in terms of my age, my prior bachelor's degree and the full-time job I have maintained with the University Development Office.

Continuing to serve Purdue in a professional capacity while making time for classes, studying, and student activities has been as challenging as it has been rewarding.

### What has been your favorite MSE course; why?

The year-long senior design course has been a great opportunity to build on everything we have been learning in our coursework at Purdue. In this course, we work in teams to address projects provided by industry partners. The team decides what to research, how to conduct experiments, and how to analyze the data. The course also provides experience in making the most of feedback from faculty and industry connections.

### Please briefly discuss any participation in study abroad and how the experience was beneficial.

I have not traveled abroad since I began this program, but I have traveled extensively around the United States. It's important to me to see beyond the views available from highways and skyscrapers. Driving down small rural roads has given me a glimpse into so many ways of life that I hadn't previously imagined. I'm also a fan of leaving the car behind and hiking in state parks. When you look across a gorgeous natural vista and see plastic grocery bags and paper coffee cups, you understand how important it is to promote biodegradable and reusable materials.

### Please discuss any participation in co-op or internship programs and how the experience was beneficial.

I will join Oerlikon Fairfield in Summer 2017 to complete an internship. This will give me a chance to engage in more engineering-focused work. I am excited to be returning to an industrial setting!

### Have you been involved in any student organizations while at Purdue? If so, which ones?

I joined the Women in Engineering Program in my freshman year and I have annually participated in its mentoring program for undergraduate students. I have also served as the president of the Adult Student Network and as co-chair of the Team Tech design competition with the Society of Women Engineers. I am a member of the Purdue Material Advantage student organization and am a student ambassador with the group.

### Why would you recommend this department to others who are still deciding on an area of study?

Materials Engineering affords you the opportunity to work with a vast array of manufacturing processes, market segments, and physical materials. Purdue's program includes a rigorous plan of study that includes calculus, molecular structure, and the transfer of energy on an atomic scale. This program prepares students to be adventurous and bold practitioners of science.

### How do you plan to use your knowledge and experience gained at Purdue University in the future?

After graduation, I plan on fulfilling the vows I took in freshman engineering to make the world a more efficient, sustainable, and enjoyable place. I look forward to exploring the opportunities available in industry as I approach graduation.



# Graduate Student Profile



**Gamini Mendis** • Reston, VA

## **How did you first hear about Purdue University?**

Through the Engineering Academy at Chantilly High School.

## **What attracted you to Purdue University's graduate programs?**

The Materials Department had recently won an NSF IGERT award to study sustainable electronics. I was interested in studying a rigorous scientific problem using a multidisciplinary approach, and I thought the IGERT program would allow me to do that.

## **What has been most rewarding about your time in Materials Engineering?**

The most rewarding parts of graduate school have come from collaborating with the talented professors and graduate students in the department. I also enjoyed and teaching the bright young undergraduate students through independent research projects and teaching assistant assignments.

## **What is your area of research?**

I am a polymer scientist. I try to better understand the structure-properties relationships in a variety of polymer systems, including silica nanocomposite gels, dielectric thin films, ballistic fibers and epoxy composites with sustainable additives. I utilize a variety of characterization tools to study properties from the nanometer length scale to the centimeter scale. In particular, I use positron annihilation to study dynamic free volume differences in structurally heterogeneous polymer systems. This information is used to better understand the evolution of the polymer's properties under different environmental conditions.

## **Have you been involved in any student organizations or community activities while at Purdue? If so, which ones?**

I have worked with the Materials Engineering Graduate Student Association (MSEGSA) and the Purdue Graduate Student Government (PGSG) to develop communities in the graduate school. I have also worked with MSEGSA's outreach group to teach elementary, middle and high school students about Materials Engineering.

## **Why would you recommend this department to others who are still deciding on an area of study?**

The Materials Engineering department at Purdue offers a collaborative environment with world class facilities and researchers. There are a variety of research opportunities and the potential to develop multidisciplinary collaborations with groups around the University. There is a strong sense of community and professors and fellow graduate students are willing to help you attain your goals.

## **How do you plan to use your knowledge and experience gained at Purdue University in the future?**

I intend to use my knowledge of structure-properties relationships and materials characterization to design and fabricate new materials to address a variety of future challenges. I want to apply sustainable design principles to my work to ensure that I leave the world a better place for future generations.

## **Why did you choose grad school as opposed to going straight into the workforce?**

I initially expected to move into industry after my undergraduate degree, however I could not pass up an opportunity to get paid while working on pressing future challenges and learning about fundamental science.

## **If you could give one piece of advice to undergraduates considering graduate school, what would it be?**

The development of new materials has transformed society. If you are interested in really understanding how materials behave, and develop new life-changing materials, go to grad school. Graduate school helps you learn how to critically analyze, organize and communicate information and push the boundaries of human knowledge.



### *2016-2017* **Student Award** **RECIPIENTS**

#### INTERNAL STUDENT AWARDS:

**David Guzman**  
College of Engineering Outstanding  
Graduate Student Researcher

**Logan Kroneman**  
**Samuel Reeve**  
Estus H. and Vashti L. Magoon  
Graduate Teaching Award

**Kathleen Reeve**  
College of Engineering Outstanding  
Graduate Student Service Scholarship

**Lisa Rueschhoff**  
MSE Outstanding Graduating  
Graduate Student

**Jared Smith**  
John L. Bray Memorial Award

**Hannah Woods**  
MSE Outstanding Graduating Senior

#### EXTERNAL STUDENT AWARDS:

**Christina Landon:**  
*Toolin' in SWE Award*

**Varsha Ganapathy:**  
*Sandra Postel Leadership Award*

**Fiona O'Dowd:**  
*Outstanding Sophomore Award*  
**Society of Women Engineers (SWE)**

**Theresa Saenz**  
Fulbright Student Program Grantee

**Nelyan Lopez Perez**  
National Institute of Justice Research Fellowship

**Kathleen Reeve**  
Charles Hutchins Educational Grant from the Surface  
Mount Technology Association

**Adam Miller**  
PULSE Scholarship from Purdue Libraries

**Brendan Hamilton**  
Astronaut Scholarship Finalist

**Philip Gordon**  
2017-2018 AIST Foundation's Steel Scholarship  
American Foundry Society Scholarship

**Xin Li Phuah**  
Smalley Award from Purdue Student Union  
Board Industrial Scholarship from Purdue  
Engineering Student Council

**Alejandro Figueroa**  
2017 Nuclear Energy University Program  
Scholarship from Department of Energy

**K.S.N. Vikrant**  
Awarded 1 of 3 poster awards at the  
Workshop on Electromagnetic  
Effects in Materials Synthesis



# 2017 SCHOOL OF MATERIALS ENGINEERING ADVISORY COMMITTEE



The School of Materials Engineering would like to take the opportunity to recognize the men and women who serve on the School's Advisory Committee. We sincerely appreciate the time they spend on campus, the opportunities they provide for our students, and the commitment they consistently show towards helping us improve.



**Ms. Dianna Clute**  
New Product Introduction Team  
Leader - 3500 Product  
*Caterpillar Lafayette Engine Center*



**Dr. Keith Kruger**  
Senior Marketing Manager –  
High Temperature Alloys  
*Haynes International, Inc.*



**Mr. Barry Efron**  
President (Retired)  
*Efron Family Enterprises*



**Mr. Tim McCrea**  
Division Manager –  
Talent Acquisition & Development  
*ArcelorMittal USA*



**Mr. Steven Ferdon**  
Director of Engineering Technology  
*Cummins Fuel Systems Business*



**Dr. Ryan K. Roeder, Professor**  
University of Notre Dame  
Bioengineering Graduate Program  
Department of Aerospace and  
Mechanical Engineering



**Mary Lee Gambone, PhD**  
Head, Materials Engineering –  
North America  
*Rolls-Royce Corporation*



**Mr. Dustin Ruh**  
Commercial Director  
*Arconic Forgings and Extrusions*



**Dr. Mark Gruninger**  
President (Retired)  
*Praxair Surface Technologies*



**Ms. Linda Sarros**  
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*ArcelorMittal  
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**Jon L. Hilden, Ph.D.**  
Associate Engineering Advisor  
*Eli Lilly & Company*



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**Dr. H Joseph Klein**  
Vice President, Retired  
*Haynes International, Inc.*



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Test Engineer  
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## EVENTS

### Mark Your Calendar!

#### **MSE Current Student and Alumni Mixer**

**Thursday, September 14  
5:30 - 7pm**

**Mackey Arena, Spurgeon Club  
Cost: Free**

#### **MSE Alumni Reception at MS&T Conference**

**Monday, October 9  
6:30 - 8pm**

**Olive or Twist  
140 6th Street  
Pittsburgh, PA 15222  
Cost: Free**

For additional information about  
these events or to RSVP, please  
contact Stacey Coar at 765-494-4100  
or at [scoar@purdue.edu](mailto:scoar@purdue.edu).

