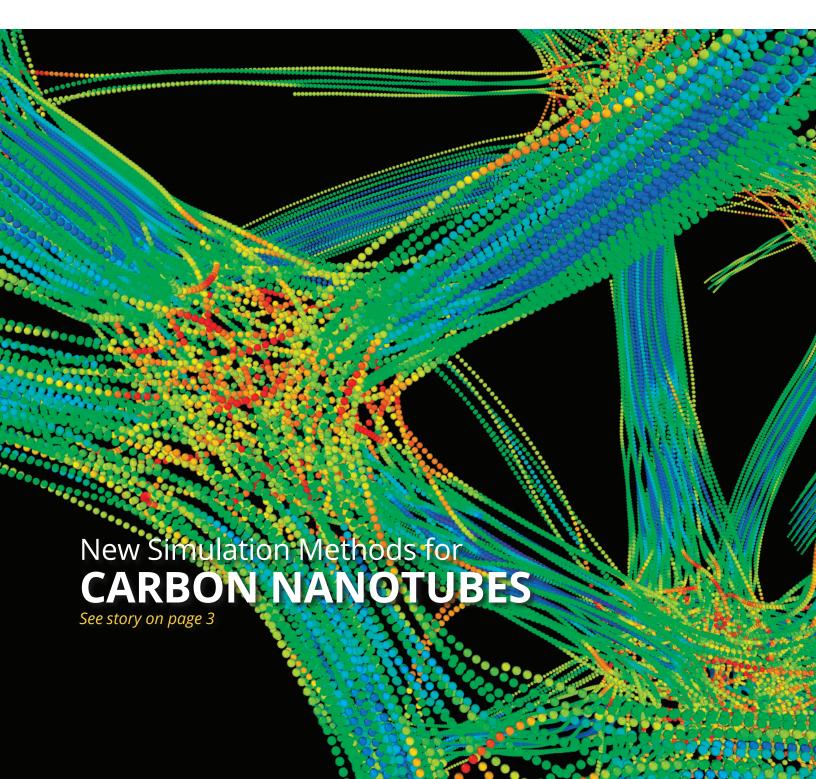


WINTER 2018

Carnegie Mellon University



department head



A NOTE FROM THE DEPARTMENT HEAD Gregory S. Rohrer W.W. Mullins Professor

reetings to our MSE alumni! I am happy to report that the Department of Materials Science and Engineering continues to grow and thrive. As always, you will find this issue of *MSE News* packed full of the successes of our students, faculty, and alumni.

As you look through the stories in this issue of *MSE News*, I hope it's apparent that there is a great deal of intellectual diversity in the materials research activity in the Department. This research encompasses everything from blacksmithing work conducted by **David Sapiro**, a graduate student working on corrosion in austenitic stainless steels, to Coarse-Grained Molecular Dynamics simulations of nanotubes by graduate student **Ankit Gupta**. This broad range of research is representative of the Department's current activities, which range from metallurgy to biomaterials.

It is also a pleasure to share the continued successes of our newest faculty. **Professors Noa Marom**, **Tzahi Cohen-Karni**, and **B. Reeja Jayan** have received Young Investigator awards from the Kaufman Foundation, the Office of Naval Research, and the Army Research Office — adding to previous Young Investigator awards they have already received from the National Science Foundation. These are all highly competitive awards, and they provide a strong financial foundation for these faculty members' growing research programs.

Of course, senior faculty members in the Department also continue to achieve success by breaking new ground in research, winning awards, and publishing textbooks. For example, at the MS&T meeting in Pittsburgh last October, I enjoyed seeing **Professor David Laughlin** present the Edward DeMille Campbell Memorial Lecture on Magnetic Transformations and Phase Diagrams. I also enjoyed meeting many successful alumni at the Saltminers Dinner during the conference. This was the best-attended dinner I can remember, and I hope the attendance is similar this year.

I hope you enjoy reading about all the activities and achievements of MSE faculty, students, and alumni in this newsletter. Please let us know of any significant developments in your career and your life that we can feature in the Alumni News section. As always, if you are in town and have the opportunity, you are more than welcome to visit the Department.

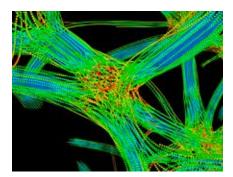
GREGORY S. ROHRER





In August, Professors Anthony Rollett and Gregory S. Rohrer visited Korea, where they spoke at Seoul National University, Pusan National University, and the Korea Institute for Ceramic Engineering and Technology in Jinju. The trip was arranged by two MSE alums: Sukbin Lee of Ulsan National Institute of Science and Technology, and Yoon-Suk Choi of Pusan National University. Shown in the left photo are (clockwise from left) Lee, Rollett, Yoon-Suk Choi, Keeyoung Jung, Rohrer, and Dooho Choi. Shown in the right photo are (clockwise from left) Sukjoon Son, Yongsug Chung, Rollett, Paul SY Lee, Seoyong Ha, Rohrer, and Lee. Not shown is Il Sohn.

Model Behavior



In this image of carbon nanotube aerogels simulated by Ankit Gupta, the individual nanotubes are color coded according to their van der Waals energy. Red signifies areas of high energy, while blue denotes regions of low energy. Note that energy is highest in the entangled nanotube junction regions; away from these junctions, nanotubes arrange into low-energy bundles.

Gupta_CNTaerogel_flythrough

Laughlin Presents Lecture at MS&T



A new simulation method makes it easier and faster to study the behavior of carbon nanotube aerogels

Elizabeth Holm to discover an innovative way to computationally model carbon nanotube aerogels.

The mechanics of these nanomaterials — developed by MSE's Professor

Mohammad F. Islam — have been examined in several experimental studies. However, in this work Gupta employed computer simulations, which provided rare insights into their deformation process unfolding at the nano scale. Gupta modeled the nanotubes as a series of beads and springs — creating an opportunity to model many more

ecent graduate Ankit Gupta (Ph.D. 2017) has collaborated with Professor

The striking, colorful image on the cover of *MSE News* shows Gupta's new structure of entangled, intersecting carbon nanotubes at the molecular level. "The high degree of entanglement was a surprise, and it modifies our understanding of the properties of carbon nanotube aerogel materials," says Gupta.

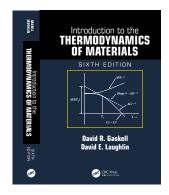
nanotubes together than was previously possible.

The image was simulated using Coarse-Grained Molecular Dynamics (CGMD), a meso-scale simulation technique in which the trajectories of nanotube atoms (represented as beads) are evolved according to a force field that accurately captures the van der Waals interactions between them. Gupta developed the CGMD model within the LAMMPS molecular dynamics software package, which is widely used to simulate materials phenomena at atomic length and time scales.

Thanks to Gupta's new modeling method, materials scientists can now run much faster computations of large nanotube systems. It is much easier for researchers to apply compressive forces and assess the material's reaction to structural stress.

Carbon nanotube aerogels are extremely lightweight, porous, and compressible — making these exotic materials ideally suited for applications where these properties are valued. "Carbon nanotube aerogels are perfect for absorbing and damping applications," notes Gupta, "including absorbing oil spills, where they could absorb one to two orders of magnitude more than current commercial oil absorbents. Another application might be in new electrodes, where their material properties would promote high-efficiency energy storage."

MSE's **Professor David Laughlin** was chosen to present the 2017 Edward DeMille Campbell Memorial Lecture Award by ASM International. This annual lecture, which took place at the MS&T meeting in October, was inaugurated in 1926 in memory and recognition of the distinguished educator, Edward DeMille Campbell, and his outstanding scientific contributions to the metallurgical profession. The list of people who were previously honored by this award include famed metallurgists such as Edgar Bain and Cyril Stanley Smith. Laughlin's lecture was called "Magnetic Transformations and Phase Diagrams."



In addition, Laughlin has co-authored a new textbook with David R. Gaskell of Purdue University. Called *Introduction to the Thermodynamics of Materials, Sixth Edition*, the 694-page book was published by CRC Press in August.

IRON MAN

Richard Fruehan Retires After 36 Years at MSE ast year, **Professor Richard Fruehan** retired from the Department of Materials Science and Engineering. Fruehan joined MSE in 1980, after spending 12 years heading the US Steel Basic Research Lab.

"The years spent at US Steel were the 'golden years' of science, when netals company sponsored its own basic and applied research," remember

every metals company sponsored its own basic and applied research," remembers Fruehan. "The environment was very similar to an academic research lab, and I enjoyed my work. But I came to Carnegie Mellon because I wanted the opportunity to work with students and mentor them. To me, that has been the most gratifying part of my career."

Through the years, Fruehan got his wish, advising 43 doctoral students and forming close relationships with every one of them. "My greatest joy has been working with Ph.D. candidates," he says. "In an undergraduate or grad program, students have eight to 10 professors they work with. As Ph.D. students, their only relationship was with me — and that's a responsibility I took very seriously."

"My students are like family to me," he adds. "And, unlike my own kids, they usually

did what I told them to." Fruehan notes that approximately 25 percent of his students have been women, a statistic he is proud of. Based on his work, he's been recognized as a member of the National Academy of Engineers and as a University Professor of Carnegie Mellon University.

Why did Fruehan choose to spend his entire academic career at Carnegie Mellon? "The University is incredibly supportive of each faculty member's ideas and interests," states Fruehan. "There's not a predefined path or 'master plan' here—the administration really listens and supports each individual's goals. CMU gives you the opportunity to succeed."

That support enabled Fruehan to found CMU's Center for Iron and Steel Research (CISR) in 1986. With corporate research budgets declining, this innovative center

brought together the world's leading steel companies, as well as the National Science Foundation, to support basic iron and steel research. "We identified the most urgent technical problems in the industry, and we solved them together," explains Fruehan. "The CISR has helped metals companies from around the world make great strides in their materials and processes that wouldn't have been possible otherwise." CISR has members from 10 different countries.

One of Fruehan's fondest memories is the 2011 Richard J. Fruehan Symposium on Physical Chemistry of Sustainable Metal Processing, which was sponsored by The Minerals, Metals & Materials Society and ASM International. "People came from all over the world to honor me — my students, as well as my colleagues in the steel industry," he recalls. "There were friends in attendance from 19 countries. It was supposed to be a symposium, but it felt more like a party."

Since retiring, Fruehan divides his time between Pittsburgh and St. Augustine, Florida. While he had hoped to play a lot of tennis — always a passion of his — knee replacement surgery has put those plans on hold temporarily. As might be expected, his CMU family has supported him both pre- and post-surgery. "A bunch of my students took me out for dinners and lunches right before my surgery," he notes. "They are always there for me, and I will always be there for them."

66 One of Fruehan's fondest memories is the 2011 Richard J. Fruehan Symposium on Physical Chemistry of Sustainable Metal Processing.

Marom Awarded New Investigator Grant

rofessor Noa Marom has received a \$150,000 New Investigator grant from the Charles E. Kaufman Foundation, which is committed to improving human life through scientific research. The two-year grant will help fund her proposed research, "Singlet Fission: Deriving Fundamental Insights From Computation." Since 2013, the Foundation has awarded 43 grants totaling \$9.1 million. Grants in the New Investigator category are awarded to scientists pursuing independent research at the beginning of their careers as they seek to transform the future of science. Marom's project was one of 26 proposals which received funding from a field of 250 submissions.

Webler Focuses on New 3D Printing Materials

Professor Bryan Webler is leading a team of researchers at Carnegie Mellon focused on developing new alloys which optimize the performance of additive manufacturing processes, commonly known as 3D printing. Despite metal 3D printing's novel process and innovative design parameters, it relies on materials such as the common titanium alloy Ti-6Al-4V, which were designed and optimized decades ago for traditional



Alloy button with process variable test tracks. Courtesy Carnegie Mellon University College of Engineering.

manufacturing approaches. New metal powders are needed, specifically designed for 3D printing and its high cooling rates. To design a new alloy, Webler and his team have developed new computational and experimental methods that "pre-screen" new alloy compositions before test batches of powders are made. "It's very hard to develop new materials for additive manufacturing, because evaluating new alloys requires a lot of powder. At least a hundred pounds of powder would be needed per composition in order to test all the process variables related to that material. This is both expensive and time-consuming," explains Webler. "This screening method allows us to more quickly understand and develop correlations between process variables and alloy composition." An article about the team's work was recently featured on www.3ders.com, a website devoted to news about 3D printing.

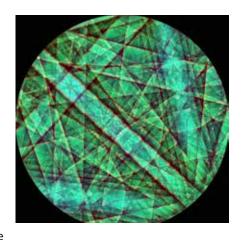


Cohen-Karni Wins 2017 ONR Young Investigator Award

Professor Tzahi Cohen-Karni, jointly appointed in Biomedical Engineering, is among the 2017 recipients of the Office of Naval Research's (ONR) Young Investigator Award. His award was based on his proposal, "Three-Dimensional Nanosensors Array for Measurement of the Electrical Activity of Microscale Human Brain Tissue." The ONR's Young Investigator program seeks to identify and support academic scientists and engineers who are in their first or second full-time tenure-track or tenure-track-equivalent academic appointment, have begun their first appointment, and who show exceptional promise for doing creative research.

DeGraef and Singh Featured on Journal Cover

Professor Marc De Graef and recent Ph.D. graduate Saransh Singh published an article, "Dictionary Indexing of Electron Channeling Patterns," in the February 2017 issue of *Microscopy & MicroAnalysis*. One of the figures from their research was featured on the journal's cover. The image depicts a simulated false color 20 kV electron channeling pattern for Si, with the [110] zone axis in the lower right. The scattered intensity is represented on a color scale from deep green to light blue, and band edges are highlighted in red using a Prewitt edge filter. The illumination cone semi-angle



spans 11.42°. This research was supported by an Air Force Office of Scientific Research (AFOSR) grant.

Jayan Wins 2017 ARO Young Investigator Award

Professor B. Reeja Jayan has received an Army Research Office (ARO) 2017 Young Investigator Award, the most prestigious award granted by the US Army. Jayan, who holds a joint appointment in MSE and Mechanical Engineering, won funding for her proposed research, "A Cross-Disciplinary Investigation of Amorphous-Crystalline Ceramics Synthesized Using Far-From-Equilibrium Electromagnetic Excitations." The ARO works to ensure the nation's technological security by functioning as the Army's principal research agency in the engineering, physical, information, and life sciences. It selects and funds the most pertinent research proposals to help solve and fulfill the nation's long-term security needs.

Pistorius Pioneers New Heat Treatment Method

Professor Chris Pistorius has published an article in *Industrial Heating* called "Leveraging Heat Treatment to Control Inclusions in Stainless Steel." Heat treatment methods are commonly used by metallurgists to optimize the metallic structure, stress state, and the sizes and compositions of precipitates in materials. Pistorius and his team found that heat treatment can also be used to control inclusions in stainless steel. By changing the chemical composition and shape of inclusions via relatively low-temperature heat treatment, Pistorius and his team are able to change the mechanical behavior of the steel material substantially. Pistorius is publishing a paper on this research in *Metallurgical and Materials Transactions B*, entitled "Transformation of Oxide Inclusions in Type 304 Stainless Steels During Heat Treatment."

Rollett, Rohrer Publish Textbook



Along with co-author John Humphreys, **Professors Anthony Rollett** and **Gregory S. Rohrer** have published a third edition of their textbook, *Recrystallization and Related Annealing Phenomena*. Released by Elsevier in July, this 734-page book is aimed at graduate students through active materials scientists and materials engineers in industry involved in the characterization, modeling, and thermal treatment of metals.

Rimnac Wins Prestigious Award



Clare Rimnac (B.S. 1978) has received the ORS/OREF Distinguished Investigator Award from the Orthopaedic Research Society and Orthopaedic Research and Education Foundation. The award honors individuals with long-standing productive careers in orthopaedic research. Awardees have a record of innovative research as evidenced by publications, presentations, and sustained research support, as well as outstanding mentorship of research trainees, service to the professional community, and exemplified academic collegiality. Rimnac

is the Wilbert J. Austin Professor of Engineering and Associate Dean for Research, Case School of Engineering, at Case Western Reserve University. She also directs the University's Center for the Evaluation of Implant Performance.

Kelly Travels to the UK

Madeleine Kelly (B.S. 2013, Ph.D. 2017) spent two weeks at the University of Manchester in England, where she collaborated with top scientists in materials science and engineering on the use of a powerful electron microscope. Kelly, now a postdoctoral researcher in MSE, spent two weeks in Manchester collaborating with Grace Burke, director of the Materials Performance Centre, and Xiangli Zhong, the experimental officer for the University of Manchester's FEI Helios TM PFIB Dual-Beam. The powerful microscope is novel: only a few exist. One of them is housed at Carnegie Mellon, where Kelly uses it to research ceramic materials.

IN MEMORIAM:

Robert Dax

t is with sadness that we announce the passing of MSE alumnus **Robert Dax** (*B.S. 1972, M.E. 1977*) last May at the age of 67. Bob's career included positions with US Steel Corp.; ESM, Inc.; Value Engineering Laboratory; Caterpillar Tractor Corp.; Colt Industries/Crucible Research Center; and Cytemp Specialty Steel.

While at Crucible, his team was awarded a patent for a cobalt-free high-speed steel, later selected as an IR-100 award winner for 1981. In 1992, Bob joined Concurrent Technologies Corporation (CTC), spending the next 20 years in management and project development. Bob contributed to more than 50 articles and gave numerous technical talks. Bob served on the executive committee of the Golden Triangle Chapter of the American Society for Metals (ASM), served as chapter president in 1991, and was elected an ASM International Fellow in 2009.

While a student at CMU, Bob developed his volleyball skills as a three-time MVP in club volleyball, later traveling for semi-pro volleyball teams and competing in beach volleyball tournaments. Bob ran two marathons, including the first Pittsburgh Marathon in 1985. In later years, his passions included long-distance cycling, Sudoku puzzles, and cerebral computer games. He also enjoyed yearly Myrtle Beach golf trips and bonding with his Corgi, Toby. For 35 years, Bob spent weekends renovating and managing rental properties, becoming quite a handyman.

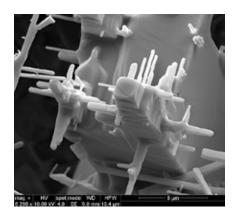
At CMU, Bob began his lifetime involvement with the fraternity Sigma Alpha Epsilon (SAE). After Bob was diagnosed with Lou Gehrig's disease (ALS) in January 2014, SAE dedicated its annual Donut Dash fundraiser to raise money for LiveLikeLou, a fund of the Pittsburgh Foundation which helps families affected by ALS and supports ALS research. Bob was fondly remembered on October 1 at the SAE/CMU Donut Dash, held in Schenley Plaza. His legacy also lives on at the LiveLikeLou Center for ALS Research, where a recently acquired Nikon Confocal A1R Microscope was named in Bob's honor, "The Dax." Bob is survived by his wife, Kathy Sabec Dax. MSE sends its deepest sympathies to Bob's family and friends.

student news



h.D. student **Ajay Pisat** is gaining attention for producing hydrogen for energy storage via photocatalysis. Pisat hopes to unlock hydrogen's full potential as a primary, mainstream energy storage medium by maximizing the efficiency of hydrogen production through photocatalysis. He focuses on engineering the surface morphology of oxide compounds to optimize their surface areas for hydrogen evolution — which, in turn, increases the efficiency of hydrogen production. If Pisat can scientifically engineer the surface structure of an oxide compound for maximum efficiency, then he can engineer similar compounds which absorb sunlight better. Researchers could then use these compounds at a larger scale, for entire photocatalytic systems. Pisat is advised in his research by MSE **Professors Gregory S. Rohrer** and **Paul Salvador**.

Ajay Pisat has also recently won the Graduate Excellence in Materials Science (GEMS) award at the Materials Science and Technology (MS&T) 2017 conference. This annual award from the American Ceramic Society recognizes the outstanding scientific and research achievements of up to 10 graduate students. Applications for the award are open to all graduate students making an oral presentation at any symposium or session at the MS&T conference, which was held last October in Pittsburgh.



MSE doctoral student **Deepoo Kumar** won the First Place Award in the 2017 Materials Photography Contest, sponsored by the TMS Foundation. Winners were announced at the 2017 TMS Annual Meeting & Exhibition, held in San Diego. This inaugural competition encouraged TMS members to submit photographs or images that reflect the beauty in minerals, metals, and materials. Judges determined the winners based on materials relevance, aesthetics, visual impact, and creativity. Kumar received a certificate, a first-place ribbon, and a cash award of \$300. His winning photograph, "MgO Crystal Growth in (100) Direction," was on display in the TMS Member Welcome Center during the meeting. Kumar is advised by **Professor Chris Pistorius**.

66 Kumar's winning photograph, MgO Crystal Growth in (100) Direction, was on display in the TMS Member Welcome Center during the 2017 TMS Annual Meeting and Exhibition. 99



Ph.D. candidate **David Sapiro** complements his doctoral research on corrosion in austenitic stainless steels with a unique hobby: blacksmithing. Sapiro enjoys applying his knowledge of metallurgical science to this hands-on work. "Corrosion is very much electrochemistry and studying individual atoms and molecules, very upper level science," observes Sapiro. "But then the metal breaks, and I have to look at the fracture surface and say, 'Was this a ductile fracture or a brittle fracture, and why did it break like that?' That's stuff I can do in my garage." TMS recently incorporated an alternating blacksmithing competition and symposium into its annual proceedings. Sapiro entered the inaugural competition in 2015, presented his findings at the symposium in 2016, and competed again in 2017. He has also published an article, "Fabrication of a Bronze Age Sword Using Ancient Techniques," in *JOM* (formerly *Journal of Metals*). Sapiro's MSE advisor is **Professor Bryan Webler**.

Carnegie Mellon University





Recent Ph.D. recipient **Sudipto Mandal** won the Alumni Choice Award at the 2017 Three Minute Thesis Competition for his presentation of his thesis, "Improving Performance of Aerospace Materials Using Integrated Computational Materials Engineering." Three Minute Thesis (3MT®) is an internationally recognized competition at Carnegie Mellon that challenges Ph.D. students to present a compelling oration on their thesis and its significance in just three minutes, in language anyone can understand. 3MT is not an exercise in trivializing or "dumbing down" research, but requires students to consolidate their ideas, crystallize their discoveries, and capture the imagination of their audience.

MSE recent Ph.D. graduate **Saransh Singh** and MSE Ph.D. candidate **Joseph Tessmer** have each won a Student Scholar Award from the Microscopy and Microanalysis 2017 Conference, held in St. Louis. The award included conference registration fees, as well as a contribution toward travel and lodging expenses. Advised by **Professor Marc De Graef**, Singh was recognized for a paper entitled "Applications of Forward Modeling to Refinement of Grain Orientations." Tessmer's paper, entitled "Automated Acquisition and Analysis of Selected Area Electron Channeling Patterns in an FEG-SEM," reflects his research, jointly advised by De Graef and **Professor Yoosuf Picard**.

Young Explorers

ore than 500 local students in kindergarten through twelfth grade visited CMU's College of Engineering for a unique event called "Explore Engineering!" Held in conjunction with National Engineers Week, the festival was aimed at exposing the young scientists to a variety of engineering fields and sparking their interest in engineering careers. Students from MSE led hands-on demos and activities showcasing materials science.





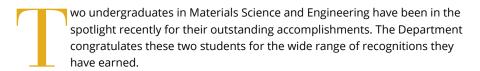




MSE Students Win Recognition



Mari-Therese Burton is shown with the Immediate Past President of ASM International, Dr. William E. Frazier, at the ASM Annual Meeting/the Materials Science & Technology Conference last October.



Junior Mari-Therese Burton was a recipient of a prestigious Boeing Scholarship in her sophomore year, which is awarded to exceptional undergraduates with an interest in aerospace. In 2017, Burton won a \$10,000 scholarship from the II-VI Foundation, created to encourage undergraduates to pursue an engineering career. This scholarship, funded by II-VI — a local manufacturer of engineered materials and optoelectronic devices — recognizes students with hands-on industrial experience. Burton has already had multiple internships, including one with Nucor Steel and three with the Naval Surface Warfare Center.

In addition, Burton serves as a student member of the Board of Trustees for ASM International, one of only three representatives chosen from across the US to give a voice to materials science and engineering students. Burton attends multiple ASM conferences and events annually in this capacity. Burton currently holds three jobs at CMU: as an MSE tutor, as a peer educator for University Health Services, and as an undergrad researcher working with **Professors David Laughlin** and **Michael McHenry** on high-entropy magnetic alloys, funded by the Semiconductor Research Corporation Undergraduate Research Opportunities scholarship.

"I'm grateful for all the hands-on experiences and scholarship opportunities I've been exposed to as a student in MSE," notes Burton. "I'm fortunate to be supported by faculty members like Professors Laughlin and McHenry who are invested in my success — and who encourage me to seek opportunities for awards and financial aid both inside and outside the University."



Gaurav Balakrishnan, also a junior in MSE, has earned numerous awards and honors in recent months. At ASM Young Members Night last spring, Balakrishnan won the highly competitive Past Chairperson's Educational Assistance Award, given to an outstanding sophomore studying materials science. More recently, he was awarded the 2017-2018 AIST Pittsburgh Member Chapter Scholarship from the Association of Iron and Steel. Balakrishnan was also granted a tuition scholarship for the 2017-18 school year from the Samuel and Claire Bell Trust Fund of the Pittsburgh Foundation.

Last summer, Balakrishnan traveled to Israel to work as a research fellow with Dr. Avi Schroeder at Technion University. Balakrishnan, who has a dual major in Biomedical Engineering, studied drug delivery mechanisms and developed data analysis software for better medical decisions. His trip was funded by CMU's International Summer Undergraduate Research Fellowship (ISURF) program.

Back home in Pittsburgh, Balakrishnan works as a research assistant in the lab of **Professor Tzahi Cohen-Karni**, supporting research on the synthesis and characterization of graphene. This busy undergrad is also a resident assistant in a CMU dorm.

"I feel lucky to have mentors in the Department, including Professor Cohen-Karni and **Professor Bryan Webler**, who have taken an interest in me and my goals," Balakrishnan says. "They've introduced me to so many contacts and so many opportunities. By opening doors for me, they are putting me on a path to career success, even though I'm still an undergraduate."

MSE Celebrates Commencement 2017

he Department of Materials Science and Engineering hosted its 2017 Commencement ceremony on May 20 at the Twentieth Century Club in Oakland

The Department awarded 33 B.S. degrees, 40 M.S. degrees, and 23 Ph.D. degrees. Whether these graduates are entering the engineering profession or pursuing additional study, the Department wishes them all the best in their future endeavors. The following awards were presented during the Commencement ceremony:

- The William W. Mullins Undergraduate Award Recipient: Kate J. Beittenmiller
- The Hubert I. Aaronson Undergraduate Award Recipient: Paul Chao
- The James W. Kirkpatrick & Jean Kirkpatrick Keelan Award Recipient: Mariana Rodriguez
- The William T. Lankford Memorial Scholarship Award Recipient: Heather Bowman
- The ASM Golden Triangle Chapter Outstanding College Senior Award Recipient: David Ott
- The Paxton Award for Best Doctoral Dissertation Recipient: Dr. Brian DeCost















DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING

Carnegie Mellon University Pittsburgh, PA 15213-3890





SAVE THE DATE!

On Friday, April 20, the Department of Materials Science and Engineering will be hosting a Deck Party in conjunction with the 2018 Carnegie Mellon Spring Carnival. We hope to see many MSE alums when they return to the campus for this annual event!

Carnegie Mellon University does not discriminate, and Carnegie Mellon University is required not to discriminate, in admission, employment, or administration of its programs or activities on the basis of race, color, national origin, sex, or handicap in violation of Title VI of the Civil Rights Act of 1964, Title IX of the Educational Amendments of 1972, and Section 504 of the Rehabilitation Act of 1973 or other federal, state, or local laws or executive orders.

In addition, Carnegie Mellon University does not discriminate in admission, employment, or administration of its programs on the basis of religion, creed, ancestry, belief, age, veteran status, sexual orientation, or gender identity. Carnegie Mellon does not discriminate in violation of federal, state, or local laws or executive orders. However, in the judgment of the Carnegie Mellon Human Relations Commission, the Presidential Executive Order directing the Department of Defense to follow a policy of "Don't ask, don't tell, don't pursue" excludes openly gay, lesbian, and bisexual students from receiving ROTC scholarships or serving in the military. Nevertheless, all ROTC classes at Carnegie Mellon University are available to all students. Inquiries concerning application of these statements should be directed to the provost, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213, telephone 412-268-6684, or the vice president for enrollment, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213, telephone 412-268-2056.

Carnegie Mellon University publishes an annual campus security report describing the University's security, alcohol and drug, and sexual assault policies, and containing statistics about the number and type of crimes committed on the campus during the preceding three years. You can obtain a copy by contacting the Carnegie Mellon Police Department at 412-268-2323. The security report is also available online.

Obtain general information about Carnegie Mellon University by calling 412-268-2000.

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