It’s my privilege to write this greeting to our fall alumni newsletter as the newly appointed interim school head. We have our fall term in full swing, and I am taking in stride the duties of leading this exceptional school.

In the issue, we introduce six new faculty as well as hear about research of two outstanding graduate students.

We are together serving more than 2,000 students, including 337 graduate students, with the help and support of 78 faculty and staff.

It will be an exciting year as we conduct a national search for a permanent school head, and I look forward to your continued support and involvement. Please know that the door is always open at the School of MIME.

— David P. Cann
Since its foundation in 2003, the Microproducts Breakthrough Institute (MBI) has served as a home for the School of MIME’s advanced manufacturing research breakthroughs. MBI is a collaborative space focused on the research, development and commercialization of microchannel technology.

The MBI is housed in a 70,000-square-foot building with research and development laboratories, fabrication facilities and offices for MIME and OSU faculty as well as a bevy of industry tenants representing a range of manufacturing sectors.

Research activity in the MBI has involved primarily two schools of engineering, MIME and CBEE, leading to breakthroughs in microchannel and nanotechnology for sustainable energy, biomedical devices, and chemical production.

But another important aspect of MBI’s activities navigates the rough waters of commercialization — e.g., the development and scale up of products and processes in partnership with new startup companies or existing business.

“Research at the MBI has emphasized commercial application, which is important for manufacturing faculty who aspire to see their research making an impact in industry,” said Professor Brian Paul a key member of the founding faculty. “The successes of prior commercialization efforts have caught the attention of state officials eager to see the university play a growing role in Oregon economic development.”

For that reason, Paul explains, the OSU Research Office has launched a broader institute called ATAMI to expand on the success of the MBI to translate research to industry.

ATAMI, or the “Advanced Technology and Manufacturing Institute” is under the leadership of Dr. Sam Angelos, the prior VP and site manager for HP Corvallis.

“We are looking to connect the dots among the big programs at Oregon State, and expand to other colleges, for example, the Colleges of Science, Business, Forestry. We want the best and the brightest, and we’d like more opportunities to commercialize research across the entire university,” said Angelos.

ATAMI has the scope to accommodate broader, deeper pockets of research excellence from other colleges. New programs at ATAMI include research and development in semiconductor manufacturing and the ‘internet-of-
things’ as well as new techniques for 3D printing, machining and forming.

“Our message to OSU faculty is that if you are working on hardware, ATAMI is a place for you. We still have 25,000 to 30,000 square feet of open high-bay research space that needs programming,” said Paul.

The MBI will remain as one of several programs advancing technology to market within ATAMI. Over the past years, the MBI has brought in approximately $28 million in R&D expenditures, launched 10 startup or spinout companies, and secured eight licensing agreements, an impressive set of accomplishments for a small cluster of businesses and researchers.

And according to Paul, ATAMI has a strong future because of the proven track record of the MBI.

“Through the MBI, and now ATAMI, we in the state of Oregon are becoming more aware that we can grow our own businesses. Entrepreneurs are more aware of the expanding infrastructure to help them get started including ONAMI, Oregon BEST and the campus accelerator. We are taking what we learned in the original partnership of two schools and PNNL, and seeking to scale that up to the university level,” Paul said.

Activities at ATAMI and MBI will continue to involve industry and government research that enables graduate education. Companies like Boeing and Blount are sponsoring research with MIME faculty Rajiv Malhotra and Karl Haapala. The U.S. DOE’s SunShot Initiative has funded projects with MIME faculty to optimize and scale up concentrated solar thermal energy. Dr. Paul and retired Associate Professor Kevin Drost are working with other MIME researchers including Brian Fronk, Sourabh Apte, Hailei Wang and Rajiv Malhotra to conduct this research.

Other entities supporting MBI include the National Institutes of Health, the U.S. Army, the Department of Energy Advanced Research Projects Agency and the National Science Foundation.

Beyond grants, patents, theses and students, ATAMI, in partnership with ONAMI, Oregon BEST and regional accelerators, offers the opportunity for companies to innovate faster. According to Paul, these entities help bring entrepreneurs-in-residence intended to help researchers make the extra leap to commercialization. Collaboration with entrepreneurs is key to moving the mission of ATAMI forward.

The expected outcome of greater collaboration is job creation in Oregon through the launching of new companies and assistance to existing manufacturers in the state. This will lead to more success stories, like that of Voxtel, a small Oregon company that partnered with OSU researchers, through an ONAMI gap grant, to create a new process for scaling up the production of precision quantum dots. The new process has led to the establishment of Shoei Electronic Materials Inc. (SEMI), a new division of Japan-based Shoei Chemical Inc. within Oregon.
Onan Demirel’s research focuses on the development of multi-disciplinary design theory and methods to optimize human well-being and overall system performance. This approach considers both form and function aspects of design process. Demirel’s work engages in human subject data collection and virtual simulations, and applies mechanical engineering design methods with industrial design techniques to include human needs, abilities and limitations early in the design process. Dr. Demirel received his PhD in 2015 from Purdue University in industrial engineering.

In the Enhanced Heat Transfer Laboratory, where Josh Gess is a co-principal investigator, research focuses on mass, momentum and thermal transport enhancement at the micro and nano scales. His research interests include two-phase immersion cooling techniques specific to applications involving high-performance data centers, bubble dynamics and two-phase heat transfer phenomena. Dr. Gess was a Walt and Virginia Woltosz Fellow in 2013 and 2014, and a U.S. Steel Fellow in 2012. He received his PhD in 2015 from Auburn University in mechanical engineering.

Nordica MacCarty’s background is in thermal-fluid sciences, engineering design, computational modeling, energy systems, and humanitarian engineering. Her primary research interest is in the use of integrated modeling to assist design and decision-making for complex energy systems. MacCarty has a particular interest in design of household energy systems for the developing world and the use of engineering to address poverty and environmental issues. She received her PhD in mechanical engineering from Iowa State University in 2015, where she studied under a graduate research fellowship from the National Science Foundation.

Kyle Niemeyer performs research on computational modeling of multi-physics — in particular, chemically reactive — flows relevant to applications in aerospace, transportation, and energy systems. His research has been funded by both government and industry stakeholders, including the National Science Foundation, U.S. Department of Defense’s Strategic Environmental Research and Development Program (SERDP), NASA, Lucid Energy, and Oregon BEST. Dr. Niemeyer received his PhD in mechanical engineering from Case Western Reserve University in 2013.

Melissa Santala researches the role of surfaces and interfaces in the morphological and phase stability of nanostructured materials, the kinetics of phase transformations, and has extensive experience in the application of transmission electron microscopy to problems in materials science, including aberration-corrected and photo-emission transmission electron microscopy. Dr. Santala was a research scientist at the Lawrence Livermore National Laboratory, Materials Science Division prior to joining the school. She received her PhD in materials science & engineering from the University of California, Berkeley, in 2009, where she studied under a graduate research fellowship from the National Science Foundation.

Xinhui Zhu’s research centers around three themes: 1) occupational safety, 2) usability of products and environments across diverse user populations, and 3) development of new assessment tools to assist with data collection in ergonomics studies. Her research areas include human factors/ergonomics in health care and forestry industries, and office ergonomics. Dr. Zhu received her PhD in industrial engineering from University at Buffalo, SUNY.
The School of Mechanical, Industrial, and Manufacturing Engineering is pleased to announce that David Cann, professor of mechanical engineering, has been selected to serve as interim school head.

Cann joined Oregon State in 2005, and has served as the associate school head for graduate education and research since 2008.

Cann in his decade of service to Oregon State has developed relationships with key committees and individuals throughout OSU, industrial sponsors, and other stakeholders.

Cann earned his PhD in Materials at Penn State, and his current research activities involve energy capacitors and lead-free piezoelectric materials. He is affiliated with the interdisciplinary Materials Science Graduate Program at Oregon State.

Cann will step down from his position as associate school head for graduate education in order to focus on maintaining the School of MIME’s momentum and preparing the conditions to ensure the success of the permanent school head.

The College of Engineering is conducting a national recruitment to find the next leader for the school after Professor Rob Stone announced his plan to step down from this position.

Stone returns to his tenured position as a professor of mechanical engineering and co-director of the NSF Center for e-Design after more than four years leading the school.

During his time as head, the School of MIME has seen strong growth of the student body, programs and faculty as well as improvements to facilities.

We are all grateful for Dr. Stone’s service, and look forward to the next challenges and advancements that the MIME community will make with Dr. Cann.

GROWTH CONTINUES: GRAD SCHOOL TOPS 300, UNDERGRAD-rounds up to 2,000, AND PRO-SCHOOL BOOSTED BY NEW GPA

We’ve done it again — and hit a high point for fall student enrollment for yet another year. We welcomed 72 new incoming graduate students in 2015-16, creating a busy evening (at right) for our distinguished faculty flipping burgers for the now more than 330-strong MIME grad school at the annual Grad Welcome Barbeque!

At the undergrad level, the fall 2015 pro-school has 675 students, up impressively last year’s count of 264 students.

This tremendous growth stems from the implementation of a unified GPA standard and increased opportunities for students to apply to pro-school.

Currently, our total undergraduate head count is an impressive 1,901.

Other interesting growth — robotics enrollment has doubled since fall 2014 when the degree program was added, and our new online MEng in Engineering Management has made an impressive benchmark in one year: with 18 students enrolled, it is almost at par with our IE MEng students on campus (21 enrolled).

The 2015 graduating class earned 297 degrees in June. This included 159 BS ME, 46 BS IE, 7 BS MfgE, and 15 BS ESE degrees awarded. Eleven students earned PhDs; 28 students earned MS degrees, and 16 earned MEng degrees.

GRAF HALL – NEARING THE VISION

A summer facelift has brought us many steps closer to the vision for our world-class Robotics hub. Improvements include offices built along the south wall, and a new staircase at the northeast end. Additional infrastructure upgrades are in the pipeline ... stay tuned!
ALUMNI UPDATES

Dr. Douglas L. Van Bossuyt
HBS ME, HBA ME 2007; PhD ME 2012
Assistant Professor of Mechanical Engineering
Colorado School of Mines

Dr. Douglas L. Van Bossuyt – 2007 HBS ME, HBA ME (international degree program); MS ME 2009; PhD ME 2012 – is entering his third year as an assistant professor at the Colorado School of Mines seated in the mechanical engineering department and working with the Nuclear Science and Engineering Program and Center for Space Resources.

He focuses primarily on early conceptual complex system design methodological development for the assessment of risk and reliability information and secondarily focuses on additive manufacturing process control with the eventual goal of producing a design tool to aid engineers in designing parts that behave as intended.

Dr. Van Bossuyt received the Nuclear Regulatory Commission Faculty Development Grant in 2014 and has worked to develop a laboratory to support his research spanning the aerospace, nuclear, and robotics domains.

Recently, Dr. Van Bossuyt and his research group authored five papers at the 2015 ASME IDETC/CIE conferences.


Sarah Oman Developing Design Curriculum, Supervising Capstone Projects
Dr. Sarah Oman, PhD ME 2012, is currently teaching mechanical engineering design courses at Northern Arizona University in Flagstaff, Arizona. Oman was hired on to develop a brand new course for sophomore design practices and to supervise senior Capstone Design projects.

Hoda Mehrpouyan Joins Computer Science Faculty at Columbus State
Dr. Hoda Mehrpouyan, PhD ME 2014, has joined the Columbus State University’s computer science faculty as an assistant professor. At Oregon State, Mehrpouyan’s PhD advisor was Prof. Irem Tumer, and her dissertation research addressed assessment and improvement of the resilience of complex engineered systems during the early design process.

William MacNeill Publishes Research in “Scientific Reports”
William MacNeill, MS ME 2015, has published as the first author “On the self-damping nature of densification in photonic sintering of nanoparticles,” in Scientific Reports’ October 2015 issue. MacNeil, advised by Dr. Rajiv Malhotra while at School of MIME, published the paper with chemical engineering faculty and researchers Chang–Ho Choi, Chih–Hung Chang as well as Malhotra.

Dr. Joseph Piacenza
MS ME 2012, PhD 2014
Assistant Professor of Mechanical Engineering
Cal State Fullerton

Dr. Joseph Piacenza, MS ME 2012, PhD 2014, reports that he has joined the faculty at Cal State Fullerton. Dr Piacenza is an assistant professor of mechanical engineering in the College of Engineering & Computer Science. At Oregon State, Piacenza, advised by Prof. Irem Tumer, presented “Design of Robust Infrastructure Systems Incorporating User Behavior.”

Please send us a note and let us know what’s new in your career and your life — use our convenient online update form (don’t forget to send a photo), or just email us.
The winners of the 2014-2015 School of MIME Excellence Awards were announced at the fall graduate student welcome picnic and received a plaque made in the Machining Product & Realization Lab. Industrial engineering recognizes Amin Mirkouei (top photo) as its Outstanding Graduate Teaching Assistant and Ian Garretson as its Outstanding Graduate Research Assistant. Mechanical engineering recognizes Chaitanya Ghodke as its Outstanding GRA (above left).

To address our concerns and intention of improving the diversity, we have joined an NSF-funded project called TECAD (Transforming Engineering Culture to Advance Inclusion and Diversity) which aims to increase diversity in mechanical engineering programs. OSU is one of just five universities selected for the project.

Our team, called DIV/MIME, is led by Professor Kendra Sharp and includes Associate Professor Brady Gibbons (who is also the associate head for undergraduate programs), Associate Professor Karl Haapala, Ellen Momsen, director, College of Engineering’s Women and Minorities Engineering Program, and Professor Rob Stone.

Change efforts the team has put in place this year include a curriculum expansion, which added a discussion on how to advance inclusion and diversity in engineering disciplines. DIV/MIME visited MIME 101 classes, the required intro course for first-year engineering students, to lead a diversity and implicit bias workshop and introduce the school’s goals for diversity and inclusion.

The reaction of students was quite powerful and in most cases positive. However, some students expressed frustration that class time was being spent on a topic that is not perceived as central to their engineering education. The students also indicated that the workshop would feel more relevant if it included a perspective from industry on what challenges engineers face (or whether they do, in fact, face them) when working with diverse stakeholders, or on diverse project teams.

Can you help? We are asking that you share your narrative from the workplace. Please write to us -- info_MIME@oregonstate.edu -- with stories of how you encounter issues of diversity in the engineering profession.

GrADUate students receive MIME Excellence Awards at Annual Fall Welcome picnic

The winners of the 2014-2015 School of MIME Excellence Awards were announced at the fall graduate student welcome picnic and received a plaque made in the Machining Product & Realization Lab. Industrial engineering recognizes Amin Mirkouei (top photo) as its Outstanding Graduate Teaching Assistant and Ian Garretson as its Outstanding Graduate Research Assistant. Mechanical engineering recognizes Chaitanya Ghodke as its Outstanding GRA (above left).

Process Improvement Group Earns Recognition at International Event

Three MIME students, Waleed Mirdad (PhD student), Joshua Hille (MS candidate) and Jeremy Melamed (BS candidate), from the Process Improvement Group (PIGroup), advised by Dr. Chinweike Eseonu, earned the Merl Baker Award for third best student paper at the International Annual Convention of the American Society for Engineering Management (ASEM). With their collaboration, “Pyramid of Mentorship,” the students developed a preliminary model to improve our understanding of change management at the individual (or micro-) level.

The PIGroup students are finalizing a journal paper with Dr. Eseonu in the next step to solve this persistent problem in lean process improvement research and practice. They hope to develop a decision support system for splitting the cash award.

( Photo l to r: Waleed Mirdad, Joshua Hille)
NSF FELLOWS HAVE AMBITIOUS AIMS FOR ROBOTS, FIRE

Two MIME students were selected by the National Science Foundation Graduate Research Fellowships program for fully funded graduate studies this year. The prestigious award reaches only about 2,000 of the most outstanding graduate students in science, technology, engineering, and mathematics disciplines from accredited U.S. institutions.

Our winners, Aaron Fillo, advised by Dr. David Blunck, and Andy Abate, coadvised by Dr. Jonathan Hurst and Dr. Ross Hatton, are pursuing cutting-edge research in thermal-fluid sciences and robotics, respectively.

For Fillo, an Eagle Scout’s sensibilities about playing with fire have developed into a project that looks anew at the physics behind the turbulent flame speed of large hydrocarbon fuels, and his work is already attracting the interest of transportation industry stalwarts.

For Abate, designing a new agile, bipedal robot, improving his previous work on the Dynamic Robotics Lab’s ATRIAS, has the long-term potential to transform the multi-million dollar research platform into a fully mobile robotic scout, costing as much as a family car, and fitting into a typical backpack.

Abate’s next-generation robot design goals are twofold—to improve energy efficiency and to dramatically increase mobility and speed. “If we want rescue robots to climb ladders and duck under debris in fallen buildings, we’ll need more sophisticated leg designs.” Abate said.

He plans to create a new design, incorporating his research in compliance and actuation. ATRIAS’s success at running has been based on symmetry and simplicity of design, but the more complex designs will require this advanced research.

“ATRIAS had two springy joints per leg, and those springs were easy to tune because of the leg symmetry. When we start having three or four different links in an articulated leg design, we have to fine-tune the springs so that the joints naturally work together in a way which is good for locomotion,” he said.

Abate is also designing custom, lightweight, and sturdy transmissions for the joints based on cycloid geometry: a concept currently used in aerospace and heavy industry. This design is expected to dramatically increase the efficiency of the new robot over that of ATRIAS.

Fillo’s research on the turbulent flame speed of liquid jet fuels comes as global dependence on hydrocarbon fuel remains high and interest in energy conservation and fossil-fuel alternatives gains traction. He cites U.S. consumption data at 18.49 million barrels of oil a day, of which 70 percent is used in transportation.

“Despite decades of common use, the turbulent combustion of these fuels in modern internal combustion and gas turbine engines is poorly understood. This inability to predict combustion performance can result in hundreds of millions of dollars in losses in certification and development of new engines,” Fillo said.

Fillo expects that his research will provide turbulent combustion data needed to improve the industry’s understanding and approach jet engine design and analysis.

And looking forward, Fillo sees great potential to improve our understanding of alternative jet fuels.

“My research has the potential to generate a new, affordable methodology for evaluating alternative fuels enabling reduced fossil fuel dependence and lowering emissions,” he said.

SUPPORTING MIME EXCELLENCE WILL HELP US CONTINUE TO ACHIEVE GREAT THINGS

The School of MIME continues to rely on your support for our ongoing success. Please consider making a donation to support our student-centered priorities. To help out, please contact David.Cann@oregonstate.edu, or make an online donation to the MIME Excellence Fund.