

A MESSAGE FROM THE CHAIR, JAMES MILKE

This last year of remote classes and telework was challenging for everyone. We're all looking forward to resuming in-person classes in the fall!

We're hiring! FPE has on ongoing search for a junior faculty member. Please help to distribute the news of the opportunity, or consider applying!

The 6th Annual FPE Design Challenge (FPEDC) - a competition that involves creative designs of detection and suppression systems for a small-scale, two-room house - was held this last year with the final 'Burn Day' held April 12. Team "If You Can Stand The Heat" from Elizabeth Seton High School won the 2020/2021 FPEDC. And we appreciate ADT Commercial for their sponsorship!

This fall, we're projecting 9 students will join us as first year students, although twice that number were offered admission. The majority of students who decline the UMD offer of admission is primarily due to lack of scholarship support. While FPE has an appreciable number of scholarships, most are limited to juniors and seniors, a stipulation set up years ago. The Chair's Discretionary fund has been used to offer 2 scholarships to entering students, both of whom accepted our offer of admission. This fund also helps with recruiting activities and hiring of summer interns. If you'd like to give to this fund, please contact Kyle Zeller (kzeller@umd.edu). Thank you!

FIRED UP OVER INEQUITIES: FPE PARTNERS WITH KINDLING

In Cape Town, South Africa, a 2017 fire in an informal settlement damaged 2,194 houses, leaving at least four dead and 9,700 homeless. In Dhaka, Bangladesh, over 80 people died when a massive blaze swept through a historic district of the capital in 2019.

While devastating fires are not limited to the developing world, as violent wildfires on the U.S. West Coast demonstrate, the human cost of fire disproportionately impacts poorer countries, where factors such as overloaded power utilities, dense urban settlements, and open-fire cooking contribute to 95% of the world's total fire-related deaths and injuries, with fatality rates nearly six times higher than in developed countries.

A team of six UMD undergraduates led by Professor James Milke, chair of the Department of Fire Protection Engineering at the University of Maryland's A. James Clark School of Engineering, recently delved into the factors that cause fire safety inequities around the world to help propose solutions.

"We wanted to collect information to see what could become viable solutions," Milke said. "The common denominator or characteristic in the developing world that causes the inequality is the challenging economic conditions. Investing in fire safety is very much an afterthought."

The group examined fire safety measures in workplaces and informal settlements where millions of people live in slum conditions in South Africa, Bangladesh, and Puerto Rico.

Students partnered with Kindling, a Massachusetts-based nonprofit that aims to reduce the impacts of fire on people living in informal settlements, displaced persons camps, and emerging cities generally.

Danielle Antonellis. executive director of the nonprofit, supplied the team with data and literature to help them conduct research. The partnership is expected to be the beginning of a long-term relationship between the Department of Fire Protection Engineering and Kindling Safety to develop equitable solutions to tackle fire safety in development and humanitarian settings around the world, particularly in informal settlements, where fires can spread rather guickly. **Continue reading** here...

FPE STUDENTS WEIGH IN ON THE LAST YEAR

Students around the globe have been profoundly destabilized by COVID-19. Much of the data collected over the last year shows that university students have faced increased levels of anxiety, depression and financial stress, often followed by substance abuse. All the more reason for our FPE faculty and staff members to check in regularly with students to ensure our tight-knit community remains that way.

Shuvam Roy, an FPE Undergraduate Student in the BS/MS program, was just starting his junior year courses when COVID hit.

"At first, it was difficult not having any interaction with my new cohort --no experience of walking down the halls with fellow students to class, no in-person bonding with the professors," Roy said. "Still, we made the most of it and tried to interact as much as possible."

Roy said one of the major complaints he's heard from friends in other majors was that the professors were often unwilling to work with the students, to give them extra time to complete assignments, or offer additional help when needed. The stress was intense.

"That wasn't the case with FPE," he said. "The professors, who must have been equally as frustrated at times, were very considerate and so willing to offer additional help where needed, give extensions on complex assignments, and offer graded projects instead of exams."

He continued: "Last summer nearly killed me -- the course load was tough -- but my advisor Nicole Hollywood did everything in her power to help me through the process and prepare for the next part of my program."

Currently the plan is to return to the classroom in the fall, but if we go back into lock-down mode, Roy has some words of advice for other students: "Communication is key - reach out to other students and faculty as much as you can, take good notes and hang on to them because you will need them in future courses."

FPE GRAD STUDENT SHAHEER AHMAD RECEIVES 2021 UL FSRI FELLOWSHIP

__Shaheer Ahmad, a graduate student in the UMD Department of Fire Protection Engineering, is the 2021 recipient of the UL Firefighter Safety Research Institute (FSRI) Graduate Fellowship.

Ahmad received his bachelor's degree in fire protection engineering from UMD in May, 2021. He will begin his master's degree program in fire protection engineering in the fall, while conducting research that will contribute both to UL FSRI and his thesis. Advised by FPE Chair, Jim Milke, Ahmad's research focus will be on firefighter PPE.

During his tenure, Ahmad has served as an FPE Ambassador and volunteered as a research assistant in the FPE labs. Coming into Maryland, however, he did not plan to pursue a career in fire protection.

"Switching into fire protection engineering was a leap of faith for me," said Ahmad. "I didn't know much about the field, but what truly stood out to me was the direct impact that this field has on society and the uniqueness of the topics we study. Looking back at it now, switching into this program was the



best decision I ever made."

He continued: "I sought out the UL FSRI fellowship because the research the organization conducts not only protects civilians, but front-line firefighters as well. Fire is a concept that has both plagued and revolutionized mankind for generations -- I want to use the fire safety knowledge I've gained to give back and ensure our communities are safe from the thermal hazards of this world."

The Fellowship, established in 2017, supports an FPE GRA and will be renewed each semester provided the Fellow remains in good academic standing. Learn more....

STUDENT HONORS & AWARDS

Bryce Bathras received the NFPA Ambassador Award for going above and beyond to promote the major as an FPE Ambassador. **Thomas Roche** received the R.J. Taylor Academic Achievement Award offered by the Salamander Honor Society to the FPE Junior with the highest GPA. **Shuvam Roy** received the SFPE Outstanding Senior Award offered to the FPE Senior with the highest GPA. **Colleen Whitcomb** received the FPE Chair's Award for her significant contribution to the Department mission via service and leadership. **Follow this** **link** to watch a recording of the (virtual) 2021 Honors and Awards Ceremony hosted by the Clark School.

Rui Xu, a mechanical engineering Ph.D. student advised by Arnaud Trouve, received an Ann G. Wylie Dissertation Fellowship offered by the UMD Graduate School. Learn more...

Mahdi Tlemsani and Genevieve Tan are both recipients of the J.L. Bryan GRA Award for the 2021/2022 academic year. Learn more...

FPE DISTINGUISHED ALUMNI: 2021 INDUCTEES



Marshall and Underwriters Laboratories (UL).

"I am deeply honored and humbled to be so recognized and elected by my fellow FPE alumni, many of whom I have worked with, learned from and greatly respected for the contributions they have made to the profession and greater society," Bender said. "I certainly wish to thank the nominating committee of the Alumni Association for their vote of confidence, as well as all FPE alumni and faculty who guided me, and provided the environment and support in a career that I truly loved. I also sincerely thank my entire family for all of their love and support over the years. I hope to continue promoting the value and personal rewards of the FPE profession to the younger generation and society as best I can."

John Bender (left), who completed his bachelor's degree in 1969, retired after

44+ years as a registered Professional Fire

Protection Engineer in the private sector

as well as state government, including the

State of Maryland Office of the State Fire

Joseph Jardin (right) completed his bachelor of science degree in 1983. Currently, Jardin is the New York City Fire Department Chief of Fire Prevention.

"I was surprised and a bit overwhelmed to learn of my selection as



a Class of 2021 Distinguished Alumni," said Jardin. "I'm honored to be recognized as a part of a truly prominent group of FPEs. My career has benefited from mentoring with and working alongside a number of talented alumni including several recognized as distinguished alumni. I was especially fortunate to both learn from and teach with Prof. Bryan as well as benefit from his sage wisdom. Prof's advice was

influential in my desire to merge my affinity for the fire service with my FPE education."

Amy Murdock (right) completed her bachelor's degree in 1998 and is currently a Principal at Code Consultants, Inc., a member of the FPE Board of Visitors (BOV), and the originator of the FPE Diversity and Inclusion Scholarship.

"I'm honored to be considered an UMD FPE Distinguished Alumni," Murdock said. "I am truly blessed by support from my family, FPE past and present staff, UMD FPE grads, colleagues at CCI, and so many other people. Fire protection engineering is a profession where my life-safety and my fire-protection knowledge makes a silent, yet impactful difference in this world. I look forward to the future of our profession, the growth of the UMD FPE program, mentoring young engineers, and expanding the great CCI team!"

Congratulations to these distinguished alumni and many thanks for all that you do!

FPE FACULTY MEMBERS: UPDATES

James Milke (FPE Professor and Chair), Jessica Doermann (M.S. '19, Arup), and Erica Kuligowski (M.S. '03, RMIT Unversity) have won the 2021 Harmathy Award for best paper in the journal, *Fire Technology*.

Their paper, entitled, "From Social Science Research to Engineering Practice: Development of a Short Message Creation Tool for Wildfire Emergencies," was published in Springer last year and discusses the more efficient creation of messages during imminent threat emergencies with a focus on wildfires.

The Tibor Z. Harmathy Award is presented annually to the team with the best Fire Technology paper and includes a cash prize of \$1,000 from Springer. The Department recently held two celebrations in recognition of the retirements of Professors Marino diMarzo and Andre Marshall. Marino joined the department in 2001 as the Chair and served in that capacity for a decade. During his time as Chair, the department expanded research activities, initiated the distance graduate program and moved into a new space, which he designed. Marino is planning to split his time between Maryland and Italy, and indulge his love of sailing. Andre also joined the department in 2001 and led the research effort to develop the innovative 4S apparatus used to characterize water sprays. Andre started his new position as Vice President of Research at George Mason University earlier this summer.

UNUSUAL FLAMES DISCOVERED ABOARD THE INTERNATIONAL SPACE STATION

A discovery has been made in Earth's orbit – steady (Washington spherical cool diffusion flames. Measurements in these flames could help improve engines of the future. (University of the NSF, NASA

Most experts expected it would be easy to obtain cool diffusion flames burning gases in microgravity, but researchers have found this is not the case. Between January and June, 2021, they burned over 150 hot diffusion flames aboard the International Space Station (ISS), some for as long as 3 minutes, yet none transitioned from hot to cool burning after extinguishing.

(Washington University) and Forman Williams (University of California, San Diego), and supported by the NSF, NASA and CASIS.

"These flames have several favorable characteristics that have never before been combined," Sunderland said. "They have known, controlled and steady flow rates. They are self-sustaining without heated reactants or exotic oxidizers. Their reaction zones are thick (on the order of 6 mm), which facilitates measurements and simulations. The fuel is the light and gaseous *n*-butane,

On June 23, with a slight change in conditions, Minhveng Kim -- a University Maryland of (UMD) Fire Protection Engineering (FPE) Graduate Student noticed something



like the contents of most cigarette lighters."

Cool flames burn at 600 - 1000 K, far cooler than the 1100 - 2200 K of typical hot flames. Cool diffusion flames. discovered in 2012 liauid fuel using droplets (also aboard the ISS), were recently created in normal gravity using heated

unusual in three of the tests: after the hot flames extinguished and disappeared in the camera view, heat was still being produced. The fuel was *n*-butane diluted with nitrogen and the oxidizer was 40% oxygen in nitrogen. The pressure was 2 atm.

The flames were so dim that even the most sensitive camera available for the tests initially revealed nothing.

Then, Kendyl Waddell -- a mechanical engineering student, advised by FPE Professor, **Peter Sunderland** -- enhanced the video feed to reveal astounding behavior. After the hot flame extinguished and all reactions ceased, residual heat in the porous burner re-ignited the flowing fuel as a steady spherical cool diffusion flame (see image above).

The experiments were performed as part of the Cool Flames Investigation with Gases (CFI-G) project -- led by Peter Sunderland (UMD FPE), Richard Axelbaum

air and usually with liquid fuels and exotic oxidizers.

This phenomenon has already generated tremendous interest in the combustion researcher community. The goal is to generate a comprehensive understanding of cool flame chemistry that will enable cleaner and more efficient engines and burners, as well as improved fire safety. Email Dr. Sunderland for more information.

