This spring we celebrate our newest alumni achieving one PhD, three master’s degrees, and eight bachelor’s degrees supported by programs at the UAH Propulsion Research Center. New graduates, as you continue your studies or enter the workforce, take pride in all of our UAH alumni who have gone before you to establish an excellent reputation for the PRC. Also, take a moment to express your appreciation to the people who have provided outstanding mentorship and opportunities for you to build relationships, gain an exceptional education, and participate in cutting-edge research projects. Remember that our most important community value is to “Keep our relationships more important than tasks or problems (or winning).” We wish all the graduates a successful and enjoyable future. Call on us in the future. We look forward to hearing from you.

Dr. Robert A. Frederick, Jr.
Director, UAH Propulsion Research Center
Professor of Mechanical and Aerospace Engineering
Huntsville AL, April 27, 2023
Spring 2023
PRC Graduate Recognition Program
Group Photo/Welcome
Lunch
Special Recognitions

Recognition of Graduates
Ph.D. Student, Master’s Students, and Undergraduate Students

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New Staff Recognition

Dr. Yunping Zhang joins the Mechanical & Aerospace Engineering Department as an Postdoctoral Research Assistant. She received a B.E. in Aircraft Design and Engineering from Beihang University (2013), a M.S. (2016) and a Ph.D (2022) in Aeronautics and Astronautics Engineering from Purdue University. Her graduate research focused on development of a robust ignitor subsystem utilizing vacuum surface flashover for CubeSats electric propulsion systems. She has worked with electrostatic accelerators and hall thrusters and plasma diagnostic methods including microwave interferometry, Rayleigh microwave scattering, optical emission spectroscopy and Langmuir probe for various plasma sources. Dr. Zhang’s current research interests focus on the plasma-jet magneto-inertial fusion approach to breakeven nuclear fusion, which involves high energy density laser-produced plasmas, plasma magnetization, high-velocity plasma jets and its interaction with magnetized laser plasma. Her advisor, Dr. Xu welcomes Dr. Zhang to UAH and the PRC, and looks forward to working with her and helping her advance in her career.
# Service Anniversary Recognitions

**Gabriele Cromartie** is recognized for ten years of service at the University of Alabama in Huntsville. Gaby started her UAH career at the College of Business and then served as a Staff Assistant at the Civil and Environmental Engineering Department. She joined the Propulsion Research Center in May 2018 as the Program Coordinator. Gaby says, “I enjoy working with a variety of people and take pride in mentoring students.” Dr. Frederick said, “We are extremely pleased to have Gaby with us. She promotes a sense of community through organizing our anniversary celebrations, social events, and corresponding with alumni. She is organized in handling business, thoughtful, and has excellent rapport with others.”

**Anthony Edmondson** is recognized for 15 years of Service at the University of Alabama in Huntsville. Anthony joined the PRC as a Research Coordinator after moving from the University of Texas at Austin. In 2015, he completed his MBA at UAH while working full-time at the PRC. He was then promoted to PRC Program Administrator. Anthony said, “There is never a dull moment at the PRC. I also like how we value our relationships with each other at the PRC.” Dr. Frederick said, “Anthony is very diligent in all of his work and keeps all of our financial world in good order. I admire how he continues to expand his skills as an officer in the Society of Research Administrators International. I have absolute confidence in his work and trust in his good judgment for all our financial operations.”

**Tony Hall** is recognized for 20 years of service at the University of Alabama in Huntsville. Tony received his BSME in Mechanical Engineering in 2005. Tony has been a key contributor in establishing our test capabilities including: the construction of the Rocket Test Facility and various propellant feed systems. Tony said, “I have enjoyed interacting with the students over the years and hope to continue advancing the PRC as a world-class research center.” Dr. Frederick said, “Tony is a key player in keeping all of our facilities and equipment in order. Most importantly, he watches over the students and keeps them in a safe environment as they learn the ins and outs of propulsion testing.”

**Dr. Keith Hollingsworth** is recognized for 12 years of service as the Chair of the Department of Mechanical and Aerospace Engineering at the University of Alabama in Huntsville. Keith’s leadership has promoted the academic excellence and growth of the MAE Department. He has fostered the success of the students and faculty who work at the Propulsion Research Center. The MAE undergraduate enrollment has doubled under his leadership. Dr. Robert Frederick remarked that, “Keith is a very wise and thoughtful leader who has cared well for the students, faculty, and staff of the MAE Department. Keith was made for his leadership position and we are proud to have him as our chair. He is also an excellent teacher, researcher and student mentor. We congratulate him for 12 years of excellent service as MAE department chair, and look forward to his future contributions to PRC research and UAH.”
Recognition of Doctoral Graduates

Dr. Hallie Collopy is receiving a PhD degree in Mechanical Engineering. Hallie completed her dissertation which is titled, “EFFECTS OF PRESSURE SIDE FILM COOLING HOLE PLACEMENT AND CONFIGURATION ON SURFACE HEAT TRANSFER CHARACTERISTICS OF A TRANSONIC TURBINE SQUEALER BLADE TIP.” Her research was innovative and unique as it involved new knowledge and understanding of novel film cooling configurations for improved thermal protection of the tip of a transonic turbine blade with a squealer recess and rim. Hallie is co-author of 8 archival journal publications, in addition to 2 other papers recently accepted for archival journal publication. She is also first author on one book chapter and two conference publications, including an invited plenary keynote paper which was presented under the invitation of the National Committee on Heat and Mass transfer of the Russian Academy of Sciences. Hallie remembered, “I am so glad that I had the opportunity to get involved with the PRC when I started my Master’s with Dr. Phillip Ligrani as my advisor. Dr. Phillip Ligrani has really helped me grow as a researcher.” She pointed out, “I have been extraordinarily lucky to have such a terrific team and first-rate support from the PRC. I really appreciate Dr. Dave Lineberry and Tony Hall because they are always so generous with their time and knowledge to help me and my team with our research project.” According to her advisor, Dr. Phillip Ligrani, “Hallie's research results have provided important knowledge advancements of thermal transport phenomena in transonic flows. Her work is not only currently being used for improved designs of gas turbine engine components, but is already becoming widely cited in the archival literature.”

**Dr. Collopy received a tentative offer from NASA MSFC in Huntsville, Alabama to work with turbomachinery components for rocket engines.**

Recognition of Master’s Students

Kyle Goethals is receiving a Master's degree in Aerospace Systems Engineering. He completed a non-thesis degree under his advisor Dr. Phillip Ligrani. Kyle stated, “I was involved in research that investigated the unsteadiness affiliated with a normal shock wave and a lambda foot.” He also stated that he met Dr. Ligrani in his undergraduate Thermodynamics I class and then became an undergraduate research assistant for him later that semester. He said, “I really appreciate the opportunity that Dr. Ligrani gave me. I would also like to thank Dr. Lineberry for all of the knowledge I gained from him during the Senior Rocket Design course.”

**Dr. Phil Ligrani, his advisor** said, “Kyle made some nice contributions to the overall research effort related to the quantification and understanding of the sources and development of unsteadiness associated with normal shock waves.”

**Kyle Goethals is currently working at Dynetics as a Flight Modeling and Simulation Analyst.**
Joseph Agnew is receiving a Master's degree in Mechanical Engineering in the summer of 2023. Joseph's thesis is entitled "Design of a High Altitude Simulation Apparatus for the UAH Solid Fuel Ramjet." He designed and fabricated a modular eductor system for the solid fuel ramjet. The device characterizes high altitude ignition. Joseph supported solid, liquid, and hybrid engine tests, torpedo research, and the USLI 2019-2020 team. Joseph recalled, "I contacted Dr. Cassibry about possible hands-on research opportunities at UAH my Freshman year because I wanted to learn how to actually apply what I was going to learn in school. "I really appreciate all those at the PRC who have been mentors for me and assisted me in research and growing as a person and a professional. Specifically Dr. Frederick, Dr. Lineberry, Dr. Cassibry, Tony Hall, and everyone else who has played a role. The PRC very much provides an avenue for developing strong professional relationships in a learning environment and allows students room to grow into the best versions of themselves.”

Dr. Robert Frederick, his advisor, said, “Joseph has done a phenomenal job designing a complex propulsion experiment and has become a very skilled test engineer on a wide variety of applications. He is also the honorary director of the fictional "PRC Warp Drive Laboratory." If you have a job that requires attentiveness to detail and determination to finish, Joseph is the perfect person for the job.”

Joseph Agnew plans to continue at the JRC this summer to finalize designs for an ejector upgrade to his thesis project, and then pursue his career in Mechanical Engineering in the Defense Industry.

Spencer Christian is receiving his Bachelor of Science degree in Aerospace Engineering. He explained, “I served as the project manager of Charger Rocket Works, and lead for the PRC’s white fuming nitric acid test and safety planning.” Christian added, “I developed a fluid system for white fuming nitric acid along with all of the safety considerations. I am the project manager for Charger Rocket Works; responsible for leading the team through the 22-23 NASA University Student Launch Initiative challenge, which we finished with a high degree of success.” “I got involved with the PRC through Space Hardware Club, where I led a student team focused on building and testing a liquid bipropellant rocket engine.” Christian said, “I most appreciate the staff in general at the PRC, especially Dr. David Lineberry, as they are very willing to step into a mentorship position and provide knowledge without being negative or discouraging. The PRC is really a dream come true for any UAH student interested in propulsion, and this is all due to the hard work of the staff to maintain the facility and its culture of engineering excellence.”

Dr. David Lineberry, his mentor, said, “I have appreciated Spencer’s attention to detail and thoroughness. His genuine enthusiasm for rocketry and propulsion is evident in the way he approaches problems and follows through on tasks.”

Spencer plans to find a full-time job in a propulsion-related field, and then return to graduate school after establishing a career in order to bolster his knowledge of advanced engineering topics.
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<th>Name</th>
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<td>Jackson Miles</td>
<td>Bachelor of Science in Aerospace</td>
<td>His research involved the exploration of triboelectric generators for small scale power generation and energy harvesting. Jackson remembered, “I got involved with the PRC through Dr. Gang Wang’s research group when he advertised a position in my Aerospace Structures class. That research role was my first technical job, and it was a great learning experience.” He pointed out, “I really appreciated the people I worked with, and had fun learning about a completely new technical subject.” Dr. Gang Wang, advisor. Jackson plans to continue in his current role as an Aerospace Engineer at Dynetics, and pursue a Master’s degree in the near future.</td>
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<td>Matthew Maybee</td>
<td>Bachelor of Science in Aerospace</td>
<td>He assisted Dr. Bennewitz in fundamental droplet combustion experiments and participated in the SLI Senior Design. He designed and characterized a droplet generator for use in a fundamental combustion experiment campaign at Argonne National Labs. He remembered, “I got connected with the PRC by emailing Dr. Bennewitz.” Matthew said, “I appreciate Dr. Lineberry’s patience and assistance throughout Senior Design. Great thanks to Tony for helping me replace my alternator.” Dr. Bennewitz, his mentor, said, “Matthew has played an important role in ensuring the droplet-detonation interaction study at Argonne National Laboratory was a success through both the preliminary testing we performed at UAH, as well as on site data collection at Argonne. I look forward to Matthew continuing his academic career in the fall as a graduate student in our research group.” Matthew is planning to go to graduate school at UAH.</td>
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<td>Samuel Morrison</td>
<td>Bachelor of Science in Physics</td>
<td>He explained, “my job as a research assistant is to support the research and testing being done at the PRC.” He added, “During my time at the PRC, I supported solid fuel ramjet testing, worked on the CNTP project, provided machinist services, and supported a number of other projects from the research faculty. I also supported projects with outside customers such as Torch, Northrop Grumman, and the US Army.” He remembered, “I knew Dr. Frederick from prior to my time at the PRC. I happened to catch him at his favorite gas station and asked if he was hiring. He was and offered me a job sometime later.” “I appreciate Dr. Frederick for his insights on the field of propulsion and his down to earth demeanor. It is rare to have a boss at work that you can casually talk to or play in a jazz band with.” Dr. Robert Frederick, his mentor, said, “Sam has a wide range of skills ranging machine shop, fundamental physics, engineering, hardware design, and music. He is a pleasure to work with and provided hands-on support to our research teams on several programs. Also, Sam’s father took propulsion from me over 20 years ago.” Sam plans to attend the University of Tennessee in Knoxville to pursue a master’s degree in Nuclear engineering.</td>
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Jayashree Paudel is receiving her Bachelor of Science degree in Aerospace Engineering. Her research involved the study of laser produced plasmas in magnetic fields. Jayashree remembered, “I got involved with the PRC by reaching out to Dr. Xu for a research opportunity as well as later by joining the UAH SLI team.” She pointed out, “I really appreciate Dr. Xu, Mr. Zachary White, and Dr. Lineberry for their guidance and assistance throughout my experience at the PRC.”

Dr. Gabe Xu, her undergrad research advisor, said “Jaya was a wonderful student to have in the lab. She did research with us for over a year assisting with an experiment to study laser produced plasmas in magnetic fields for future application to pulsed fusion propulsion. Her work was presented at the 2022 AIAA regional student conference, and the 2022 International Electric Propulsion Conference. I know she will excel in whatever she does and wish her all the best in her career.” Jayashree plans to find a full-time job in Aerospace/Mechanical engineering field and later pursue a graduate degree in the same field.

David Tutunzhiuis receiving his Bachelor of Science degree in Aerospace Engineering. He said, “I have fabricated parts for the controllable solids and NTP project as an undergraduate research assistant to support their test campaigns. I have provided support work in the lab for reviewing SOPs, conducting experiments in the test cell, and adding to the research infrastructure.” David explained, “I got in direct contact with Dr. Frederick to see if there were any opportunities to get involved with real research being done in propulsion.” He added, “One aspect I most appreciate is the collaborative and helpful atmosphere between the differing projects and research. It exposed me to more ongoing research than I would have been otherwise and to get more viewpoints on problems I was facing when looking for solutions.”

Dr. Frederick, his mentor, said, “David has faithfully supported our research teams by fabricating critical hardware and supporting test operations. He works well with others and has a genuine passion for engineering. He is a talented musician and directed the PRC Stage Band on its Nursing School (Spoonful of Sugar) Concert Series last year.”

David plans to continue as a master’s student here in Aerospace Systems.

Riley Kirby is receiving her Bachelor of Science degree in Mechanical Engineering.

Dr. Phil Ligrani, her advisor, said that “Our lab groups much enjoyed working with Riley, as she was involved in investigations of surface heat transfer characteristics of transonic turbine blade tips with film cooling.”

Mario Georgiou is receiving his Bachelor of Science degree in Aerospace Engineering.

Dr. Phil Ligrani, his advisor, said that “Mario helped us to advance our efforts in investigating elastic flow instabilities and elastic turbulence, through his efforts related to the determination of rheological properties of polyacrylamide solutions.”

The Women In Defence Tennessee Valley Chapter presented $1,5000 Cash Scholarships to UAH Graduate Students Amber Sleeis, Michaela Hemming, and Paige Berg at a Spring Scholarship Tea during a garden party at Annabella at Cedar Glen. The WID-TVC scholarship program is designed to provide financial assistance to further the educational objectives of women who are U.S. citizens planning careers or employed in defense or national security areas. All three students support hypersonic propulsion research programs.