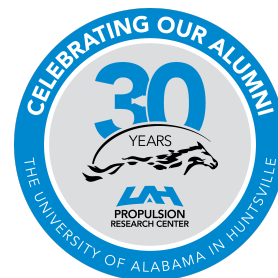


Summer/Fall 2022 Recognition of Graduates

December 2nd, 2022



Our Guest Speaker

"From Cotton to Countdowns and Beyond"

Melanie Newton

Director of Operations and Strategic Development at

JBS Solutions, Inc.

President of Women in Defense, Tennessee Valley Chapter

The Tennessee Valley Chapter of Women in Defense is an active, thriving organization dedicated to cultivating and supporting the advancement and recognition of women in all aspects of national security.



This spring we celebrate our newest alumni achieving one PhD, five master's degrees, and one bachelor's degree supported by research programs at the UAH Propulsion Research Center. New Propulsion Research Center 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 made your time at UAH and the PRC an outstanding opportunity 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.
PRC Director
Professor of Mechanical and Aerospace Engineering
December 2nd, 2022



Summer / Fall 2022

PRC Graduate Recognition Program

Group Photo/Welcome

Dr. Robert Frederick, PRC Director

Lunch

Lunch catered by Mason Dixon Bakery and Bistro

Special Recognitions

Guest Speaker

“From Cotton to Countdowns and Beyond”

Melanie Newton

*Director of Operations and Strategic Development at JBS Solutions, Inc.
President, Women in Defense Tennessee Valley Chapter*

Recognition of Graduates

Ph.D. Student

Master’s Students

Undergraduate Students

Reception

Special Recognitions

New Faculty



Dr. John Bennewitz
Assistant Professor
UAH Mechanical and
Aerospace Engineering

Dr. John Bennewitz joins the Mechanical & Aerospace Engineering Department as an Assistant Professor. He received a B.S. in Mechanical Engineering from the University of Pittsburgh (2005), M.S. in Aerospace Engineering from the Georgia Institute of Technology (2010), and a Ph.D. from the University of Alabama in Huntsville in Mechanical Engineering (2015). Prior to joining UAH, Dr. Bennewitz was a postdoctoral research scholar at the University of California, Los Angeles Energy and Propulsion Research Laboratory studying acoustically-coupled fuel droplet combustion, and began working at the Air Force Research Laboratory (AFRL) in 2016. At AFRL, he was a senior research scientist working within the Rocket Combustion Devices Branch at Edwards Air Force Base, serving as the principal investigator for the rotating detonation rocket engine (RDRE) program. In this role, he directed the technical efforts for both the experimental and high-fidelity modeling groups towards demonstrating the benefits of a detonation-based rocket propulsion cycle. Under this effort, over 2500 successful hot-fire RDRE tests were performed to identify operability, quantify performance and capture detonation wave dynamics to advance understanding for increased engine performance. Dr. Bennewitz's present research interests focus on fundamental detonation physics, advanced propulsion and acoustically-coupled combustion. Dr. Bennewitz is UAH PRC alum.

New Orbit



Jim Steele
Research Writer/Editor

Mr. Jim Steele who is currently a **Research Writer/Editor** is retiring from UAH in December 2022. Jim has been a fantastic supporter of the Propulsion Research Center and caught our attention early in his tenure at UAH with his well written articles that promote the work of our UAH faculty, researchers and students around the world. Here are example titles of some of his work: Alumni Achievements in Focus as Propulsion Research Center Celebrates 30 Years - APR 05, 2022; 'Bubble-Through' Nuclear Engine Might be a Future NASA Workhorse - MAR 08, 2022; UAH Wind Tunnel Researchers Investigate Shock Waves Under New NSF Research Grant - JAN 27, 2022; New concept for rotating Detonation Ramjet Engine gets Hypersonics Funding - OCT 12, 2021; Michaela Hemming has her Choice of Three National Graduate Engineering Scholarships - APR 12, 2021; LSI Grant Funds Further UAH Fusion Propulsion Research - SEP 08, 2020; UAH Student Rocket Team Takes Third Overall, First in Safety at NASA Student Launch- JUL 27, 2020; Rotating Detonation Engine Test-Fired for First Time at UAH's Johnson Research Center - SEP 16, 2020; Dr. Shery Welsh Accepts Position as Director, Air Force Office of Scientific Research - JUN 09, 2020; UAH Modeling the Spacecraft for NASA's Nuclear Thermal Propulsion Idea - NOV 13, 2019; UAH Alumna Helping NASA get its Space Launch System Off the Ground - MAY 30, 2018; Blast From the Past - Opening a Rocketry Time Capsule - MAR 19, 2015. We appreciate your contributions. Congratulations Jim!

Recognition of Doctoral Graduates



Dr. Nathan Schilling
Rockville, Maryland

Dr. Nathan Schilling is receiving a PhD degree in Aerospace Systems Engineering. Nathan completed his dissertation on “Modeling a Power Generating Pulsed Nuclear Magnetic Nozzle.” He explained, “I developed two computer codes to predict the performance of a magnetic nozzle for a NASA fission-fusion hybrid propulsion system.” He continued, “I was involved with the PRC by attending the monthly luncheons (which were a lot of fun) and representing the PRC at the 30th anniversary celebration.” Nathan said, “Of the PRC members I most appreciated my advisor for being helpful, kind, and caring, but I also appreciated the other students who helped me with classes and were just fun to hang out with. I also liked the lab tours and the networking.”

Dr. Jason Cassibry, his advisor, said “Nathan has been a fantastic person to work with. He took on a very challenging problem in modeling a power producing pulsed magnetic nozzle for advanced propulsion. He worked well with UAH and our NASA counterparts that resulted in numerous conference papers and two peer reviewed publications. He secured a postdoc in Japan to build on that work. We leveraged the dissertation work to win a NASA program on experiments and modeling at UAH.”

Dr. Schilling currently lives and works in Fukuoka Japan, continuing his dissertation work. He said, “I’m not sure what I’ll do after that.”

Recognition of Master’s Degree Graduates

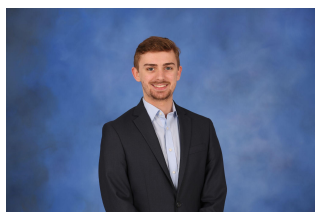


Benjamin Campbell
Napa, Idaho

Benjamin Campbell is receiving a Master’s degree in Aerospace Systems Engineering. He completed a non-thesis degree with his **advisor Dr. Robert Frederick.** He stated, “I was involved in the Centrifugal Nuclear Thermal Propulsion (CNTP) research effort.” Ben continued, “While involved with the CNTP effort, I worked on designing and fabricating experiments relating to propellant flow fluid dynamics in static and dynamic environments mimicking the internal conditions of a CNTP system.” He remembered, “Wrapping up my undergrad, my advisor there was able to get me in contact with Dr. Frederick and Dr. Lineberry, and from there everything started lining up to get me plugged in with the UAH community and the PRC.” Ben said, “I really appreciated the environment of the community at the PRC and how willing everyone was to help each other and share insight. While at some points it would seem intimidating being surrounded by some of the smartest individuals I’ve ever met, they were still welcoming and well-meaning people that were great to work with. It was great being able to be a part of whatever the activities of the day would be, whether it be just sharing an office, filling in a spot on test cell operations, or running an experiment for the first time and hoping everything goes nominally.”

Dr. Robert Frederick said, “Ben is an excellent designer who speaks as easily in CAD as in English. He made significant contributions to our initial work on designing, building, and operating the “Ant Farm” to study bubble motion in fluids relevant to nuclear propulsion applications. He is a delightful, motivated, and hard-working student who brightens the classroom with his presence and participation.”

Benjamin is planning to continue on to a PhD in Aerospace Systems Engineering involving small satellite propulsion and satellite constellation dispersion techniques.



Matthew Cox,
Tullahoma, TN

Matthew Cox is receiving a Master’s degree in Aerospace Systems Engineering. He completed his thesis titled “Investigations of Surface Film Cooling Characteristics Along the Trailing Edge of the Tip of a Transonic Turbine Blade” with his advisor **Dr. Phillip Ligrani**. He stated, “I appreciated the opportunity to contribute to the incredibly exciting research being undertaken at the transonic/supersonic wind tunnel. I would like to thank Dr. Ligrani for his guidance throughout my time at the PRC, as well as my fellow researchers, Hallie Collopy, Kyle Goethals, and Ward Mannes Schmidt, whose enthusiastic teamwork made it a joy to work at the lab.”

Dr. Phillip Ligrani said, “Matthew Cox undertook outstanding experimental research to investigate complex thermal and fluid flow phenomena within a transonic turbine blade environment. As part of Mathew’s efforts, he completed an Honors Bachelor of Science thesis, as well as a Master of Science thesis, which considered surface film cooling characteristics from a unique configuration as applied to the tip surface near the trailing edge of the turbine blade. His accomplishments included co-authorship on three archival journal publications, with first authorship on one paper which was published within the International Journal of Thermal Sciences.”

Matthew is planning to enter the aerospace industry as a test engineer supporting the Missile Defense Agency.



Jacob Keese
Valley Center, KS

Jacob Keese is receiving a Master’s degree in Aerospace Systems Engineering. His thesis is titled “Thermal Model of a Centrifugal Nuclear Thermal Propulsion System” with his advisor **Dr. Keith Hollingsworth**. Jacob stated, “My research was centered around Centrifugal Nuclear Thermal Propulsion. This involved developing a one-dimensional computational thermal model of the reactor in this system to help us understand the potential performance of this advanced concept.” He continued, “I was interested in pursuing research in advanced propulsion, and I was drawn to the PRC because of the ongoing research into Nuclear Thermal Propulsion.” He said, “I love the wealth of knowledge and experience that the PRC contains among its faculty and students.”

Dr. Keith Hollingsworth said, “Jacob has been remarkably productive. We went from our first meeting to a defended thesis in about 14 months with several completed and presented conference papers along the way. Always professional and careful with the details, Jacob has shown himself to be a talented engineer and researcher.”

Jacob is currently working for Jacobs Space Exploration Group in Huntsville as a propulsion structural analyst supporting NASA’s Marshall Space Flight Center.



Jacob Moseley
 Gaylesville, AL

Jacob Moseley is receiving a Master's degree in Aerospace Systems Engineering. He completed a non-thesis degree with his undergraduate **advisor Dr. Phillip Ligrani**. Jacob stated, "I worked on the transonic/supersonic wind tunnel (undergraduate)." He continued, "I work as a loads and dynamics analyst on the Space Launch System in support of the Artemis missions." He remembered, "I met Dr. Ligrani in my undergraduate Thermodynamics I class and began undergraduate research for him in the summer of 2018." He said, "For my master's degree, I have enjoyed the variety of propulsion classes offered. I always enjoy Dr. Frederick's classes (Rocket Propulsion II and Advanced Solid Rocket Propulsion) as well as Dr. Xu's Electric Propulsion class."

Dr. Phillip Ligrani stated, "Jake provided techniques for design and designed components for our transonic cascade and related components, as the project was under development. Much appreciated were the elegant and practical designs which solved a wide collection of intricate engineering problems. As a result, Jake's activities were instrumental in the success of the overall project, including the development of a unique experimental facility, and the collection of a considerable amount of archival data, which are now published in multiple archival journal papers."

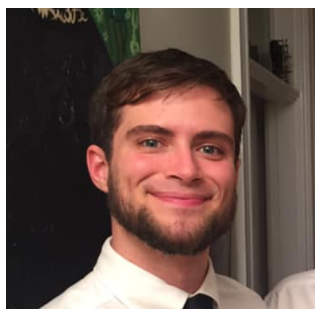
Jacob is planning to continue developing his career as a loads and dynamics analyst on the SLS and future NASA moon/mars exploration projects.



Patrick Rugel
 Edwall, WA

Patrick Rugel is receiving a Master's degree in Aerospace Systems Engineering. He completed a non-thesis degree with his **advisor Dr. Robert Frederick**. Patrick explained, "I provide manufacturing and engineering analysis on PRC projects, while facilitating the PRC's propulsion testing." He remembered, "Dr. Frederick got me involved with the PRC based on my engineering and manufacturing experience." He added, "I appreciate all the staff at the PRC, but Dr. Frederick has been the most influential person in my experience with the PRC and my education."

Dr. Robert Frederick, explained, "Partick has been an outstanding and reliable student researcher supporting our component fabrication tasks in the rocket test area. He fabricated parts for our ramjet engine testing and nuclear propulsion simulation test rig. He is a mature, steady, and skilled worker and we wish him the best in his job search." **Patrick is pursuing a career in the aerospace industry, focused on rocket propulsion.**



John Seekins
Belfast, ME

John Seekins is receiving a Master's degree in Aerospace Systems Engineering. He completed his degree requirements under the **advisement of Dr. Jason Cassibry**. **John stated**, "My activity at the PRC has been supporting the active thrust modulation of solid propellant boosters for the hypersonic boost project with modeling of optical fibers. I built a numerical model of the fiber fuse effect as a mechanism for heat transfer and used results to write a conference paper. He continued, "I became involved with the PRC when Dr. Frederick invited me to participate in a special topics course this summer to study the fiber fuse effect after touching on the topic in his advanced solid rockets class. I appreciate the available hardware testing infrastructure at the PRC."

Dr. Jason Cassibry said, "John has become an integral member of our research group. He has specifically worked on development of visualization algorithms for high speed sprays and other multiphase flows. He has made significant contributions in several different programs, including the Rapid program with the FBI, modeling of a centrifugal thermal nuclear rocket with NASA, and the work mentioned above with Dr. Frederick. I look forward to working with him on his PhD." **John is planning to continue his PhD work next semester.**

Recognition of Bachelor's Degree Graduates



Stefan Raschke
Birmingham, AL

Stefan Raschke is receiving his Bachelor of Science degree in Aerospace Engineering. He stated, "I helped set up Dr. John Bennewitz's lab at the JRC. I aided in conducting experiments related to rotating detonation engines and started analysis for the PRC test cell flow system." Stefan remembered, "I was given a tour of the PRC, where I was encouraged to reach out for opportunities. I appreciate how helpful the staff is and how they are willing to answer any questions."

Dr. Bennewitz, his mentor, said, "Stefan has a passion for rocket propulsion and commercial space that he plans to cultivate upon graduation. He has played an important role in assisting with setting up our laboratory. During his time working at the PRC, he has gained useful research experience in propulsion that will create a strong foundation for his promising future."

Stefan is planning to pursue an aerospace engineering career.

UAH Student Launch Team Receives Support from Women in Defense, Tennessee Valley Chapter



Charger Rocket Works (CRW) is the competition team for the University of Alabama in Huntsville (UAH) in NASA's Student Launch Initiative (SLI). Each year a new team of roughly 20 mechanical and aerospace engineering students participating in their senior capstone course work to design, construct, and launch a rocket with payload to accomplish a task developed by NASA.

Dr. David Lineberry, PRC Engineer, teaches this class assisted by Mr. Jason Winningham, a Research Engineer in UAH Center for Cybersecurity Research and Education. The Tennessee Valley Chapter of Women in Defense is an active, thriving organization dedicated to cultivating and supporting the advancement and recognition of women in all aspects of national security.

Alumni Return to Campus for 30th Anniversary Celebration



PRC alumni and faculty at our 30th Anniversary celebrating our Alumni Banquet on April 14th, 2022. The left photo is of alumni who have received a bachelor's degree and the photo on the right are alumni with advanced degrees.

Our PRC 30th anniversary festivities included a Banquet, a Propulsion Research Symposium, and a Cookout at the Lab on April 14 and 15, 2022. In all, over 75 of our alumni participated traveling from as far away as California, Washington, Florida, and other parts of the United States.