

**UF**

**MAE Momentum**

**2023**

# Soaring to New Heights

**UF MECHANICAL & AEROSPACE ENGINEERING ALUMNI AND NASA ENGINEER, MIGUEL HERNENDEZ, SHARES HIS INPIRING JOURNEY TO GET TO NASA, FROM HAVANA TO HOUSTON.**



**MECHANICAL & AEROSPACE ENGINEERING at the UNIVERSITY of FLORIDA**

# A Message From Our Chair

I would like to personally thank you for taking the time to read our MAEMomentum 2023 Magazine. This magazine is just a start to the exciting tradition of annual magazines in our department to come. With a new semester in full swing, opportunities are available for us all to lean in and welcome new and exciting opportunities that lie ahead of us.

This edition's feature story focuses on one of our outstanding alumni's accomplishments with NASA, Miguel Hernandez, who was seated at the Mission Control console when astronaut Jim Lovell famously announced, "Houston, we've had a problem." This edition also showcases the groundbreaking research our faculty have been working on to address energy and sustainability challenges. We are also highlighting other department updates like our record-breaking Solar Gators team's national championship in Topeka, Kansas.

The intellectual diversity of our students and faculty is truly a strength of Mechanical and Aerospace Engineering (MAE), and I am excited to see the Department grow and prosper with strong institutional support. One focus within MAE is on excellence in engineering education, which extends from our incoming freshmen to our PhD graduate students and post-doctoral researchers. At the undergraduate level, MAE has made a commitment to teaching both theory and practice, which is reflected in our classroom lectures and our five state-of-the-art laboratories. A first class education in MAE requires a strong foundation of core knowledge coupled with hands-on opportunities to design, build and test, along with the soft skills of leadership, communication and teamwork.

MAEMomentum is a small part of a bigger picture of the exciting excellence that is being showcased everyday in our department. On behalf of the faculty and staff of the Department, I want to thank our MAE alumni for their commitment to excellence in creating the top tier standard that our department has today.

It is indeed a great time to be a Gator Engineer!



Warren Dixon, PhD  
*Dean's Leadership Professor  
and Department Chair*

— “ —

**MAEMomentum is a small part of a bigger picture of the exciting excellence that is being showcased everyday in our department.**

— ” —



A publication of the Department of Mechanical and Aerospace Engineering at the University of Florida

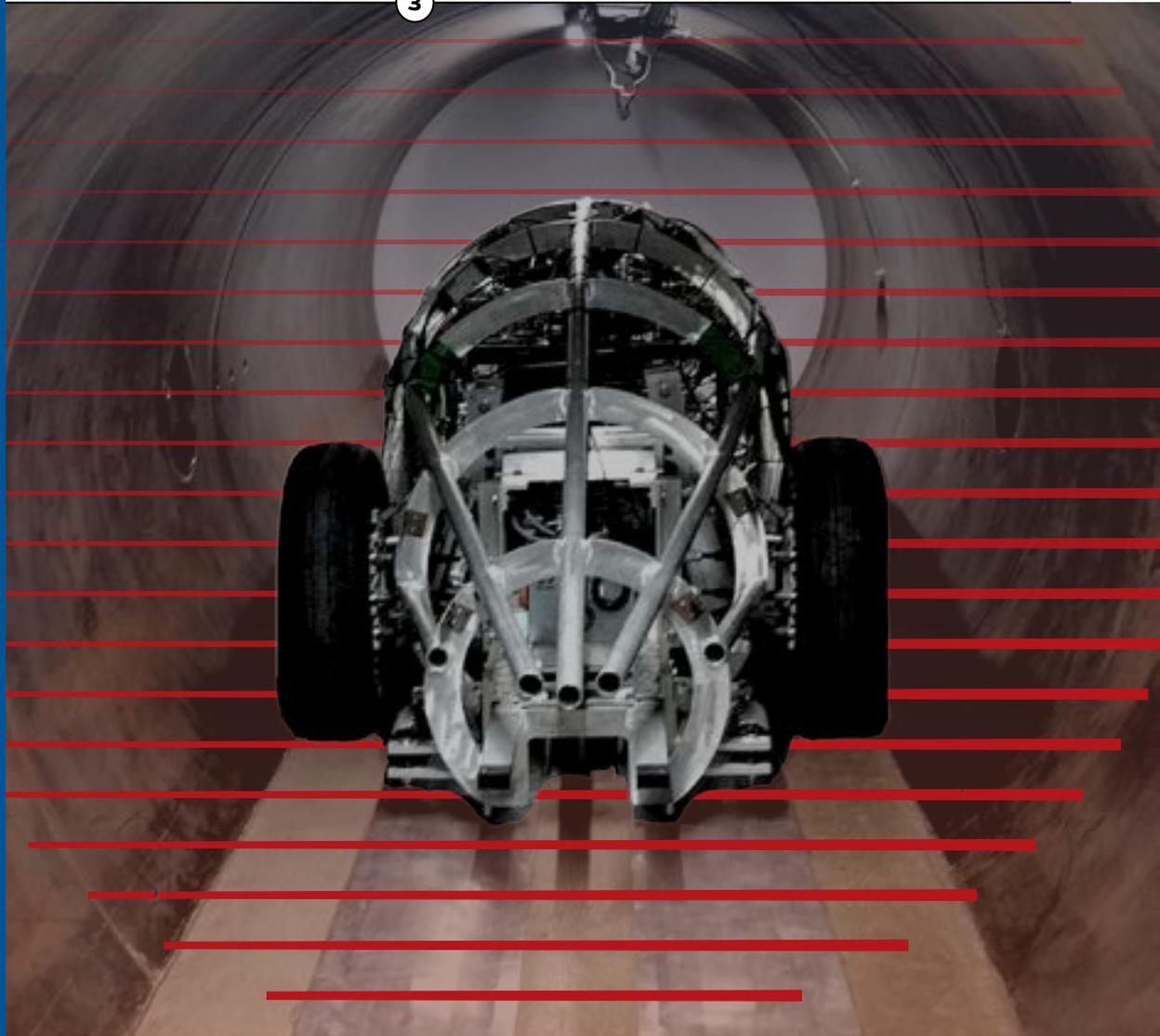
**DEPARTMENT CHAIR**  
Warren Dixon, PhD

**EDITORS**  
Emily Hinds  
Melanie DeProspero  
Greg Norton  
Joelle Beecher

**GRAPHICS**  
Greg Norton  
Joelle Beecher

**WRITERS**  
Emily Hinds  
Joelle Beecher

**WEBSITE**  
MAE.UFL.EDU



## Table of Contents

<p><b>4</b>  Facts, Figures, and Department Updates</p>	<p><b>17</b>  ME Project Capstone</p>
<p><b>5</b>  Solar Gators Story</p>	<p><b>19</b>  Development and New Building Update</p>
<p><b>6</b>  Research</p>	<p><b>20</b>  Mailing Information</p>
<p><b>8</b>  From Havana to Houston</p>	

**120**  
Patents  
Granted



### Mechanical and Aerospace Engineering by the Numbers

**\$19.4 M**  
Research  
Expenditures

**2,233+**  
Enrolled

The Department of Mechanical and Aerospace Engineering (MAE) at the University of Florida is one of the largest academic programs on campus, by student enrollment. Our Mechanical Engineering program celebrated its 100 year anniversary in 2009 and is one of the founding departments of the Herbert Wertheim College of Engineering. Now more than a decade beyond the successful merger of the mechanical and aerospace programs, MAE remains a vibrant and intellectually diverse program at both the undergraduate and graduate levels.

**17**  
Active Grants  
Over \$1 M

**5** Best public university US News and world report

**16** Graduate Mechanical and Aerospace Engineering Program among public universities

**78** Percent of domestic students comprise UF MAE'S Ph.D. enrollment

**21** Percent of undergraduate students are women

**23** Percent of undergraduate students come from underrepresented groups



## Solar Gators Make History Landing First Place at the 2023 Formula Sun Grand Prix

After six years of hard work and competitions, UF's SolarGators placed first in the 2023 Electrek Formula Sun Grand Prix, held June 27–July 2 at Heartland Motorsports Park in Topeka, KS. The student-run team, sponsored in part by both the Department of Electrical & Computer Engineering and the Department of Mechanical & Aerospace Engineering (MAE), drove their vehicle, Sunrider, 707.5 miles powered only by the sun. Last year's winners, Principia College, came in second place with 542.5 miles. Team SolarGators were also proud to receive certificates for most improved team and for aesthetics. This was the second competition for Sunrider, SolarGators' third vehicle. Design and manufacturing of their current vehicle began in 2019 and its debut was in the 2022 competition. The team overcame supply chain delays, the graduation of experienced team members, and challenges brought by the COVID-19 pandemic but were still able to improve on previous designs to build the current car.



**Team Solar Gators with their award winning vehicle, "Sunrider"**

The current iteration of Sunrider features 3D-printed titanium uprights, a custom designed 5kwh battery pack consisting of 416 individual lithium ion cells, a 1kw custom designed solar array, and completely customized low voltage embedded systems. Team SolarGators were especially proud of the speed with which they passed scrutineering. They were the first team in their class, and the second team overall, to complete this crucial step in the competition, leaving them with an entire day to add finishing touches and double-check all the systems in the vehicle. The Formula Sun Grand Prix (FSGP) is an annual road-style closed course endurance race. Competitors come from schools all over North America. Vehicles undergo strict, multi-day scrutineering to ensure safety and regulations compliance. Drivers are also vetted with various dynamics tests to verify the handling of the car and driver. After completing the scrutineering stage, teams have 24 hours, spread over 3 days, to run as many miles as possible, and the team logging the most miles is the winner. The FSGP serves as a qualifier for the American Solar Challenge (ASC), held every two years. The ASC is a cross country endurance race, spanning over 1,400 miles. With the first-place win at the FSGP, team SolarGators is assured of a spot in the 2024 ASC.

### 2023

Car: Sunrider  
Results: 1st place, 707.5 miles, Aesthetics and Most Improved Award (3rd overall lap record on track)

### 2022

Car: Sunrider  
Results: 10th place, 75 laps, 187.5 miles, tied 6th fastest lap

### 2019

Car: Cielo  
Results: 8th place, 52 laps, ~200 miles

### 2018

Car: Cielo  
Results: 10th place, 10 laps, 23 miles

### 2017

Car: Torch  
Results: 15th place, 1 lap, 3 miles

“

As the Faculty Advisor for the Solar Gators, I am so proud of this team for not only achieving an overwhelming win, but the way they accomplished this feat. I have observed the hard work, late nights, and camaraderie of this large all-volunteer team. Team SolarGators exemplifies engineering excellence in the results that they produced, the mutual respect evident on the team, and their selfless dedication to each other. The entire university should be proud of these students.

—Dr. James A. Trainham,  
PhD MAE Professor

”

## Dr. Saeed Moghaddam Receives Grant from the Department of Energy ARPA-E to Revolutionize Data Centers' Energy Efficiency and Carbon Footprint Reduction

UF was awarded a prestigious grant from ARPA-E under COOLERCHIPS program to spearhead groundbreaking research and development aimed at dramatically increasing the energy efficiency of data centers while significantly reducing their carbon footprint. "Project Hyper-efficient Data Centers for Deep Decarbonization of Large-scale Computing" is the result of years of scientific advancements we have made in phase-change heat transfer under ONR and NSF projects, and I am excited to lead a team of academic, national lab, and industry leaders under this project." stated Dr. Saeed Moghaddam, William Powers Professor of Mechanical and Aerospace Engineering at the University of Florida.



Saeed Moghaddam, P.h.D,  
William F. Powers Professor

In announcing this news, U.S. Secretary of Energy, Jennifer M. Granholm commented that "climate change, including severe weather events, threatens the functionality of data centers that are critical to connecting computing and network infrastructure that power our everyday lives". The UF collaborative work marks a pivotal milestone in the pursuit of a greener future,

“Receiving this grant from ARPA-E is a tremendous honor and a testament to our unwavering dedication to creating a more sustainable world.”  
- Dr. Saeed Moghaddam

aligned with the ambitious goals outlined by the Department of Energy to combat climate change and promote energy conservation.

Under the guidance and support of the Department of Energy ARPA-E, the project partners will leverage their extensive expertise in cutting-edge technologies and data center optimization to create an innovative solution that revolutionizes energy efficiency standards within the industry.

The grant will provide ample resources to conduct extensive research, design groundbreaking prototypes, and implement scalable solutions that will reshape the landscape of data centers, establishing a new paradigm for sustainable data centers operations.

“Receiving this grant from ARPA-E is a tremendous honor and a testament to our unwavering dedication to creating a more sustainable world. We believe that data centers, being pivotal hubs of digital infrastructure, have a critical role to play in reducing greenhouse gas emissions and promoting energy efficiency. We are grateful for the opportunity to collaborate with ARPA-E and

contribute to the global efforts in combating climate change.” said Dr. Saeed Moghaddam.

By combining state-of-the-art technologies, innovative cooling techniques, and efficient server rack design, the project aims to optimize energy usage in data centers. The transformative solutions developed through this grant will not only benefit data center operators but also have far-reaching impacts on the environment, contributing to a cleaner and more sustainable future. In addition to the advancements in energy efficiency, the project will also focus on developing comprehensive monitoring and analytics tools to enable data center operators to track, analyze, and optimize their energy usage in real-time.

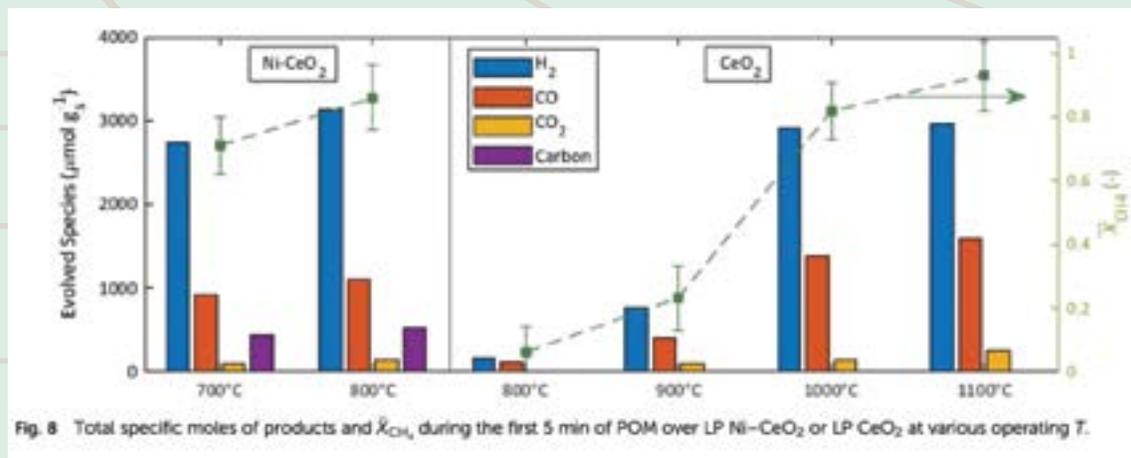
## Add Nickel to Ceria for Solar Syngas at just 700°C

Dr. Jonathan R. Scheffe, led the team behind a groundbreaking study that explored producing syngas at lower temperatures using a nickel catalyst deposited on ceria. The team’s paper, titled “Kinetic investigation of solar chemical looping reforming of methane over Ni–CeO<sub>2</sub> at low temperature,” was published in the journal *Applied Energy*. Dr. Scheffe has been involved in various research projects related to thermochemical energy conversion, including solar fuel production and carbon dioxide capture.



Jonathan Scheffe, P.h.D., Professor

Further investigation is needed to determine the effect of FCH<sub>4</sub> at higher volume fractions, as well as the effect of increased pressure on CLRM with Ni–CeO<sub>2</sub>. Future work should focus on filling in these gaps in our understanding, then extracting ideal operating conditions to optimize the rate of syngas production over Ni–CeO<sub>2</sub> in scalable and efficient reactor systems.



# From Havana to Houston

**FROM FLEEING CASTRO'S CUBA TO SENDING THE APOLLO ASTRONAUTS INTO SPACE, NASA ENGINEER MIGUEL HERNANDEZ'S JOURNEY ARCED WITH HISTORY**

## **“Houston, we’ve had a problem”**

The trouble erupted late evening on Monday, April 13, when the spacecraft was nearly 56 hours into its flight to the moon. Hernandez was at Mission Control, monitoring as the astronauts performed routine system tests in preparation for sleep. He was looking forward to getting some shut eye himself when blinking red lights on the console indicated a sudden and drastic loss of oxygen.



**HERE'S HIS STORY.**



The "mailbox" improvised device. Photo courtesy NASA



Miguel Hernandez at NASA console

## "The Eagle has landed"

### Plastic bags, cardboard and duct tape.

In April 1970, millions of viewers marveled as a device improvised from these simple elements helped save the three U.S. astronauts aboard Apollo 13, stranded en route to the moon after an oxygen tank exploded.

The MacGyvered solution was the brainchild of NASA's engineers in Houston, among them, 28-year-old Miguel Hernandez (BSMEng '66). The Cuban-born Gator was seated at the Mission Control console when astronaut Jim Lovell famously announced, "Houston, we've had a problem." And Hernandez was among the experts who worked tirelessly for four days and nights to get the crew home safely.

More than 50 years later, Hernandez still marvels at his NASA teammates' ingenuity, which included calculating a new flight trajectory back to Earth for a reconfigured spacecraft.

"They had to redo the simulator math models for the new configuration in hours, not days," he said in a recent interview. "And we had to

adapt the Lunar Module so it could support the astronauts on the return flight, something it was not designed to do. I'm amazed we were able to solve all the problems and do so on time."



MIGUEL HERNANDEZ

"Then again, [NASA] Flight Director Gene Kranz had told everyone, 'Failure is not an option,'" he added."

“  
**Whatever you told them,  
 it had to be 100% correct  
 because their lives were at  
 stake. We developed very  
 close relationships with  
 them, like real friends.**

”  
 Those extraordinary feats earned Hernandez and his Apollo 13 Mission Operations teammates the Presidential Medal of Freedom, the highest U.S. civilian honor. Hernandez would go on to found his own successful engineering firm and contract with NASA for decades, earning the title

Entrepreneur of the Year from Ernest & Young, Inc. Magazine and Merrill Lynch, and the Golden Knight Award from the National Management Association. As impressive as those honors are, they only hint at the dramatic arc of Hernandez's life over the last eight decades.

Equally remarkable is how a teenaged Hernandez escaped Fidel Castro's Cuba and landed on U.S. shores with just \$100 in his pocket. Little did he know then that a future opportunity at the University of Florida would make him part of the visionary team that put the first man on the moon.

## Harsh Reality in Havana

Born in Havana, Cuba, in October 1941, the only child of a businessman and a lawyer/social worker, Hernandez grew up fascinated with airplanes and anything to do with space travel, he said. During his teens, the Cold War between the United States and the Soviet Union loomed from afar. In October 1957, the Russians launched Sputnik 1, the first artificial satellite to circle the Earth, spurring the Space Race between the two superpowers. Anxious to catch up to the Soviets, the U.S. Army and Navy vied to propel the first satellite for Team U.S.A.

"I remember following the competition to see which satellite, the Navy's Vanguard or the Army's Explorer, would be the first to successfully orbit the Earth," Hernandez said, speaking from his home in Seabrook, Texas, outside Houston. "Explorer 1 made it first in 1958."

Drawn to science and math, Hernandez dreamed of becoming an aeronautical engineer and earned an engineering draftsman certificate by the time he graduated high



The Soviet Union launched Sputnik 1, the world's first artificial satellite, on October 4, 1957. This still from a Russian movie made post-Sputnik shows the relative size of the satellite.

school. However, political turmoil on the island put his career plans on hold. Like many Cubans in the 1950s, Hernandez took part in demonstrations against dictator Fulgencio Batista – “nothing violent, just handing out flyers,” he said – and was temporarily living in Honduras when Castro and his 26th of July revolutionaries overthrew Batista on January 1, 1959. Not long after, 17-year-old Hernandez caught a cargo plane back to Cuba, anticipating a freer, more humane, atmosphere. But the day after he returned, Castro's strongmen came knocking on his front door, proffering a 26th of July uniform.

“They said, ‘If you want, you can come with us. We're going to take over some government members' houses,’” Hernandez remembered. “There were shootouts and things like that.”

Hernandez politely refused the uniform, but it wasn't until years later that he realized what Castro was laying the groundwork for that day.

“They were taking away the weapons of anyone who was not a 26th of July member,” he said, “to make sure there would not be any armed groups to go against the things Castro would implement later.”



Hernandez narrowly escaped Castro's Cuba two years after the revolution. He is shown here with fellow Cuban emigres in Flushing, New York, summer of 1961.

Hernandez remembers strolling along Havana Harbor and seeing the first naval vessel flying a Russian flag.

"That was horrifying," he admitted.

Aboard that ship was a replica of Sputnik 1. Hernandez admired the gleaming metal satellite and listened to speeches about how Russia's industrial know-how would transform Cuba, but the promised innovations never came. Instead, Castro began nationalizing companies, seizing homes and imprisoning Hernandez's activist friends. Two years into the revolution, he fled to the United States.

"I left on one of last flights out of the country, on December 29, 1960," he said. "Almost two years to the day that Castro took power."

Once on U.S. soil, he learned Cuba and the United States had just broken off diplomatic relations.

## \$100 to his name

Hernandez went first to Miami and then to New York City to live with his aunt and uncle, who had previously fled Cuba. He had only \$100 to his name and no language skills.

"I didn't know any English, so I would follow whoever was sitting next to me on the bus to New York," he remembered. "Whatever they ate, I ate. Wherever they went, I went."

To survive the bitter northern winters, his aunt bought him long johns and heavy sweaters to layer underneath an oversized jacket.

"I looked like I had just stepped off a ship docked in New York Harbor in the late 1800s!" he joked.

During the days, Hernandez worked delivering mail at his uncle's workplace, American International Underwriters (now AIG); at night, he took English classes. But his attention kept gravitating to Cuba. His heart broke as friends who had participated in the failed Bay of Pigs invasion on April 17, 1961, went missing. Were they dead, alive or prisoners, he wondered? Amidst the devastating news, Hernandez distractedly noted that Russia had put the first human in space on April 12, 1961, with the U.S. astronaut Alan Shepard following suit on May 5.

Twenty days later, on May 25, President John F. Kennedy announced the ambitious goal of sending an American safely to the moon before the end of the decade.

On March 1, 1962, Hernandez joined the crowds in Lower Manhattan to cheer the tickertape parade for John Glenn, the first American to orbit the Earth. Later that year, he attended a science fair at the New York Coliseum and gazed up in amazement at the lower portion of the Saturn V launch vehicle, suspended from the ceiling.

"To me, what I was seeing was unbelievable,"

he remembered. “Five engines, each measuring over 10 feet in diameter! Those had to be the engines of the first stage of a humongous rocket vehicle, I thought. There was no way something that big could fly. I didn’t realize at the time this was going to be the vehicle that would take men to the moon and bring them back alive and that I was going to be part of that historic adventure.”

## To “affordable” Gainesville and its “excellent university”

In late 1962, Hernandez moved to Miami for intensive English classes. By then, more than 200,000 Cuban refugees – including Hernandez’s parents, many relatives and his high school sweetheart, Teresita – had immigrated to the United States, and the U.S. government welcomed the exiles with medical and financial aid. With a \$500-a-semester educational loan, Hernandez enrolled at the University of Miami; however, Uncle Sam’s dollars did not stretch far enough in expensive Miami. In the fall of 1964, he and about 10 Cuban-born friends – some newly released from Castro’s prisons, under ransom deal brokered between the U.S. and Cuba – transferred to the University of Florida.

“It was more affordable,” he explained. “We could study and pay for housing and food and textbooks. Plus, it was an excellent university, especially in the area we wanted, which was engineering.”

Hernandez settled into a more comfortable lifestyle in Gainesville and married Teresita (by then a UM graduate) in December 1964. For two years, he studied for his degree in mechanical engineering and worked as a draftsman on campus, assisting various academic units. He kept abreast of the Space Race, but for the most part, it was nose to the grindstone. He knew education was his ticket



Teresita Hernandez and their older son Michael attend the 1967 UF Homecoming parade. Michael Hernandez was born near campus in April 1966 at Alachua General Hospital, the site of today’s UF Innovation Academy.

to a better life for him and his growing family. “I could not have accomplished any of what I’ve done in my life without my courses at the University of Florida,” he said. “Florida is the key. Our son Michael was born at the University of Florida in April 1966, at the Alachua General Hospital!”

At the 1967 Orange Bowl, Miguel and Teresita – then pregnant with their second son, Jorge – cheered as quarterback Steve Spurrier (BSPE ’81) led the Gators to victory against the Yellow Jackets, 27-12.

## “The Eagle has landed”

By that winter, Hernandez was a proud UF graduate, as well as a newly minted U.S. citizen. When NASA recruiters came to the UF campus, “Mike,” as he was known then, leaped at the opportunity to work for the space agency.

“Maybe they saw I was involved with many units at UF and solving all kinds of problems,” he said, speculating on why the recruiters chose him. “At the interview, I talked a lot about all the different space missions, including the Gemini one



Miguel Hernandez (front) and other NASA engineers train the crew of Apollo 7. Photo courtesy Miguel Hernandez.

that ended in November '66. They seemed to like that.”

He was hired by the Manned Spacecraft Center, in Houston, but assigned to work at the John F. Kennedy Space Center (KSC), near Cape Canaveral, training astronauts for the nascent Apollo program. He and his team had to master the systems that operated the spacecrafts and teach them to the astronauts via simulators. His specialties were propulsion and environmental control.

“Our function was to assure that the vehicle operated exactly as the real one, all the displays and functions,” said Hernandez. “The crew came to our simulators, where we would train them in all aspects of their mission, using the same checklists, procedures documentation and trajectory they would have on their flight. ... We put the astronauts through all kinds of scenarios so they learned how to recover from every foreseeable failure or situation.”

Just two weeks into the job, disaster struck. On January 27, 1967, during a countdown demonstration at the KSC launch pad, a fire inside the

Apollo 1 spacecraft killed all three astronauts trapped inside.

“That was terrible, really terrible, for everybody, the loss of those three great men,” he said. “It took close to two more years to get ready to fly again, but NASA used that time to construct the type of capsules that were able to fly to the moon.”

For the next five years, Hernandez and his team put the Apollo astronauts through their paces. To make the lunar-landing training sessions as realistic as possible, they replicated every anticipated detail of the descent, down to the visibility-reducing moon dust.

Preparing for the first moonwalk consumed nearly every waking moment of their lives, Hernandez said, and it was tough on his and the other engineers’ families.

“We didn’t have a lot of normal working hours,” he said. “Our group covered 24 hours of operation, every day of the week, and you could easily stay there 12 or more hours at a stretch. There were no windows, so we didn’t know if it was day or night outside.”

“We were responsible for the astronauts’ safety,” Hernandez added. “Whatever you told them, it had to be 100% correct because their lives were at stake. We developed very close relationships with them, like real friends.”

For the Apollo 11 mission, Hernandez trained astronauts Michael Collins, Neal Armstrong and Buzz Aldrin to operate the Command Module (CM), named “Columbia.” Once they reached their destination, CM Pilot Collins would circle the moon alone while Armstrong and Aldrin

landed the Lunar Module, named “Eagle.” Theirs was the most difficult Apollo mission yet, notes historian Andrew Chaikin. The Eagle had to execute a “controlled fall out of lunar orbit” with only enough fuel for a single try.

At 4:18 p.m. EST, on Sunday, July 20, 1969, the module’s legs thudded against the lunar surface. It was a bumpy landing, but the astronauts had made it.

“Houston, Tranquility Base here,” Armstrong famously announced. “The Eagle has landed.”

“When I heard those words, it was the most incredible feeling,” said Hernandez.

## “Houston, we’ve had a problem”

Hernandez’s most harrowing experience at NASA was the Apollo 13 near disaster in April 1970, he said.

The trouble erupted late evening on Monday, April 13, when the spacecraft was nearly 56 hours into its flight to the moon. Hernandez was at Mission Control, monitoring as the astronauts performed routine system tests in preparation for sleep. He was looking forward to getting some shut eye himself when blinking red lights on the console indicated a sudden and drastic loss of oxygen. Then the electrical fuel cells started to fail.

“Right after that, [astronaut James] Lovell called in and said, ‘Houston, we’ve had a problem,’” he remembered. “We already knew they had a big problem because everything was coming to pieces right in front of our eyes.”

An explosion in oxygen tank No. 2 in the Service



Miguel Hernandez at the Lunar Module Simulator. Photo courtesy Miguel Hernandez

Module has destroyed the connection to the other tank, resulting in a complete loss of oxygen. The Command Module could no longer support the astronauts, who needed to find a refuge fast.

“Fred Haise, the Lunar Module pilot ... picked up on what to do right away,” he said. “Even before we told him to go in the Lunar Module, he was already opening the hatch to go there. Because he saw that was the only place to go.”

The moon landing had to be aborted, and the focus turned to getting the astronauts home safely with the Lunar Module’s limited supply of oxygen, electricity, fuel and water.

While engineers calculated a new flight path, other team members brainstormed ways to sustain the three men. To remove excess carbon dioxide from the air, they improvised a duct-taped rig, nicknamed “the mailbox,” using cardboard and plastic covers ripped from procedures manuals.

As unbelievable as it sounds today, the Apollo 13 spacecraft had no onboard equipment to send or receive text messages, Hernandez pointed out. Houston had to verbally convey each



Apollo mission simulators at the Kennedy Space Center

set of instructions, and the astronauts scribbled notes on the only paper surfaces available: printed checklists and documents. With tragedy just one mis-transcribed digit away, everyone's nerves were keyed to a fever pitch, and the Mission Control team survived mainly on adrenaline.

"We slept whenever we could, but no one left the Control Center for four days," remembered Hernandez.

The engineers' discomforts were nothing compared to what the astronauts had to endure, however.

"It was extremely cold in the lunar module," Hernandez said. "Fred Haise got pretty sick and had a fever. It was wet because there was no equipment to reduce the humidity. We were concerned about powering the Command Module for re-entry because of those conditions."

The astronauts' plight drew worldwide interest, and the United States received an outpouring of support from foreign nations. Remarkably, the Soviet premier reached out to President Richard Nixon and offered Russia's help in rescuing the astronauts, if needed.

When the damaged Command Module safely splashed down in the South Pacific Ocean on Friday, April 17, at 1:07 p.m. EST, Houston and the world exhaled a collective sigh of relief.

Among the rescue ships floating nearby were four Soviet naval vessels.

"It was unbelievable," said Hernandez. "God was there with the astronauts."

## A bond like no other

Hernandez worked for NASA for nearly 15 years, training astronauts for all 11 Apollo flights, the three Sky Labs and the first two Shuttle missions, as well as supporting multiple missions at Houston's Control Center. In 1982, he founded Hernandez Engineering Inc. (HEI), which specialized in manned space flight operations and product assurance. Their first job was to prepare crewmembers and ground personnel for two dedicated Space Shuttle missions (D-1 and D-2) for the German Space Research Agency (now DLR). His wife, Teresita, soon joined the company and saw it grow to become the 11th-largest minority-owned business in the United States. In 2007, the company was sold and merged with Bastion Technologies, owned by their younger son, Jorge. The company is now providing essential support for the Artemis 1, the first of NASA's new missions to the moon.

Now retired and UFAA life members, Miguel and Teresita live outside Houston and have five grandchildren. Hernandez enjoys travel, scuba diving and gardening, and gives generously to UF's Department of Mechanical and Aerospace Engineering. But space travel is never far from his mind.

Hanging behind his desk is a photo of what looks like the moon's surface but is actually a 3'x3' sample of the turf originally used to train astronauts to land on the moon. Recalling the days when he prepared pilots for the most audacious mission ever attempted, Hernandez becomes animated, the technical details rolling off his tongue so effortlessly, it is as though we are back in 1969 and he is 28-year-old "Mike," clipboard in hand, telling Michael Collins and Neil Armstrong to get back in the capsule and practice the sequences again and again and again.

The Spanish term "la familia" refers to not just immediate family, but also to extended family and friends. In Hernandez's case, "la familia" can be said to encompass all 29 Apollo astronauts, most of whom flew to the moon and back between October 1968 and December 1972. To this day, those men and their descendants honor the unique debt they owe to the behind-the-scenes heroes who enabled them to safely explore a brave new world, 250,000 miles from our own.

In October 2019, Hernandez attended his industry's big annual event, the International Astronautical Congress, in Washington, D.C. The 50th anniversary of the first moon landing was cause for celebration, and the featured speakers included Buzz Aldrin and Mark Armstrong, son of the late Neil Armstrong.

Hernandez had never spoken to Mark Armstrong before, but the latter approached him and engaged in a long, thoughtful conversation. At the end, Armstrong did something the engineer, then 78, never expected.

"He embraced me," Hernandez recalled, his voice tight with emotion. "The thing he said was, 'Thank you for keeping my dad safe.'"



Astronauts Buzz Aldrin (left) and Neil Armstrong participate in a simulation of deploying and using lunar tools. Photo courtesy NASA



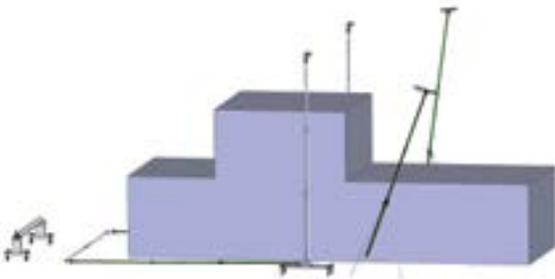
Apollo 13 space vehicle is launched from Pad A, Launch Complex 39, Kennedy Space Center. Photo courtesy NASA

## US Army 3rd Infantry Division performs camouflage demonstrations at UF for ME Capstone students



A group of US Army personnel from the 3rd Infantry Division (3ID) traveled to Gainesville from Fort Stewart, Georgia, in February to interact with UF ME Capstone students, perform vehicle camouflage demonstrations, and discuss the collaboration between them, UF, and the Civil-Military Innovation Institute (CMI2).

“Sometimes soldiers don’t have the time or the resources to solve their own problems,” said Capt. Christopher Flournoy, one of the 3ID visitors. “So that’s where the innovation team comes in to find external resources, such as funding for prototype material and academic resources to help solve that problem.”



Intents - 2023 Spring EML4501 Group 1

This collaboration is about bringing soldiers’ ideas for military innovation to fruition by connecting with universities and having students help create solutions to problems faced by soldiers. CMI2, which also had representatives visiting campus, supports the innovations team at 3ID by providing funding and machinery in addition to assisting with connecting them to universities.

“  
**I HOPE IT GROWS BEYOND  
 JUST CAPSTONE PROJECTS,  
 AND WE HOPE TO EXPAND OUR  
 COLLABORATION WITH THE ENTIRE  
 US MILITARY IN DIFFERENT AREAS.**  
 - MATTHEW TRAUM,  
 INSTRUCTIONAL ASSOCIATE PROFESSOR

”  
 The ID3 and CMI2 visit to UF was coordinated by MAE instructional faculty Matthew J. Traum and Umesh Persad. For their Spring 2023 Capstone project, UF MAE senior design students were challenged to design a vehicle camouflage system that is faster and safer for soldiers to deploy and pack

up than the current system. 3ID visitors demonstrated the current system of camouflaging a military vehicle to the gathered students in EML4501. Persad said the visitors were great at explaining and interacting with students, and expressed confidence that this partnership would continue.



Chameleon - 2023 Spring EML4501 Group 2

“I hope it grows beyond just Capstone projects, and we hope to expand our collaboration with the entire US military in different areas,” he said. “We want to see that our innovations, whatever we come up with collaboratively, see the light of day, that they actually end up being products that are made and used, making a difference in the lives of people.”

Persad also noted how beneficial it is for engineering students to gain hands-on design experience through Capstone senior design.

“We are quite happy to see, from the collaboration, the benefit to students at the end of the day,” he said. “They could see the value of their work and be motivated in that process.”

“The idea behind this course is to expose students to real-world problems and let them work in teams, as it’s done in the real world, to come

up with solutions,” Persad said. “We all wish to have as much of a real-world experience as we could before heading out into the world of work, and I think this is very good for design engineering students in particular, having that real-world experience and putting their skills to actual use.”

The students who were present described the demonstration as “interesting, informative, and awesome.”

“They’re very knowledgeable,” said Roly Isern, one of the attending UF ME Capstone students. “They’ve probably done it a dozen times, and they know the struggles, they know the weaknesses, and they’re able to convey that over to you.”



Rango - 2023 Spring EML4501 Group 3



Night Hawks - 2023 Spring EML4501 Group 5

# New Mechanical and Aerospace Engineering Home

A 142,000-square-foot academic building located in the heart of UF’s main campus that will serve as the home for Mechanical and Aerospace Engineering. Through on-going philanthropic support, we are creating a new state-of-the-art inspirational research and educational facility for students, faculty, staff, and alumni.



## Be A Part of the Transformation

UF MAE alum Matt Palmer recently made a generous contribution towards the construction of a Student Village. We had the chance to speak to him and learn more about his background and motivation for donation.

**Scan the QRCode below or visit [mae.ufl.edu/engage](http://mae.ufl.edu/engage) for more information**

**“To me it’s all about the students and that’s why I was happy when they came up with the idea to use the money for a student village...when you really boil it down, there is no university without the students. The students drive everything. Everyone should be focused on nothing but the students.”**



**Matt Palmer**



# UF UNIVERSITY of FLORIDA



Herbert Wertheim College of Engineering  
Department of Mechanical and Aerospace  
Engineering at the University of Florida



1064 Center Drive, Gainesville, FL 32611

