FOUNDERS DAY

ABOUT THE COVER

Florida Tech's 60th Anniversary Founders Day celebration was Sept. 22, 2018, in the Olin Quad. Recognizing Florida Tech’s rich history and the great strides the university has made since its founding in 1958, the event attracted 2,000 Florida Tech students, faculty, alumni, staff and friends. Together, we donned novelty “60th” spectacles and tossed red Florida Tech flying discs. We enjoyed ice cream bars and each other’s company. We admired the beauty of our dramatically lit campus until it was dark. Then, promptly at 8 p.m., the fireworks began, filling the sky with color and our hearts with Panther Pride.
A CUSTOM-FIT CAREER
PHILINA RICHARDSON ’09, MARINE BIOLOGY

Philina Richardson has found the uniquely perfect intersection of her marine biology degree and her time as a Florida Tech librarian. She now puts her anomalous skill set to use with the Alaska SeaLife Center in science outreach for shark research.

As a librarian, Richardson helped students find, access and evaluate information. Now, she puts her information literacy skills to use on the other side of that process, working with biologists at the SeaLife Center to create an outreach site for the Pacific sleep shark research project.

“The path from student to librarian to arctic shark research has certainly been interesting, and I wouldn’t have had it any other way!”

‘GOO’-Y INGENUITY
JUSTIN CLARK ’16, BUSINESS ADMINISTRATION

When Justin Clark got tired of wiping his sweaty hands on his pants between video games and embarrassingly passing the wet controller to his buddies, he did something about it. Enlisting the help of his former Bisk College of Business professor, Scott Benjamin, Clark spent six months concocting a mixture of essential oils and chemicals they titled “Gamer Goo.”

A scented hand lotion for gamers, Gamer Goo is designed to keep hands dry and cool and gamers energized while playing video games for an extended time period. Since the product’s launch in February 2018, the Gamer Goo team has continually hit business goals and plans to reach $1 million in sales within the next year.

“You can’t be afraid to fail. You can’t let the fear of not being good enough stop you from starting. Take those leaps, and figure the risks out as you go.”

FROM SENIOR DESIGN TO SPACE
NICHOLAS CUSHING ’17, MECHANICAL ENGINEERING
LOGAN GIACCO ’17, AEROSPACE ENGINEERING

With the help of funding from a NASA undergraduate program, what started as a senior design project has reached new heights: space. Nicholas Cushing and Logan Giacco spent more than a year designing and building a payload that launched aboard a suborbital rocket at NASA Wallops Flight Facility March 22, 2018. The Aerospace wire-Repair Intelligent System Experiment, or ARISE, tested the effectiveness of a wire-repair method developed by NASA and Vencore in the microgravity created by the 15-minute rocket flight.

According to Giacco, now an integration engineer at Harris Corporation, many senior design projects only make it through the design cycle.

“But ours had a real client, real deadlines and a real launch date,” he said. “We got to go to a NASA facility for a week and do integration and testing work with NASA engineers, learn from what they were doing, learn from our mistakes … It’s been cool to be part of something that unique within the program.”

SWINGING FOR THE FENCES
DREW BEYER ’18, BUSINESS ADMINISTRATION, BUSINESS MANAGEMENT/FINANCE

A former four-year member of the Florida Tech baseball team and Florida Tech Athlete of the Year nominee, Drew Beyer has made it to the big leagues. In June 2018, Beyer was signed by Major League Baseball’s Detroit Tigers as a non-drafted free agent, making him the second Panther to sign with an MLB team in spring 2018. With 20 career saves, Beyer ranks second in Florida Tech history. In addition to his baseball achievements, after graduation, Beyer earned a position as special project coordinator at Houser Financial Group. He is set for assignment with the GCL Tigers East, Detroit’s Gulf Coast League affiliate.
ON THE RISE

SHOOTING FOR THE MOON
JOE BUSSINGER ’13, AEROSPACE ENGINEERING

Joe Bussenger first learned of Florida Tech during a visit to the Space Coast to watch a shuttle launch. When it came time to choose where to attend college, he had made his decision: a return trip to the Sunshine State for four years at Florida Tech. By the time he earned his degree in aerospace engineering, Bussenger had secured a position with SpaceX as the lead engineer for recovery and landing operations. He is now manager of offshore and landing operations engineering.

AYE AYE, CAPTAIN
MERT KUTLU ’10, AVIATION MANAGEMENT

Mert Kutlu’s graduation from Florida Tech in 2010 was far from the last recognition of his excellence. He achieved the Federal Aviation Administration Airmen Certification, given to pilots who have exceeded the FAA’s educational, licensing and medical standards. In 2016, just four years after he joined Turkish Airlines, Kutlu became the company’s youngest captain candidate ever with more than 4,000 hours of flight time. He’s not done, either. Kutlu is currently pursuing graduate studies in political science in Turkey.

STEMINIST
KIM DAY ’14, PHYSICS, COMPUTER SCIENCE

Steeped in STEM from an early age, Kim Day’s love of and fascination with science, technology, engineering and math was solidified by watching shuttle launches from her home on the Space Coast. A recipient of Florida Tech’s prestigious Farmer Scholarship, Day excelled in her coursework with a double-major in physics and computer science. The year before she graduated, Day earned a summer internship at Google in Silicon Valley. At the end of her internship, she was hired as a full-time Google employee, where she now works on the Chromecast team.

AIR, LAND AND SEA
JENNIFER GILLETTE ’10, BIOLOGY; ’12, MBA

As an award-winning soccer player and rower at Florida Tech, Jennifer Gillette excelled on the pitch and in the water. She later helped guide the Chesapeake Charge to the United States Adult Soccer Association National Championship in July 2013. Having had success on land and in water, Gillette was drawn to a new venue: the skies. She earned a commission in the U.S. Air Force, and after graduation from pilot training, First Lt. Gillette is flying the F-15E Strike Eagle fighter aircraft.
PROPAGATING CORAL REEFS

“Thirty years ago, this type of research was unnecessary. We are trying to understand where farmed corals will survive and under which conditions.”
—Professor Robert van Woesik

Coral populations in the Florida Reef Tract have declined in the last three decades due to extreme temperature events and other stressors that cause bleaching and disease. Scientists, like Robert van Woesik and his team, are reviving reefs with heartier fragments by transplanting healthy, nursery-grown corals back onto the reefs.

BARNACLE BUSTING FOR SMOOTH SAILING

“We are one of only a few test facilities in the world to have this capability. We are leaders in pushing this research forward.”
—Assistant Professor Kelli Hunsucker

The smoother a vessel can cut through water, the greater the fuel economy, which means fewer greenhouse gases. Unfortunately, plants and animals make their homes on the hulls of ships, slowing them down and contributing to global carbon dioxide output. Researchers at Florida Tech are on the forefront of creating anti-fouling coatings that are nontoxic and safe for marine life with research being conducted at the static and dynamic test facilities in Port Canaveral.

CREATING A LIVING SHORELINE

Over the years, pollution and coastal construction have wiped out huge numbers of oyster beds, which act as natural reefs that help block wave energy and prevent shoreline erosion. Oysters act as living filters, removing impurities from the water naturally, efficiently and constantly. Last year Florida Tech, Brevard County and the Brevard Zoo partnered to create the Living Shoreline project in an effort to restore oyster beds to the Indian River Lagoon. We now provide critical research to see if this proof of concept will serve as the model for future oyster reef build-outs in other parts of the estuary.
GENERATING ENERGY FROM THE OCEAN

It’s not out of the ordinary to see Florida Tech researchers launching their GECCO (Green Energy Coastal Collection Operation) offshore. GECCO is an ocean engineering research project that harnesses energy from ocean waves. This sustainable energy solution leverages hydraulic rams that are connected to the joints to compress and pressurize hydraulic fluid in an accumulator. Similarly, two pairs of ducks attached to the joints oscillate horizontally in a back-and-forth motion. The ducks are connected to one-way bearings that drive internal pumps. These pump hydraulic fluid into the same accumulator as the hydraulic rams. Once the accumulator reaches a maximum pressure, the fluid is released and drives the turbine, creating electricity.

SHELTERING SHARKS

“We sharks are much more complicated than people give them credit for.”
—Assistant Professor Toby Daly-Engel

Every year, 100 million sharks are killed at the hands of humans, either as victims of bycatch in fishing nets, through the practice of cutting off their fins for shark fin soup or because of their popularity in sport fishing. Through research and outreach, our resident shark expert Toby Daly-Engel is raising awareness about these highly evolved animals and their important contribution to ocean ecology. Her expertise and enthusiasm for sharks have led to partnerships with television shows produced by National Geographic and Discovery Channel.

SPAWNING WILD BONEFISH

“We now know we can, indeed, get bonefish to spawn in captivity. This success will help us optimize methods to induce spawning of fish brought in from the natural habitat and to spawn fish maintained for a long time in a controlled aquaculture facility.”
—Associate Professor Jonathan Shenker

A team led by Florida Tech and Harbor Branch Oceanographic Institute has, for the first time, successfully induced spawning of wild bonefish and hatched the fertilized eggs into larvae.

The Bonefish Restoration Research Project, an initiative sponsored by Bonefish & Tarpon Trust, has been attempting to spawn and raise bonefish in captivity in a larger initiative to replenish the bonefish population in the Florida Keys.
Florida Tech and space go hand in hand.

**THERE FOR EVERY LAUNCH**

Florida Tech began the same year as NASA and shares a home with Kennedy Space Center on Florida’s “Space Coast.”

The university got its start providing advanced education in space technology to Cape Canaveral rocket scientists and missilemen.

Today, Florida Tech students, faculty and alumni are engaged in every aspect of the space industry, partnering with government agencies and commercial companies alike in a collective mission to take astronomical research and space exploration to the next level.

**ALDRIN SPACE INSTITUTE**

“[Florida Tech] will play a key role in my ongoing legacy and Cycling Pathways to Occupy Mars. You ain’t seen nothing yet!” —Buzz Aldrin, Ph.D.

Through technical analysis, research, curriculum, workshops, conferences, public outreach and partnerships, the institute seeks to establish a permanent human presence on Mars and to maintain the scientific and technical legacy of Buzz Aldrin. #GYATM

**HANDS-ON RESEARCH**

Mars rovers, zero-gravity simulators, solid rocket fuel, CubeSats, LunaBots, hybrid rockets, microgravity exercise equipment and landing simulators are just some of the space-related projects students work on at Florida Tech.
SEARCHING FOR ALIEN WORLDS

In 2017, Florida Tech launched a university-built, highly specialized camera onboard the SpaceX CRS-10 mission to the International Space Station. Nestled in the space station’s NanoRacks External Platform on the Dragon capsule, the camera, known as a Charge Injection Device (CID), was successfully installed on the exterior of the station. The CID is used to capture very bright and very dim light, which helps scientists identify potential Earth-like planets beyond our solar system.

ASTRONAUT ALUMNI

Five Florida Tech alumni have gone on to become space shuttle astronauts:

- Sunita Williams ’95 M.S.
- Joan Higginbotham ’92 M.S., ’96 M.S.
- Kathryn P. Hire ’91 M.S.
- Frederick Sturckow ’00 M.S.
- George Zamka ’97 M.S.

GARDENING ON MARS

Martian soil, or “regolith,” contains few minerals, a lot of chlorine and no organic matter, making it a poor home for plants. Through a partnership with NASA, Florida Tech is conducting the first Mars environment simulation for growing plants in Mars regolith.

Students are also exploring another use for the inhospitable Mars regolith: building blocks. Using 3-D printing technologies, students are creating solid bricks from regolith simulant and testing them as building materials.

SPACE TOURISM

When space tourism gets off the ground, research from Florida Tech will likely be on board. Researchers in Florida Tech’s human-centered design program are developing a prototype space suit for future space tourists as well as the flight deck they will board and the safety protocols they will follow.

Professor Ondrej Doule, Ph.D.
SOLDIER PSYCHOLOGY
When you are a member of the U.S. Army Special Forces, failing to win the trust of allies in a combat zone could mean the end of a mission or a life. Rich Griffith, executive director of the Institute for Cross Cultural Management, is testing Green Berets’ cultural competence by observing them in an “unconventional warfare” exercise. He uses cross-cultural competence, a set of skills and attitudes that allows individuals to move in and out of any culture by studying local customs and taking behavioral cues from a population. The ultimate goal of the project is to create a test that helps the Army identify the most culturally competent soldiers to place in war zones.

HORSE THERAPY
Through the “Eye of a Horse” practicum program taught by Sandra Wise, doctoral students are taking an experiential approach to autism treatment. Students work with at-risk youth, PTSD patients and young adults on the autism spectrum as they interact with horses to build their situational awareness. Patients are guided through various exercises, including visiting a boneyard to help process death and lunging horses to help understand the link between action and reaction.

REDDUCING ARRESTS
“Prisons are now the largest mental health treatment facilities in the United States.”
—Assistant Professor Julie Costopoulos

Her research, the longest ever conducted on the subject, found that re-arrest rates are substantially reduced for criminals who graduate from mental health court. This adds to a growing body of evidence of the value of mental health courts from almost every perspective—human, economic, criminal justice, societal, etc. In comparison, more traditional incarceration has been ineffective at reducing recidivism while actually exacerbating mental health issues.
MONKEY SEE, MONKEY DO

Through a symbiotic partnership with Brevard Zoo, assistant psychology professor Darby Proctor and her students have the rare opportunity to work directly with exotic animals. Master’s students test their research hypotheses through observation and interaction with spider monkeys, flamingos and leopards. Unlike traditional research, during which scientific papers are written and three years later the findings might be implemented, the hypothesis and solution timeline moves very quickly for animal behavior students in Florida Tech’s psychology program.

LIFE-CHANGING EARLY AUTISM DIAGNOSIS

One in 68 children is affected by autism. The Scott Center is a global leader in effective early intervention through the use of applied behavior analysis (ABA) and has successfully proven the life-changing benefits of early diagnosis. Its research has shown that the earlier a child is diagnosed and treated the more likely that child is to meet grade-level expectations by kindergarten. By developing proven screening techniques, The Scott Center has equipped families with the necessary tools to see early warning signs and gain easy access to treatment information and support.

OVERCOMING DOG PHOBIA

Clinical phobias are common among individuals on the autism spectrum. Phobias result in avoidances ranging from medical routines to clowns to the family pet. Researchers are employing a behavioral treatment known as contact desensitization combined with positive reinforcement to specifically treat dog phobias in children with autism. Phobias, in general, can elicit signs of distress, including aggression, increased heart rate, blood pressure and cortisol levels, and can negatively impact daily life. Through contact desensitization, children move closer to dogs through gradual approach attempts followed by a snack reward. Results have been promising, as two of the three children eventually were able to interact with the dog. Follow-up assessments, conducted several weeks after treatment, showed that these children were able to interact with new dogs that were not used during treatment—an exciting and robust therapeutic outcome.
DITCHING THE PASSWORD

“It blows my mind that people take the pain of having to enter in a PIN or a password away at the risk of their information.”
—Assistant Professor Heather Crawford

Mobile devices essentially hold our entire lives, from bank information to website passwords to pictures. Heather Crawford is exploring ways to secure data beyond entering a password. Her research aims to incorporate keystroke and movement data into the password. The goal is to provide an authentication method that would be not only more secure but also more convenient.

BRAIN VS. ALGORITHM

“The big idea was to show that the algorithm is more efficient than humans. Humans did 20 trials and failed 10 times. The trains did 20 trials and failed once but got faster each time.”
—Graduate Research Assistant Tapas Joshi

Today, machines continually learn from their mistakes and make improvements—a concept called reinforcement learning. Researchers are working on a new visualization system and a reinforcement learning algorithm to show how much efficiency increases when these learning machines are put into action.

The experiment was simple. Researchers created a path for the trains to follow. Without prior knowledge of the path, humans and machines were given 20 opportunities to quickly navigate their train through the course without it falling off the track. The algorithm identified where and why the train fell and adjusted its speed accordingly for the next round. This learning allowed the algorithm to outperform the humans not only in laps completed but also in efficiency.
DITCHING THE PASSWORD

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GENERATING RESILIENT CLOUDS

An environment free from cyberthreats might not be realistic, but helping organizations recover from an attack is the focus of cybersecurity research. Instead of doing periodic backups, known as checkpointing, researchers are exploring a cloud computing technique that uses lightweight systems called containers, which are commonly used by Google, Amazon and Rackspace. Since containers take significantly less time to checkpoint, researchers can perform more frequent backups, meaning much less data is lost when restoration is necessary. In addition, this approach gives an administrator full control of the trade-off between data loss and system performance, a feature missing from existing approaches.

DIGITAL EYES FOR ROBOTS

“Most of what we did has not been done before. We used technologies that people don’t use and decided to go more in-depth.”
—Research Associate William Nyffenegger

By leveraging computer vision and motion planning, researchers are designing advanced autonomous vehicles that adapt to any situation, like inclement weather, pedestrians or traffic obstacles. William Nyffenegger has developed software that sees contrasting lines, instead of simply color changes, using a graphics processing unit (GPU) that can run 1,000 operations per second, rather than one. Once the vehicle reaches its destination without hitting an obstacle, its direction and successful path are saved for future use. Because the robot is able to recognize that there are different ways to arrive at a point, it can go through the same point multiple times—a task that would cause other robots to fail.

PREVENTING A CAR “HACKING”

While convenient, enabling mobile devices’ access to vehicles means opening them up to risks, including being hacked and stolen. By piggy-backing off an existing smartphone processor, called ARM, researchers found a possible solution to hacking. The ARM TrustZone is a secure environment on smartphones where certain trusted applications, like the one for your car, run. They are protected from other untrusted applications, like games. This means that even if a security flaw in one app gives an attacker access to a person’s phone, the attacker would be incapable of accessing a car via the phone.
Transformative Travel: Discovering Your Inner Scientist

From snorkeling coral reefs in Puerto Rico to attending a pig roast at a little hillside farm on the Isle of Youth, taking a summer field research course at Florida Tech isn’t your typical study-abroad program.

More than half of American college students choose Europe as their summer study-abroad destination. But Florida Tech students get a hands-on, up-close experience conducting real research while on a one-of-a-kind adventure that gives them a distinct edge after graduation. Through field surveys, scientific diaries and project reports, some students go on to present their research at scientific meetings or even publish it.

Far from ordinary, Florida Tech offers incredibly unique journeys to places like Oregon, the Pacific Northwest, Cuba, Puerto Rico, the Galapagos Islands, Peru, the Andes and the Amazon Rainforest, among others.

“Time and again over the last two decades of my involvement, I have seen many students wake up to their potential in science and research,” said professor Kevin Johnson. “This is the moment when they stop feeling like just students fulfilling assignments and become anxiously engaged scientists with a sincere interest in what they are doing.”

For marine biology students who want a leg up in this highly competitive field, Marine Mammals of the Pacific Northwest allows them to observe seals and otters in their natural environments and get so close to a gray whale, they can see the shape formed by the mist exhaled through its blowhole.

—Professor Mark Bush

By Jennifer Torres
Cassidy Myers, a marine biology and biomedical sciences student, said her participation in the course sets her apart when applying for internships in the marine mammal field. "We rowed into town one night and witnessed bioluminescence in the water. It was something I never thought I would see in my lifetime," Myers said. "Taking this course was something I will never forget, and if I could take it again, I would do it in a heartbeat."

Cuba

Ph.D. student Louis Penrod won’t soon forget his experience either. During his field course in Cuba, he captured the first-ever video of a bonefish larva in the wild, a video that is now used in scientific conferences. Associate professor Jonathan Shenker has taken students throughout the world on summer field courses, including two field sites in Cuba. Next, his class will head to a little island on Lighthouse Reef Atoll on the edge of the barrier reef in Belize.

Puerto Rico

Students who travel to Puerto Rico experience total immersion into the culture and terrain. Scuba dive or snorkel, then explore unique features of island biogeography like waterfalls, caves, rainforests and dry forests. Students even help with local research and monitor an important marine reserve, the Tres Palmas Marine Reserve in Rincon.

Galápagos Islands

Go totally off the beaten trail in the Galápagos Islands. Hike a volcano, then make your way through both lush green and arid landscapes as you visit six islands, three with an indigenous population and three uninhabited. Observe sea lions, blue-footed boobies, marine iguanas, giant tortoises and sleeping sharks.

Peru, the Andes and the Amazon Rainforest

Molly Kingston, a biological science student, took a course in Peru for paleoecology research. By horse and by hike, the students finally reached their destination: Laguna Huayabamba. They were rewarded with some interesting finds, including ancient wall paintings and a cave filled with mummies. "I will forever be grateful for the experience that made me push my limits and taught me new things," Kingston said. Archaeo-ecology of the Andes Amazon introduces students to the incredible cultural and biological diversity of the area. Visit Machu Picchu and the Sacred Valley of the Inca. Search the cloud forest for a wooly monkey before taking boats through the Amazon rainforest. In the lowlands, visit a Machiguenga village and spend several nights in the protected zone of the Manu Biosphere Reserve, possibly the most biologically intact area anywhere in Amazonia. "To walk through an Amazonian forest at night or to encounter a giant tortoise on a trail is just unforgettable," said professor Mark Bush. "The experience may completely change a student’s perspective on what fires their imagination, a lightbulb going off in their head. For some, who have never experienced a long hike in rubber boots or sleeping in a thatch hut under a mosquito net or done a 10-mile hike on a volcano, the adventure and sense of accomplishment boosts their confidence in a way that no other class can."
Reef Revamp

*Panther Dining Hall (PDH) is home to a 240-gallon reef aquarium maintained by Florida Tech’s Oceanography Program and supervised by professor Kevin B. Johnson.*

Under his guidance, a team of oceanography and ocean engineering students, with occasional help from aquaculture and marine biology students, maintain the tank.

Recently, the main 8-foot tank was replaced and the entire system revitalized—adding more hard coral and new fish.

The effort took a month in planning and a full day to implement. More than a dozen students studying marine biology, environmental science, oceanography and ocean engineering participated in the project—keeping the livestock stress-free and correctly timing the seawater delivery with the mounting of the new aquarium. Here’s a closer look. ►

The aquascape is comprised of approximately 240 pounds of sand and 250 pounds of rock—much of it generously donated by CaribSea, a leading aquarium supply company.

The fish and invertebrates eat a conglomerate of copepods and other zooplankton, mysid shrimp, flake foods and seaweed or romaine lettuce for the omnivores.
Maintaining the PDH aquarium takes a great deal of patience and hard work. The staff works Monday through Friday with the occasional weekend shift to clean the tank, feed the fish and invertebrates, monitor the water quality and keep health records on the inhabitants.

This aquarium is a beacon of what Florida Tech is all about—bringing scientists and engineers from all backgrounds together to tackle big projects.

—Connor Wong, lead aquarist

Aquarium student-staffers:

- Abbey Gering, Oceanography
- Julia Martinus, Oceanography
- Shannon O’Neil, Ocean Engineering
- Matthew Schelhorn, Ocean Engineering
- Jonathan Steffano, Ocean Engineering
- Connor Wong, Oceanography

Additional volunteers for the revitalization project:

- Xiao Ma
- Nayan Mallick
- Sean Crowley
- Sarah Johnson
- Lily Johnson
- Austen Zugelter
- Melissa Rivera
Achieving a perfect steering geometry is critical to fabrication. Steering is enabled by a 20:1 rack and pinion system. Spindles are mounted rigidly to the chassis using a triangulated tubing system. We set the wheels with positive toe (toe-in, or angled slightly inward) to ensure the dragster moves in a straight line down the track.

Programs Involved:
AE ME MTH

Designing the driver’s compartment means striking the perfect balance between keeping the driver safe and secure and maximizing his or her ability to effortlessly and effectively pilot the vehicle. That’s why we customize nearly every aspect of the driver’s compartment, from the size and shape of its seat to the placement of switches and levers, to the driver’s body. The seat is kept tight to keep the driver safe, and the controls are located where they feel most natural to the driver.

Programs Involved:
HFS PSY ME AE
GME HCD SS EE

The engine is a General Electric J-85-5 from a Northrop F-5 fighter jet, refurbished and tuned by Larsen Motorsports. To generate thrust, a turbine engine requires two key components: air and fuel. The engine takes in aerodynamically stable air; compresses the air molecules, adds fuel, ignites it and blows the resulting combustion out the exhaust.

Programs Involved:
AE ME EE MTH CS

Several different types of fuel may be used to power a jet dragster: biofuels, diesels, kerosene and jet fuel. Chemical engineers help us determine which fuel will deliver maximum power and efficiency while also promoting environmentally acceptable conditions. Having accurate measurements of different fuels’ burn rates and flow rates help our teams achieve top speeds.

Programs Involved:
AE CHE ME MTH
Dragster

**Engine Cowlings**

Cowlings, or body panels, as well as the decorative paint applied to them, affect a jet dragster's aerodynamics and may actually mean the difference between fast and super-fast. That's why we engineer our body panels to fit together virtually seamlessly and use high-end automotive racing paint with strong adhesion, durability and polish, which ensures a smooth laminar flow.

Programs Involved: AE, CHE, ME

**Rear Wheels**

Like the front wheel assembly, a jet dragster's rear wheels are fixed and rigid, and include no traditional suspension system. All the forces exerted upon the dragster as it accelerates, moves down the track and decelerates must be absorbed by the chassis and the wheels, making design of these components absolutely critical!

Programs Involved: AE, ME, MTH

**Parachute Cans**

A jet dragster cannot use everyday disc brakes to stop because its center of gravity is so far aft, or toward the rear. (Stopping a jet dragster using disc brakes would likely cause it to skid, spin or flip!) The only way to slow down, quickly and safely, is with parachutes. So effective parachute canister design is key. They must carry and protect the parachutes and release them in a split-second without damaging them.

Programs Involved: AE, ME, PHY, MTH

**Business Partners**

Each of Larsen Motorsports' four race teams operates as a separate business entity, requiring sources of revenue to cover expenses. Student interns often assist in initiating and solidifying relationships with corporate partners and sponsors to obtain funding. Each business team develops and executes a business plan encompassing all aspects of accounting, business development, marketing, education and outreach.

Programs Involved: BUS, SC, STEM, MPJ, QUM

**Afterburner**

The afterburner on a jet dragster is completely customized for racing purposes, but the mechanics are similar to those of any fighter jet afterburner, so aerospace engineering expertise is critical to an effective design. We perform calculations to achieve the most power at different atmospheric conditions. What's the airflow? Is the fuel mixture right? What's the fuel-to-air-mass flowrate?

Programs Involved: AE, CHE, EE, ME, PHY, MTH

Student opportunities for hands-on experience at Larsen Motorsports go well beyond traditional engineering.
Want to know what it’s really like to live on the Space Coast? Here is a breakdown of who we are, what we do and where we like to hang out. **You’re one of us now!**
WE'RE OUTDOORSY

From dolphins to sea turtles to manatees to gators, wildlife on the Space Coast is epic. We take advantage of Florida's pleasant year-round climate, exploring nature and enjoying the waves, rivers, creeks and hiking trails.

Things we do:

- Surf Indialantic Beach.
- Observe sea turtles nesting in Melbourne Beach.
- Fish the Melbourne Beach Pier while dolphin-watching.
- Check out the yearly winter manatee meet-up in Satellite Beach.
- Kayak, stand-up paddleboard or boat down the Indian River Lagoon.
- Walk the nature trails in Wickham Park, Turkey Creek Sanctuary and Coconut Point Sanctuary.

WE HAVE FUN

For the weekend warriors, we have a little something to suit any interest.

How we play:

- Catch a movie at Premiere Theaters Oaks Stadium 10, a vintage-style Hollywood theater.
- Eat astronaut ice cream at Kennedy Space Center Visitor Complex.
- Observe jaguars, giraffes, rhinos and Florida Tech graduate students conducting research at Brevard Zoo.
- Race down the go-cart track at Andretti Thrill Park.
- Take a daytrip with the Campus Activities Board to Universal or Disney theme parks in Orlando.
- Tinker at a Space Coast FabLab, an alumni-created makerspace.
- Play trivia and enjoy some barbecue bites at The Broken Barrel Tavern, an alumni-owned restaurant.

WE'RE CULTURED

We wouldn't say we are fancy, but we enjoy our diverse arts and culture scene.

Experiences we enjoy:

- Indiafest Brevard
- Florida Surf Museum
- Brevard Symphony Orchestra
- Henegar Center for the Arts
- Eau Gallie Arts District, home to Florida Tech’s Foosaner Art Museum
- Downtown Melbourne Festival of the Arts
- The American Space Museum
- Florida Tech’s Ruth Funk Center for Textile Arts
- Valiant Air Command Warbird Museum
TESTING GROUNDS

These are some of the places on campus you'll learn to use the tools of the research trade.

FLIGHT SIMULATORS
Elite, RedBird or Frasca simulators provide a safe place to work on your pilot chops. The primary flight simulator display shows heading, altitude and airspeed, and pilots can customize their flight conditions from day to night and clear to rainy skies.

DIGITAL SCHOLARSHIP LAB
This is where ideas are born. 3D printers and scanners, virtual reality, media production, 360-degree cameras, cutting-edge software and collaborative spaces provide students a wealth of tools to ideate, design and develop their ideas (and to just have a little fun).
PHYSICS AND SPACE SCIENCES ROOFTOP
Our custom-designed indoor-outdoor astronomical classroom is home to a 15-telescope observation deck and the Ortega 0.8-meter (32-inch) telescope, one of the largest research telescopes in the Southeast.

AQUACULTURE LAB
The 2,500-square-foot lab houses recirculating systems ranging from small glass aquaria to 720-gallon tanks. Inside, you’ll find lionfish, seahorses, algae and other organisms.

MACHINE SHOP
Tinkerers are at home in the machine shop. Whether on the lathe, saw bench or welding station, this is where projects are born.

MAKERSPACE
Soldering, laser etching, resin casting and CAD modeling are just some of the technologies available for makers on a mission.

HARRIS STUDENT DESIGN CENTER
Here, students collaboratively fabricate projects from unmanned submersibles to Formula race cars. With access to spray booths, welding stations, acid etching and work spaces, the design center is always buzzing in the spring as students finalize their designs.
The SCENE on campus

1. Food presentations and tasting.
2. Student serving seafood at an event.
3. Student performing with a guitar.
4. Dancers in vibrant costumes.
5. Students in costume at a gathering.

Images courtesy of Heather Reid Photography.
1. Culinary Team Enjoys the Taste of Victory

With just three hours and one basket of food, Florida Tech's Culinary Team took home the bronze medal at the American Culinary Federation's 24th annual Chef Culinary Conference.

Florida Tech chef de cuisine Jon Skoviera and dining service team members Jenn Manaseri, Crystal Mensch and Susan Voss whipped up a three-course meal consisting of an appetizer of monkfish mousse with seared scallops, a main course of Tonkatsu-style pork tenderloin and a dessert of bing cherry mousse with chocolate genoise, as well as a buffet course of Moroccan-style braised chicken.

2. Oysters to the Rescue

Assistant professor Kelli Hunsucker and research students from Florida Tech's Indian River Lagoon Research Institute taught budding marine scientists and coastal engineers how to help save the Indian River Lagoon. Together, they built oyster mats to spur colonies of oysters to group together and start filtering and cleaning the brackish waters of the lagoon.

3. Cold War Kids Rock Homecoming

Last year, we celebrated Florida Tech's 60th anniversary with four days of homecoming festivities. Alumni, faculty, staff, students and community members from the Space Coast and beyond gathered for the annual celebration. A little rain didn't dampen the spirits of the walkers and runners who participated in the 5K presented by Meg O'Malleys Thursday night. Luckily, the clouds cleared over Downtown Melbourne for Friday evening's free Homecoming Fest concert featuring indie rock band Cold War Kids. Saturday afternoon, fans packed Panther Stadium for a riveting football matchup against the Valdosta State Blazers, featuring the traditional halftime crowning of the homecoming king and queen.

4. Globetrot Without Leaving Campus

Each February, students take a trip around the globe without ever leaving the comfort of campus. With lawn chairs and blankets in tow, students ascend on Panther Plaza for a celebration of cultural diversity and community at Florida Tech's Annual International Festival. Student groups and local cultural organizations host country- and diversity-themed display booths showcasing a variety of traditional clothing, informational literature, maps, flags and artifacts. Dance and vocal groups, bands and other performers fill the afternoon with live entertainment on the Panthereum's outdoor stage, while attendees feast on a variety of delicious ethnic foods.

5. Treat-or-Treat

No tricks, here! Last year, about 2,000 costume-clad Halloween enthusiasts from throughout the community gathered in Florida Tech's Residence Quad for the annual free, family-friendly Treat-or-Treat event, featuring candy, games, Halloween activities and various theatrical haunted houses.

6. Rap and Particle Physics Collide

A British songwriter, rapper, producer and poet with an undergraduate degree in aerospace engineering and a recent hip-hop album about particle physics rocked the Panthereum for a free concert last fall. Consensus released his album, "ConCERNed," in 2017 after multiple visits to CERN, the European Organization for Nuclear Research, which operates the Large Hadron Collider, a project with which Florida Tech students and faculty are also involved. The Panthereum was one of only two U.S. university stops on Consensus' unique tour schedule.

7. Losing Your Voice for Pizza

Can you imagine life without the First Amendment? Each spring, Florida Tech partners with our student-run newspaper, The Crimson, to give the public a glimpse at just how important the amendment is. From a workshop about how to access government documents and a public debate on the scope of the First Amendment to a pizza party that costs no money but all your First Amendment rights, free Speech Week features events and activities centered on and designed to help foster a better understanding of the First Amendment.

continued on page 26
8. Coffee with a Sprinkle of Culture

When students need a break between classes, they take a quick trip across the globe—or rather, a popular campus hangout transformed into the homeland of some of their international classmates. An event designed for students and faculty to gather for coffee and snacks, meet new people from around the world and enjoy the music and customs of a foreign culture, International Coffee Hours are hosted on designated Fridays during fall and spring semesters. As home to about 1,800 international students from 120 countries, Florida Tech has tapped into its greatest resource for cultural immersion: its students!

9. Storm-Chasing Balloons

Florida Tech faculty, in collaboration with their students and colleagues from other institutions, have almost perfected the art of launching instrumented balloons into Florida thunderstorms. A challenging process that requires much planning, extensive calculations and only the largest, most intense thunderstorm conditions, the balloons are part of a larger project measuring and analyzing lightning signatures with the ultimate goal of protecting operations, communications, assets and personnel from the danger of lightning strikes by better understanding the powerful natural phenomenon.

10. Concrete Canoe is a Heavy Competition

To most, a ride in a canoe made of concrete sounds like a disaster. But to civil engineering students, it’s an opportunity to show off their skills: paddling AND engineering. In June, Florida Tech will again compete in the American Society of Civil Engineers National Concrete Canoe Competition, during which teams race student-designed canoes built entirely out of concrete. This year, not only will Florida Tech compete in the 30-year-old competition, for the first time since 1999, we will host the event and the expected 26 participating teams from across the U.S. and Canada, and one international university. A prestigious honor, Florida Tech is the second university in Florida to host the event and the only one to host it twice.

11. Flying Females

No boys allowed! Okay, not really, but Women in Aviation Space Coast Florida Tech Chapter’s Girls in Aviation Day event is all about girl power. Designed to show girls and young women that aviation is a fun, exciting and viable career path for them, Girls in Aviation Day features a variety of aviation activities, including aircraft tours, drone flying and flight simulations. Last year’s guest speakers, Lyndse Costabile and Jill Meyers, gave an interactive presentation about Dreams Soar: Global Solo Flight for STEM, a global outreach mission to 20 countries across five continents, all to inspire the next generation of flying females.

12. Up and Leave [Green]

We hate to see you go, but we love to watch you Leave Green. A campuswide, student-driven move-out program, Leave Green kicks off just after Earth Day each year. The goal is to divert from landfills as many reusable items, like bed sheets, small appliances, storage bins and books, from dorms by donating unwanted materials to local charities. Establishing categorized collection areas in every residence hall community on campus, in years past, Leave Green has collected more than 9,000 pounds of goods that otherwise almost certainly would have gummed up the landfill for years to come.

13. A Collegiate Collage

In November 2018, “Derek Gores: Local Edition,” a mid-career retrospective of the Melbourne-based artist known for his innovative work in the art of collage, opened a four-month run at Florida Tech’s Foosaner Art Museum in the Eau Gallie Arts District. Designed by guest curator Serene McGroarty, the exhibition built beyond Gores’ repertoire of two-dimensional work and highlighted his devotion to the local arts community while exploring the foundations of the funky, Neo-Dada style that has brought him international acclaim. The exhibition also featured interactive tableaux, a new 3D work and an interactive “work room,” where visitors tried their hands at Gores’ game, offering a unique opportunity to interrogate and explore the artist’s process.

14. Aid in the Aftermath

The day after Hurricane Michael ravaged the Florida Panhandle, 24-year-old Christa Robison ’18 drove $200 worth of supplies from Melbourne to her hometown community in Grand Ridge, Florida. When that didn’t feel like enough, Robison took her relief efforts to new heights. A Florida Tech Aeronautics alumna and current FIT Aviation flight instructor, Robison raised more than $3,000 and enlisted the help of the university. On Oct. 20, she loaded a 1,300-pound payload of goods, like charcoal, food, air mattresses, other necessities and even Halloween candy for children in the area, in a Florida Tech Piper Chieftain and flew to Marianna, Florida, stopping on her trip home to pick up a wounded warrior.

“You’re just like a drop in the bucket. There’s so many people that need help, especially in Panama City and Mexico Beach. I feel like I could do more—I wish I could do more—but it’s better than nothing,” Robison said.

15. Panthers in China

In July 2018, four Florida Tech students joined associate professor and Aldrin Space Institute director Andy Aldrin on a trek to Beijing, China, to kick off the inaugural Sino-U.S. Space Policy Research Center summer study program. A collaboration with Beijing Institute of Technology (BIT) and Ohio State University, the five-day program featured hands-on activities as well as faculty and student policy discussions on topics ranging from the management of space flight projects to the future of global space exploration.
The SCENE on campus
ORIENTATION:

Not Your Ordinary Mandatory Week

Orientation Week is a rite of passage for incoming students. It’s designed to make the transition into college a smooth ride, but it’s also where students create lifelong memories and new friends.

During the week, you will attend convocation, an unforgettable welcoming ceremony for students and their families. You’ll receive academic advising, sign up for classes and purchase your books. You will also be able to sign up for a meal plan and purchase a parking permit.

Color Wars: A Next-Level Field Day

Color Wars feels like field day, except it spans several days. During the friendly competition, students are grouped into different color-named teams based on their residence halls. Teams participate in a number of lively and challenging events, including cheer-offs, trivia wars, talent shows and obstacle courses, and they attend fun, interactive get-togethers like glow-paint nights and block parties.

“By raising awareness, we have the opportunity to create a space for more young people, especially, to have dialogue and get involved in these important issues.”

–Leigh-Riane Amsterdam ’19, Mechanical Engineering, UNICEF Campus Initiative co-president
Philanthropy

Florida Tech Panther hearts are bursting with passion and compassion, so it’s not unusual to see them spreading not-so-random acts of kindness. From making a five-year-old boy with a rare disorder an honorary member of the swim team to spending spring break volunteering, our students make us proud to be Panthers.

Alphi Phi volunteered for the Friends of Children of Brevard’s annual Superhero Run that raises awareness and funding for abused and neglected children.

The entire Florida Tech campus comes together for the American Cancer Society’s annual Relay for Life. Pictured are Pre-Med Club members who lapped the track all night.

Sigma Tau Gamma swung some hammers for Habitat for Humanity.

Florida Tech athletes came together to send school supplies to people affected by Hurricane Michael.

Alpha Tau Omega, Surf Club and the Student Organization for Sustainability Action joined forces to tidy up Melbourne Beach.

The UNICEF Campus Initiative raised funds and grew awareness for the overwhelming challenges facing children around the world.

Each year, students attend the Office of Civic Engagement’s “alternative spring break” trip. Of this year’s 120 applicants, 16 were selected to work with Habitat for Humanity to continue rebuilding New Orleans’ 9th Ward.

“I have been doing volunteer work for so long that it is a major part of who I am. At this point, it is second nature for me to set time aside to do volunteer work, and I enjoy every second of it.”

–Alex Callinan ’20, Mechanical Engineering
For a small town, we have an extensive menu of restaurants to choose from. Eat around town or the world. There’s a cuisine for any palate or mood.

- Siam Orchid for fresh sushi
- Meg O’Malley’s for traditional Irish fare
- **OLD SCHOOL PIZZA FOR NEW YORK-STYLE PIZZA**
- Del’s Freez for a mom-and-pop ice cream shop
- The Sun Shoppe for a much-needed coffee break
- **MATT’S CASBAH FOR AN ECLECTIC MENU AND RELAXED VIBE**
- Rolli for a famous pork loin sandwich
- The Nomad Cafe for international daily specials
- **THE MANSION FOR A ROOFTOP VIEW OF THE INDIAN RIVER**
“Just try it.”

It's a mantra for parents of picky eaters, foodie friends of less-than-adventurous dinner dates and Florida Tech chef de cuisine Jon Skoviera, the mastermind behind the university’s annual International Dinner Series.

Together with food service director Tom Stewart, Skoviera established the International Dinner Series five years ago to broaden native-born students’ and Brevard County residents’ culinary horizons and provide international students a sense of "home."

“I think it actually allows the students—especially if they’re thousands of miles away from home—to show off something they know as comfort.” Skoviera said.

Each month, the dinner series showcases a different culture, from Caribbean to Indian to Chinese, featuring music, entertainment, traditional dress, informational booths and a menu of regional fare painstakingly developed with the help of international students, faculty and staff who taste test for maximum authenticity.

“We’re a very diverse university,” Skoviera said. “So that’s a lot of how I think this started—to show off the diversity of the student population and get the students involved with it.”
The Legend of ...
Keuper, a Quarter, a Dime and Two Pennies

It’s 1958, and Florida Tech’s founder and first president, Jerry Keuper, joins a few colleagues at the Pelican Bar. Together, they conspire to create an after-hours engineering program in Melbourne for local missilemen. Someone standing to the side overhears the conversation, tosses 37 cents of change and quips, “Go start your college with this.” Or so the legend goes …

Seven years later, when Keuper opened a letter from the advertising department announcing a nationwide contest for a free, full-page ad, this episode sprang to his mind. Unable to resist the opportunity to promote the university, he quickly tasked Homer Pyle, the college’s part-time publicist, with composing a proposal.


The Legend of …
The Great Quail Escapade

On a flight from Colombia to Florida in fall 1972, Keuper hatched one of his zaniest schemes on record: Launch a quail hatchery at Florida Tech.

The trip itself had nothing to do with quail eggs, but upon seeing a bowl of them during a meal, a light bulb went off in Keuper’s head. He threw himself into devising a plan.

The university formed a subsidiary called FIT Farms Inc. to produce the quail eggs. Eggs he brought back from Colombia formed the brood’s nucleus, and an old carpenter’s shed near what is now the Harris Student Design Center was retrofitted into a quail roost.

By early December, 300 quails were “laying like mad at the campus hatchery,” Keuper was overjoyed. The quail scheme, however, was not destined for success. Only a handful of local supermarket managers expressed interest in marketing the speckled product. By 1974, Keuper had decided to shut down FIT Farms Inc. and close the quail hatchery.

This wasn’t the last of Keuper’s critter-centered schemes. Later, he would receive a flock of peacocks to wander the campus. Still later, he would acquire a large herd of long-horned rams as part of an experiment seeking to devise a male contraceptive.
The Legend of ... The 600-Student Streak

In 1974, a streaking fever hit college campuses across the nation. It took only two men in their birthday suits—one with a towel around his head and another wearing only a Groucho Marx mask and a backpack—to inspire 600 students to follow their lead.

Two hours later, a third streaker dashed from Wood Cafeteria to Shaw Hall. Within hours, a whispering campaign began rallying support for a mass campus streak.

Two days later, the local press reported the streak was going to happen at 9 p.m. The police prepared a perimeter along Country Club Drive to ensure the streakers remained on course.

The night of the streak, a crowd of nearly 1,000 people gathered at the Crawford Building awaiting the sound of a bugle. When the rebel yell sounded, 600 adventurous students broke into a run shouting, “We’re No. 1!”

Together, they ran naked past the president’s office, through the dorm quad and on to Roberts Hall. Some of the students sported bow ties as a salute to Keuper, who was rarely seen without one. Others displayed signs saying “Hi, Mom” and “Hi, Pop.” One wore bunny ears. One wore a sombrero. One rode a bicycle, while another arrived on a motorcycle. A team pulled a chariot.

The streak was over in a matter of minutes.

It was estimated that 55 percent of the student body had participated in the streak. By midnight, the students were back in their dorm rooms—presumably, fully clothed.

The Legend of ... The Leprous Armadillos

Eleanor Storrs became fascinated with armadillos early in her doctoral studies. After overhearing a group of leprosy researchers lamenting the absence of any animal model that could be used for leprosy studies, she knew the perfect candidate.

Armadillos maintain the same body temperatures as humans, so they are a prime species to inoculate with leprosy. Her idea was originally laughed at by colleagues, but soon her findings were published in the prestigious journal, *Science*. Subsequently, the World Health Organization and National Institutes of Health awarded Storrs a series of contracts to provide armadillo tissue with leprosy for studies seeking a vaccine against the disease.

Four years later, Storrs accepted a research professorship at Florida Tech’s Medical Research Institute. During the next 15 years, she conducted a wide-ranging series of experiments on leprosy and other infectious diseases.

While it might look like an abandoned tiki hut, it’s actually a shuttered nuclear laboratory.

In 1965, the university’s physics department received one heck of a donation: a 5 million electron volt linear accelerator and a 10,000 Curie Cobalt-60 irradiation source along with the needed radiation protection and remote operation hardware.

Our researchers planned to use the lab to explore “how space travelers will fight off radiation in outer space,” but before the construction was completed, a dispute arose involving the City of West Melbourne’s proposal to build a sewage treatment plant on one of Crane Creek’s tributaries.

Keuper was adamant that campus not be touched by any sewage pollution that could enter the stream that runs through campus. The university’s chair of the physics department, David Woodbridge, had a novel idea: Why not use the nuclear reactor to purify sewage water? His past experiments confirmed that the process could eliminate up to “97 percent of bacteria and pathogenic organisms.” With the addition of microfilters, both solid and liquid sewage could be turned into potable water.

Soon, the “bio-nuclear sewage converter” buried in a metal cylinder next to the Crawford Building was receiving daily deliveries of 300 to 400 gallons of sewage to treat. Students irreverently dubbed the facility the “atomic toilet.”

However, plans for Melbourne’s Space-Age nuclear sewage plant started to fade when city inspectors blocked the necessary permits to make it a fully operational facility. Shortly after, Woodbridge took up other projects, and the “atomic toilet” remained dormant until 1981, when it was decommissioned.

Now, all that remains of one of Florida Tech’s most imaginative endeavors is our distinctive kiosk and an underground passageway linking the “atomic toilet” to the Crawford Building.
Unfortunately, only six images fit on this page, but there are so many more! Search #FloridaTech to uncover the rest of the best.

@floridatechwomensrowing
Relaaaaaxxxx. Some mornings it’s easier than others.

@imsjets
Whatcha doing in there @zcostello331?

@x.laurenann.elizabeth.x
Floating out of teenage years likeeee 🎧 #20
Photo by @teddymageto

@floridatech
Just a shark selfie by @asc_sharkstudies

@floridatech_homecoming
Gabriela and Pedro representing the Latin American Student Association and Pi Kappa Alpha.

@floridatech
"Man, I remember the first time I climbed up on that statue 6 years ago with an old Baseball uniform which we cut and used safety pins to hold the shirt on the statue... I was told ‘you’re crazy, they’ll yell at you’... and now look at this." @galappelbaum
While your core mission during college is to earn your diploma and walk across the stage at graduation, there are some expeditions you can only seek at Florida Tech. Should you choose to accept, you have four years to complete your adventure, Mission: Florida Tech.

Take a picture in front of the panther mural in Downtown Melbourne.

Browse WFIT’s Market Day booths for goodies, like local honey, Florida native plants and Thai iced tea.

Watch a rocket launch, visible from campus or a short trip away at the beach. Night is the best time for rocket viewing.

Take in the awe that is the U.S. Air Force Thunderbirds team and its signature four-jet diamond formation during the Melbourne Air & Space Show. (Bonus: The team practices over campus!)

Watch the Florida Tech jet dragster speed down the racetrack with Larsen Motorsports.

Rock out at Homecoming Fest. Past performers have included Wyclef Jean, Cold War Kids, The Fratellis and Matt and Kim.

Enjoy a worldly experience at International Festival, where hundreds of students and locals come together for a cultural celebration of food, performance art and beloved traditions.
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Plan a visit
Schedule a campus tour or register for an upcoming admissions event at: floridatech.edu/visit

The crowning architectural feature of the F.W. Olin Physical Sciences Center at Florida Tech is the Ortega 0.8-meter (32-inch) telescope.