SPRING 2013

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MECHANICAL & AEROSPACE ENGINEERING

Gator falls 102,800 feet to benefit aviation

As a POW in Vietnam, **Joe Kittinger** spent considerable time in solitary confinement — but he didn't let this restrict his mind.

While he had nothing to read or do, he distracted himself by planning how to fly a balloon non-stop around the world. He mentally designed the balloon, the capsule, and the navigation and communications equipment.

He repeated this mental exercise for days on end. It gave him the motivation to believe he'd eventually be released from incarceration and able to pursue his aspirations.

Alumnus Col. Joe Kittinger at UF

It's this determination and strength that allowed Kittinger to spend his life setting world records and making huge strides in both aviation and aeronautics.

His ambitions to be a fighter pilot began as a child and never faded. In order to enlist in the U.S. Air Force Aviation Cadet program, he knew he needed two years of college education.

He chose the University of Florida, and he started in 1946, when WWII veterans began attending. He lived with three other people in temporary barracks and studied in the library.

After two enjoyable years, he was able to enlist and enter flight training. His career in the USAF continued for 29 years, and it's during this time he completed the famous Project Excelsior, jumping by parachute from 102,800 feet in the air.

This feat took extensive preparation. The first jump, Excelsior I, experienced an equipment malfunction, but he was able to land safely. This setback didn't deter Kittinger.

"We knew what had caused it, and I had no hesitancy in continuing on to repeat the jump from 75,000 feet," he said. "I had confidence in my team, my equipment and myself. All three of the ingredients are required to participate in such research."

The Excelsior 2 jump went as planned, and he was cleared to make the Excelsior 3 jump in 1960 from 102,800 feet, which would become the jump that set a word record for the highest parachute jump and the longest parachute freefall.

As he fell, he thought about how the data they were acquiring would provide the much needed information necessary for the coming Space Age.

One of the main objectives of the jumps was to develop a small stabilization parachute to assist high-flying pilots and astronauts in escaping from high altitudes, and his contribution to this effort remains one of the most gratifying accomplishments of his life.

"The parachute we developed is still being used in Air Forces around the world in

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INSIDE

UF UNIVERSITY of FLORIDA

Letter from the
CHAIR

David W. Hahn

Dear Colleagues, Alumni and Friends,

Welcome to the Spring 2013 issue of the MAE newsletter. I am pleased to provide an update of the many events and activities in the department to our students, alumni, faculty members and friends. The popularity of Mechanical and Aerospace Engineering continues to grow, and I am proud to announce that MAE is now the largest department in both total students and undergraduate students on the entire campus, with 2,100 students. Go MAE! The size and diversity of our department is nicely reflected by a sampling of this semester's activities. Col. Joe Kittinger, a proud Gator and MAE alumnus, was received by a standing room only crowd as he talked about his amazing aviation career. Joe is a true American hero, and his time spent with our students and faculty was a special day for us all. Our students continue to excel in many ways, with MAE teams competing in the Vex Robotics, ASME Human Powered Vehicle Challenge, Air Force University Nanosat Program, Formula SAE and Hybrid Rocket Competition to name a few. Our students have engaged our friends and alumni for professional development — with a number of prominent guest speakers this semester coming from companies such as Lockheed Martin, Harris Corporation and Pratt & Whitney — while also reaching out to our External Advisory Board members. As our B.S., M.S. and Ph.D. students leave the department and pursue a broad range of career paths, our hope is that they leave with a breadth of experience and represent the Gator Engineering Nation with excellence and professionalism in all aspects.

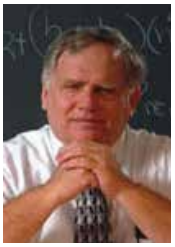
I would like to focus on the career paths of our graduates in this letter; in particular, I'd like to address the next step following graduation. This year, MAE will graduate about 300 B.S. mechanical and aerospace engineers and well more than 100 M.S. and Ph.D. students. So where do our students go after graduation? The answers are important to us as we seek to prepare our students for success, but also as we make our case for the key role that MAE plays in providing a well-trained and valuable engineering workforce for both Florida and the nation.

Our exit surveys completed so far this year by about 250 undergraduate students provide a nice snapshot of our young alumni's first career steps. About 30% of our students plan to attend graduate school at some point. Of those students, about 12% will pursue a professional degree other than engineering, including MBA (most popular), law and medical programs. Among those pursuing advanced engineering studies, remaining at UF for the M.S. or Ph.D. is the most popular choice, followed by attending Georgia Tech. It is also satisfying to see our students heading to some of the nation's other top programs, including MIT, Stanford, Purdue and Michigan.

Of the students who have already accepted jobs, the graphic on the back cover shows their employment sectors. Perhaps surprisingly, the leading sector is aerospace, including placement at Boeing, GE Aviation, Lockheed Martin, Northrop Grumman, Pratt & Whitney, Cessna and SpaceX. Following aerospace are energy (e.g. ExxonMobil, Siemens, Chevron and Schlumberger), federal (e.g. Air Force Research Laboratory, Naval Air Station, USMC), and manufacturing (e.g. Cummins and John Deere). Dean Abernathy was pleased to recently report UF is ranked as ExxonMobil's top recruiting school! We consider our engineering graduates as key contributors to an innovation economy, and it's nice to see that more than 40% have accepted positions within Florida. Finally, I note that 48.5% of this cohort participated in an internship or co-op program during their undergraduate studies, providing valuable training.

Our primary mission is to train the next generation of technical innovators and leaders within and beyond the engineering community. I hope you share our pride in the success of our students as they embark on their careers and continue to add to the reputation of our Gator engineers!

Professor places priority on bringing practical experience into classroom



Prof. **Skip Ingley** earned his B.S., M.S. and Ph.D. at the University of Florida. After completing his Ph.D. program in 1971 and teaching at Santa Fe Community College, a couple of UF faculty members asked him to come back to the university to assist with solar energy and energy conservation research. He joined the faculty and began teaching classes.

Forty years later, he's still a UF mechanical engineering professor, and his love of teaching hasn't faded a bit.

Since Day 1, Ingley has gone above and beyond to ensure students are prepared to enter the work force.

"If we're going to teach these kids," Ingley said, "we need to follow through to make sure they get a job."

He makes it his priority to help students become well equipped to start careers when they graduate. This dedication and hard work was recognized when he was named the 2011/2012 College of Engineering Teacher of the Year.

One of his main contributions to his classes is the practical experience he can draw upon while teaching.

Back in the 1980s when he began teaching more courses in the air conditioning area, Ingley started a new aspect of his career.

"I thought, 'Here I am teaching this stuff, but I've never really done it,'" he said.

This realization sparked his consulting business, which covered a variety of areas from creating utility master plans to doing energy conservation work to redesigning systems of hospitals and schools.

At the same time, he was able to keep teaching, and he felt he had the best of both worlds.

"I really had the opportunity to go into the classroom to teach students what I had learned out in the real world," he said. "I think it's been a big benefit to many."

His lecturing style follows the 10-2 teaching rule: 10 minutes of teaching followed by 2 minutes of allowing the students to absorb the information. During these 2 minutes, Ingley tells stories about his work, providing context for the material.

But he doesn't just talk about the engineering work. He tries to pass on more general career advice that would help them be successful, and he does this by teaching a consulting practices course. In this class, he teaches how to manage a team, run an effective meeting, market a project and advance in other practical business skills.

"One of the things I learned in the consulting business is how important communications is," he said. "In our profession, we get to meet a lot of different people and interact on a lot of different levels. That diversity makes it very interesting."

He said this particular course would be impossible for him to teach without having his consulting experience under his belt.

He draws further inspiration from the professors he had while attending UF. For example, his professors organized a variety of field trips and Ingley was able to get a good view of what the industry really looked like. Now he takes his students on field trips, too, showing them how systems really operate and how certain buildings are built.

"I really believe I got an excellent education," he said. "I felt I was well-prepared and able to compete at a high level."

He's been bleeding orange and blue ever since.

"I'm a Gator," he said. "My dad went to UF, my brother went here, my sister-in-law went here and most of my kids have gone here. We have a lot of legacy with this school, and I love it." ▲

Professor emeritus made major contributions to WWII effort

Since high school, **Alex Green's** goal was to get an advanced degree in physics. But while he was working on his Ph.D. at the California Institute of Technology, Pearl Harbor was attacked, and he decided to narrow his professional focus — he wanted to help win the war.

Green used his technical and scientific training to make significant contributions to the World War II effort. It began while working on Caltech's Rocket Program. He proposed the idea of a Firing Error Indicator (FEI) to help gunners-in-training shoot at moving targets. In August 1942, the Office of Scientific Research and Development and the National Defense Research Committee funded the FEI concept. The Caltech team developed multiple prototypes to measure the shock wave of supersonic bullets. In 1945, the FEI was functionally adapted into a shock wave instrument that

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participated in a major historic event — the dropping of the nuclear bomb on Hiroshima.

"The instrument's 15,000-ton TNT yield measurement from the bomb effectively announced to the world the Dawn of the Nuclear Energy Age," Green said.

In 1944, Green's work on the FEI at Caltech led to his induction as a gunnery expert with the U.S. Army Air Forces. He was sent to the China Burma India headquarters of the 20th air force to evaluate the effectiveness of the new B-29 bomber's gunnery system.

His analysis of their first 25 combat missions showed a completely different perspective than that of a large combat simulation study done in the U.S. In light of the new information he uncovered, he said tactics were modified and improved.

It wasn't long before Green started working on a new project — increasing the accuracy of ship identifications made by B-29 crew members. Because of Green's knowledge of the gunnery system, he was able to use measurements made with the gun sights and calculations with his specially designed slide rule to improve ship identifications.

It just so happened that on his first reconnaissance mission, they discovered the Japanese fleet that had been lost by the U.S. for five months. Just before the Battle of Okinawa, the American Navy sank half of the ships in Hiroshima Bay and Kure Anchorage.

"It was a historic battle I happened to get involved in thanks to the ability to measure ships from 30,000 feet with the help of the B-29 gunnery system," Green said.

After Green solved this problem, he was transferred to 20th AF headquarters on Guam, where other headquarters staff heard that he could design special slide rules. Because of the demand, Green developed a uniform frame that could go from one problem to another just by inserting a special computing chart.

"It caught on," Green said, "and before a few months went by, every B-29 had at least two of his slide rule computers."

Green's contributions were all made while he was a part of a service most people aren't familiar with. They were called Operation Analysts. Most of them were scientists, technologists, engineers and mathematicians who were there to solve technical combat problems.

"Because we spent most of our time on solving unanticipated technical combat problems rather than on analyzing operations," Green said, "I think a better name today would be Combat STEMs."

On March 12, 1945, the B-29 made an emergency landing with empty gas tanks at the 14th AF fighter field in Xian, China. (Green standing third from the right.)

While Green may have originally wanted to do fundamental physics, he said the war made him an applied physicist.

"An applied physicist is basically an engineer," he said. "I was involved in so many different types of problems that I became used to going from one problem to another."

This mentality didn't fade when he became a graduate research professor at the University of Florida in 1963. He made sure to keep his lecture material relevant and up-to-date.

"When I dried up in one subject, I would move over into a new subject and tried to take advantage of some of the methods I developed earlier in my other work," he said. "I mainly tended to get involved in problems before they were established as university subject areas."

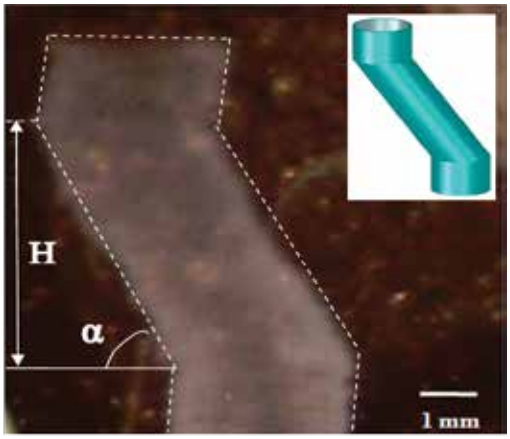
On top of teaching at UF, he researched nuclear and coal power and alternatives to oil issues. His last UF work was on converting biomass and waste to energy using special processes.

In fact, his Green Pyrolyzer Gasifier, which is an oven system that creates energy by burning waste, is a finalist for the Cade prize. Green, now in emeritus status, still writes technical reviews and does manuscript reviews for journals. He has contributed a significant amount, and his contributions have yet to stop. ▲

To learn more about slide rules and Green's role in WWII, you can view "How Slide Rules Helped Win the War," an online lecture at: **www.mae.ufl.edu/sliderule/pages/home.html**

YONG HUANG joined the UF Mechanical and Aerospace Engineering faculty in January 2013. Previously, he had taught at Clemson University since 2003 after receiving his Ph.D. in Mechanical Engineering from the Georgia Institute of Technology. His research interests are two-fold: processing of biological and engineering materials for healthcare/energy applications and understanding of process-induced damage or defect structures. His current research topics focus on 1) three-dimensional direct writing of biological and engineering structures, 2) precision engineering of medical implants and performance evaluation of machined implants, and 3) fabrication of polymeric microspheres / microcapsules / hollow fiber membranes. He served as the Technical Program Chair for the 2010 American Society of Mechanical Engineers International Manufacturing Science and Engineering Conference (ASME MSEC 2010). He received numerous awards including the ASME International Symposium on Flexible Automation Young Investigator Award (2008), the NSF CAREER Award (2008), the SME Outstanding Young Manufacturing Engineer Award (2006) and the ASME Blackall Machine Tool and Gage Award (2005). He is a Fellow of ASME.

CHELSEY SIMMONS joins the UF Mechanical and Aerospace Engineering faculty this fall following a visiting research position at the Swiss Federal Institute of Technology (ETH) Zurich. Simmons was born and raised a Gator. She received her B.S. cum laude from Harvard University and her M.S. and Ph.D. from Stanford University. She has been awarded numerous fellowships and grants, including an NSF Graduate Research Fellowship, the Stanford Cardiovascular Institute Smittcamp Fellowship, the Stanford Diversifying Academica, Recruiting Excellence Fellowship and a Burroughs Wellcome Foundation Collaborative Research Grant. In addition to her engineering research and coursework, Simmons received a Ph.D. Minor in Education and was a founding officer and President of Stanford's American Society for Engineering Education. She also serves on the advisory board of a company based on one of her pending patents. Her research focuses on mechanical design for biomedical benefit: inventing, prototyping and testing microsystems to mimic bodily functions in a dish.



Prof. Yong Huang's group uses 3D inkjet bioprinters to fabricate complex structures like this fibroblast-based zigzag tube.

CONGRATULATIONS TO:

Prof. Warren Dixon, who was elected to serve on the prestigious Air Force Science Advisory Board for a four-year term.

Prof. Subrata Roy, who received the Distinguished Visiting Fellowship of the Royal Academy of Engineering and will spend a month during summer 2013 at the University of Manchester giving lectures and discussing plasma actuator related work. Prof. Roy also will deliver the Keynote lecture at the 4th Aerospace Thematic Workshop: Fundamentals of Aerodynamic Flow and Combustion Control by Plasmas in Assuois, France. Prof. Roy supervised the undergraduate student, Thomas Underwood, whose work received the University Scholars Program Best Paper Award and is now published in the prestigious Journal of Applied Physics.

Prof. Ghatu Subhash and colleagues for receiving a $900,000 research grant from the Department of Energy to continue their work on novel materials for enhanced nuclear fuels. Prof. Subhash received the College of Engineering 2012-2013 Teacher/Scholar of the Year Award.

Professor collaborates with researchers, students on brain deformation analysis

Since Prof. **Ghatu Subhash** joined the UF faculty six years ago, he's managed to keep extremely busy.

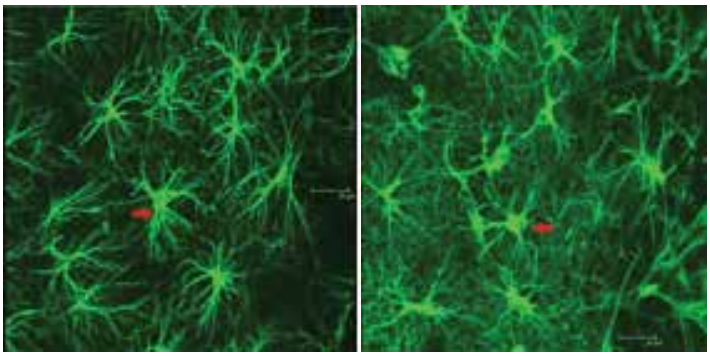
He works on a variety of research initiatives, from understanding how hard and soft materials behave in extreme environments to developing a unique process for making nuclear fuel in just five minutes.

He collaborates with a variety of researchers, including medical professionals, materials science professors, researchers in the nuclear field and 14 UF engineering students.

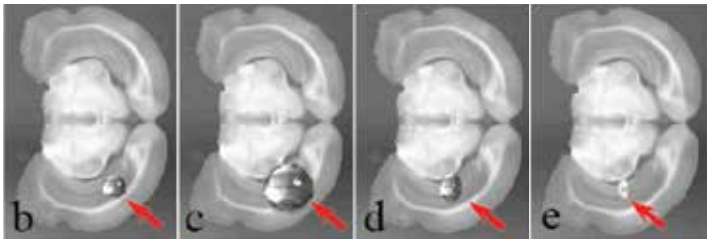
"The students are so energetic," Subhash said. "Most of my energy is coming from them; it's contagious."

His research group has crafted eight journal papers per year and about a handful of patents. When they're deciding what projects to tackle, they consider what ideas haven't been explored. Even if a problem has a solution, that doesn't mean it's off the table because there are always more efficient and simpler ways to do it.

"We try to figure out the approach that nobody has taken, and we want to be the first people to do it," he said. This would allow for the problem to be solved more efficiently, more cost-effectively and more smoothly.



MAE doctoral student **Canchi Saranya** provided these images of healthy (left) and damaged (right) brain cells from studies she is performing with Professors Ghatu Subhash and Malisa Sarntinoranont to study blast-induced traumatic brain injury and post traumatic stress disorder. The red arrows show a typical healthy cell (left) and a damaged cell (right).



Bubble growth and collapse in brain tissue. The images are taken at a frame rate of 200,000 per second. (Images provided by graduate student **Yu Hong**)

One of their current projects involves analyzing how brain deformation occurs and how it can be prevented.

One theory is that traumatic brain injury occurs when a blast causes a pressure wave which goes through the brain. The tail of the pressure wave always contains negative pressure (tension). This tensile component causes cavities to grow in the brain tissue which eventually collapse to cause damage to local neurons. This could be what's leading to the neurological damage.

However, the work doesn't end at a theory. The group's intention is to model the phenomenon, and doctors as well as biomedical professors (MAE Prof. **Malisa Sarntinoranont** and Dr. Michael King of VA) are helping them to accomplish this. The ultimate goal is to be able to measure the amount of damage that can be caused by one of these bubbles collapsing in the brain. They are conducting experimental studies both on brain tissue and surrogates (gels).

They focus on the hippocampus because of its high density of neurons, and they examine how the neurons die and how quickly they die. As their understanding grows, so will the potential for better prevention.

Subhash does his best to incorporate his research into his curriculum. For example, many undergraduate students understand the concept of loading rate and how an impact affects material behavior. However, instead of reiterating a concept, Subhash can use his research to provide a real-life situation to which the concept applies. In this case, understanding how the rate of force is dissipated by the use of softer materials in helmets can help keep athletes safer.

He already has two patent applications filed on the innovative design of helmets which can prevent concussions and impact related injuries. Both are in collaboration with medical doctors.

"I love the fact that I can take a break from research, go teach and get back to my research feeling energized," he said. "It's never tiring — that's the best part of being in academics. It's exciting every day." ▲

FACULTY SPOTLIGHT:

Prof. Bhavani Sankar served on the Vietnam Education Foundation Interview Mission in the Fall of 2012 in order to help identify promising students interested in attending UF and other U.S. graduate schools.

Engineering student finds success through SAE

If you're on the verge of failing out of school, it can be easy to give up. **Sean Niemi** wasn't going to let that happen. "I needed to do something," the MAE graduate student said. "I needed to get myself out of my apartment, out of the little tiny crevice you end up finding yourself in."

At that time, he was a freshman looking to turn things around. When he overheard two students working on their SAE projects and discussing the parts of their car, he thought it sounded interesting. He decided to give it a shot.

"It didn't take long for me to get hooked," he said. "Everyone was so dedicated, so once I walked in the door, it was a no-brainer."

After joining, he took the equations he learned in class and applied them to the problems he encountered in SAE. His GPA went up significantly.

By the next semester, he was able to redesign three components on the car based on what he learned in class.

"I got the ability to look at something, mentally take it apart and see what can be done better," he said.

Niemi has been on the UF SAE team for five years now, and he works as senior design engineer. In total, SAE consists of about 20 to 30 students whose goal is to design and manufacture a vehicle prototype to participate in the world's largest international collegiate engineering competition.

It was officially announced in December that Porsche would be the primary sponsor for the UF SAE team. Niemi said this reassured the team members that they were moving in the right direction, and they're determined to continue on the route of good, clean design mixed with solid fundamentals.

The 2013 competition will take place from May 8 to May 11. Until then, Niemi averages about 15 to 20 hours a week working on the car.

"It's almost become an addiction for me — the pace of it, how much there is to do, how much there is to learn," he said. "It was the perfect outlet to be able to say, 'Here's an interesting problem. I wonder how I can solve it.'"

He's worked on at least half of the car, contributing to everything from composite design to vehicle aerodynamics. In addition, the opportunities he had to sharpen his leadership ability and present in front of leaders in the field proved highly beneficial.

"The list of skills I learned is a mile long," he said.

The UF SAE team with their car at the 2013 Formula SAE competition, where they finished in the top 10.

Niemi graduated in May with dual majors in mechanical and aerospace engineering. He's now working on his master's in mechanical engineering at UF, and he continues to devote several hours a week to SAE.

"I would recommend it to anyone who wants to succeed and feel like they got the most out of their college experience," he said. "It's the single best thing I ever decided to do in my college career." ▲

CONGRATULATIONS TO:

Christopher Cruise, who received the UF Presidential Service Award for his dedication to social justice, community awareness and civic engagement on campus and in the community.

Nicholas Fischer and **Daniel Frank** for receiving the 2012-2013 Attributes of a Gator Engineer Award.

Kevin Hetzendorfer and **Derrick Ross** for winning national-level scholarships from Pi Tau Sigma. In addition, the UF student chapter was awarded the 2nd Tier Pi Tau Sigma National Secretary's Commendation Award.

The Florida Alpha Chapter of Tau Beta Pi for receiving the R.C. Matthews Outstanding Chapter Award for 2012.

The UF ASME Human Powered Vehicle team for bringing back a trophy for winning 2nd place in the innovation event from competition. They also won the "Puzzle in a box" award for designing and building a vehicle that was able to be packed into a travel case and taken aboard an airplane as luggage.

Philip Breaw (ME), ASME student chapter president, who received the 2012-2013 MAE Student Leadership Award.

Students launch Solar Car club, prepare for 2014 competition

When students arrive at the University of Florida, they can participate in a wide range of available extracurricular clubs and activities.

But Jason Rosen, a junior materials engineering major, did something a little different — he started his own club.

Inspired by his experience working on a solar car team in high school, Rosen decided to create a similar group at UF in 2012. It took several months to work out the logistical details, but now Rosen is the president and captain of a group of about 15 people determined to design, build and race a full-size, solar-powered car.

Participants include mechanical engineering majors, electrical engineering majors, business majors and industrial engineering majors in order to meet all of the project's needs. The Solar Gators are also welcoming new faces to grow the organization.

"We offer a way to get hands-on experience," Rosen said. "It's one thing to learn about mechanical design or circuits in your classes, but when you actually get to apply it, you see it all come to fruition."

Senior mechanical engineering major **Joseph Herrera**, who serves as the lead designer and head of the mechanical team, shares Rosen's perspective.

"I know putting a lot of work into something gives you a lot of satisfaction when you have an end result," Herrera said. "I was drawn to Solar Gators because of the challenge."

He said this semester, the mechanical team has been working about three hours every day on designing the car from the ground up. The trial and error of this process has allowed him to learn more about design through experience.

He also enjoys getting exposure to other aspects of the project's development.

"I've met a lot of new people from this," he said. "I work with people from different disciplines. I'm not just seeing the mechanical side of any project."

The group's currently in the stage of machining parts.

"We got our first order," Rosen said. "Now I know it's actually going to happen. We fought most of the battle, but we still have to work hard. We still have to push. And to see everybody working together with the same goal, to see that is really inspiring."

While they were originally aiming to race this year, they decided to take their time and get everything working as well as possible. Rosen remains confident.

"By next year, we'll definitely be ready to race," he said. ▲

The Solar Gators lightweight vehicle is being fabricated for racing next year.

Progress Energy/Duke Energy gave UF a 100-kilowatt solar photovoltaic array, which will save enough energy to avoid about $50,000 in costs over the system's lifetime. This is a key addition to the Energy Park, enabling solar PV energy research to accompany the already existing research on fuel cells and solar fuels. UF's partnership with Duke Energy started in 1948 and continues on. Duke Energy's efforts are helping UF reach its Carbon Neutral goal by 2025.

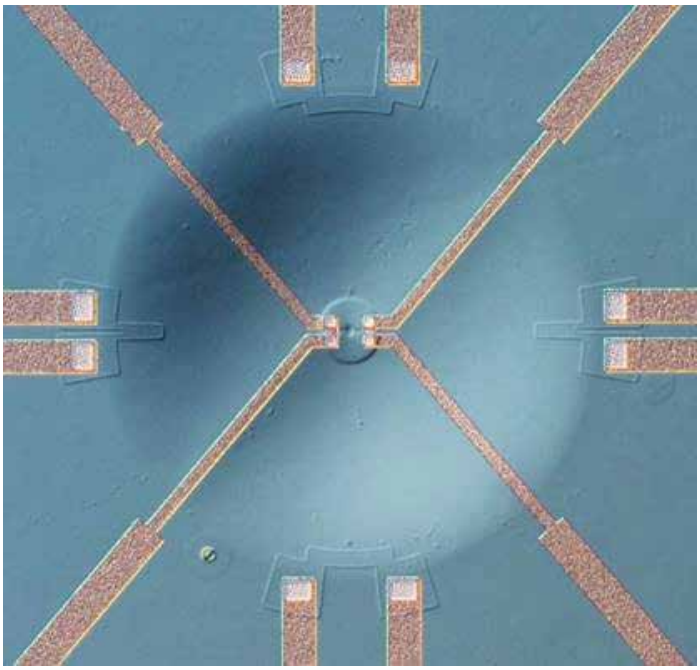
Donated PV array as installed at the UF Energy Research and Education Park

Recent alumnus values technical skills and versatility gained in MAE

When **Venkat Chandrasekaran** earned his Ph.D. from UF, he knew he wanted to work in industry. Aside from that, he didn't know how his professional life would unfold.

In 2004, he decided to do a post doc at the Massachusetts Institute of Technology. His research focused on microelectromechanical systems (MEMS), and with his UF degree and his MIT experience, he felt prepared to find good job prospects.

He ended up getting an offer to work at Texas Instruments, a company he knew was well-respected. He accepted a design engineering position, but he soon had the opportunity to explore how large-scale manufacturing worked. He helped with debugging and solving problems, and he branched out into doing more of what it takes to run a high-volume business.



Micromachined acoustic proximity sensor from Venkat's dissertation work.

> *"The company might give you a role very different from your academic background and you can't be the person who insists on doing a specific thing. You have to do what the company needs in that moment."*
>
> - Venkat Chandrasekaran

After five enjoyable years at TI, Chandrasekaran accepted a position at Analog Devices, a highly regarded MEMS company. While he started in a design capacity, he took on many roles like he had at TI, and he attributes these opportunities to his experiences at UF.

"The best thing UF did for me was make me very versatile," Chandrasekaran said. "No matter where I went, I was technical enough to take on different roles, which helps quite a bit."

He said MAE Prof. **Mark Sheplak's** group in particular helped him to learn a variety of beneficial skills. And it wasn't just his educational background that benefited him — it was the soft skills he learned in the MAE department.

For example, having autonomy in the lab, the responsibility of setting up experiments and the opportunity to collaborate with other research groups taught him valuable skills, and he said Analog Devices noticed his well-rounded abilities.

He currently works as an applications engineer, which allows him to see where the product ends up, creative things people do with it and what their needs are. This has been his favorite role so far. When he worked in design, the product disappeared after his work was done, and he never knew where it ended up. Now he can see the whole process through.

Based on his experiences, Chandrasekaran recommends soon-to-be MAE graduates stay open minded about the roles they accept in the industry.

"The company might give you a role very different from your academic background," he said, "and you can't be the person who insists on doing a specific thing. You have to do what the company needs in that moment."

He also suggests that in addition to learning subject knowledge, students would benefit from picking up as many software and hardware skills as possible. ▲

CONGRATULATIONS TO OUR NEWEST ALUMNI:

Luis Alvarez (ASE), who received the 2012-2013 MAE Student Leadership Award in recognition of leadership, service and citizenship in MAE.

Rommel Pabon (ASE) and **Christopher Neal** (ME) who received the 2012-2013 Sung and Yvonne Lu Outstanding Senior Awards in recognition of academic excellence, scholarship and citizenship in MAE.

ExxonMobil Gator embarks on fast-paced oil & gas career

When **Lindsey Baronich** was a MAE undergraduate student, she knew she wanted a challenging and competitive job with global potential. ExxonMobil seemed to provide the possibility to develop her knowledge and make a positive impact. Upon graduation in 2009, she accepted a position in the Drilling Organization. Over the past three years, she's had the incredible opportunity to build a career in oil and gas while engaging in activities all over the world.

ASSIGNMENT #1
Chad, Africa

On her first assignment, Baronich was responsible for supporting the drilling work for one of the three kelly land rigs working in the field. She was immediately assigned significant responsibility and learned quickly how to begin contributing to the team.

"The only way to be successful in this field is to leverage the experience of others," she said, "which is the key to success, particularly in a new assignment."

During this assignment, she also enjoyed the exposure to a unique culture and experienced the positive interaction of the local community and the Exxon Mobil community working together in a mutually beneficial way.

"It was wonderful to be a part of that experience," she said.

CONGRATULATIONS TO:

Prof. Paul Hubner, an associate professor of aerospace engineering and mechanics at The University of Alabama, who won the 2013 Felix Zandman Award for his contributions to the development of measurements and applications with the help of photoelastic coatings. Hubner received his B.S. (1990) and M.S. from UF.

MAE 2013 Outstanding Alumnus Award winners at the Annual Banquet, from left: Brian Holloway (DARPA), Charles Myers (Lockheed Martin), Ed Duran (GE Aviation), Jack Sparks (SERF), David Hahn (MAE Dept. Chair), J. Stephen Elliott (E2M Corp.), and Adam Zaricki (Harris Corp.). Col. Joe Kittinger was also recognized and was unable to attend.

ASSIGNMENT #2
Piceance Creek, CA

Baronich then transitioned to the Piceance Team, supporting one of the land rigs in the field. She was responsible for all of the phases of well planning and execution — and not just for one well, but for 10 wells at a time.

The scale, the speed of operations and the technical complexities made this challenging, but she was able to grow quickly and gain significant experience.

"It's just the right amount of learning with the appropriate amount of supervision," she said.

She worked with a large team of new engineers and enjoyed the experience of having the group learn together and benefit from each other's knowledge.

ASSIGNMENT #3
Belridge, CA

In Belridge, Baronich served as the planning engineer, which included preliminary well design, long lead procurement, cost estimating and eventually funding approval for the upcoming 40 well program.

This position gave her some exposure to the business side of drilling engineering and gave her a glimpse into the economic concerns that drive major business decisions.

"Slowly I started to get exposure to the more 'big-picture' side of the drilling business," she said.

At this point, Baronich had been changing roles every two years or less. This position gave her the first opportunity to zoom out of the day-to-day tasks and begin working new initiatives regarding project funding and interacting more with the management team.

"ExxonMobil/The Company tries to give all its engineers a very well-rounded experience," she said. "That's really important to me."

ASSIGNMENT #4
US Gulf of Mexico

In her current position Baronich works on deepwater drilling operations in the Gulf of Mexico. Her work to date has covered a variety of areas including challenging directional well design, changing regulatory and permitting requirements and the significant economic impact of deepwater drilling operations.

Baronich currently is enjoying a rotational assignment out to a 6th Generation Deepwater drill ship in the Gulf of Mexico.

"This is probably the most valuable experience that I've had so far in terms of exposure to operations and technology," she said. "It's a very rare and special opportunity to work on a premier drill ship."

CONCLUSION

Overall, Baronich has had a great experience.

"It has, bar none, exceeded my expectations for what I can do as a mechanical engineer," she said. "It's never a dull moment because we're always changing jobs and changing assignments and growing in terms of our abilities."

She said that her UF education afforded her every opportunity for her to be successful in oil and gas, particularly at ExxonMobil.

"The quality of my undergraduate degree from UF MAE has absolutely given me the keys to success."

MAE department chair **David Hahn** served as Baronich's academic advisor during her undergraduate career. "I remember Lindsey as an excellent student who wanted to absorb all she could during her education," he said. Hahn has continued to work with Baronich during her campus visits while recruiting for ExxonMobil, noting her willingness to give back to the department.

APPRECIATION TO:

MAE Prof. Emeritus Sung Y. Lu, along with his wife Tak-Wan and son Jimmy Lu, for establishing the Sung and Yvonne Lu Outstanding Senior Awards and Graduate Fellowship through their generous donation.

ALUMNI

When considering an aerospace engineering degree, a certain career path might come to mind. But the reality is that there are numerous opportunities in store for aerospace majors — it's all a matter of working hard and deciding what's best for you.

Where an aerospace degree can take you...

TO NASA

Sometimes it just takes a science fair to spark a dream.

UF alumnus **Ron Schlagheck** was at a high school science fair when he approached the NASA booth. The representative explained what it would be like to work for NASA, and moments after the conversation, Schlagheck's goal was to do just that.

He attended UF and earned a bachelor's in 1967 and then a master's degree in aerospace engineering. He most enjoyed working in the department machine shop in the old Hangar building and building up laser spectroscopy instrumentation in the new labs of today's MAE-A.

"These skills provided the reality of hands-on hardware and electronic experience along with the classroom academics," he said.

When he finished his graduate program in 1968, he got a job at the Marshall Space Flight Center, where all major NASA manned vehicle development was started.

However, he didn't want to do just one aerospace engineering specialty, so he explored cross-cutting design issues. His assignments involved extensive problem solving that bridged a variety of engineering disciplines.

"I enjoyed bringing science and engineering objectives together to reach a common goal of getting to space and having a successful mission," Schlagheck said.

Over the rest of his career, he held a number of important positions, from being the director for the Hubble Space Telescope for orbital verification operations to being the NASA/Mir Space Station project manager for microgravity payload planning. He ended his career as the microgravity materials science and technology program manager.

Schlagheck's favorite parts about working for NASA included the opportunity to work with the best space leadership from all of the world's space agencies along with the highly intelligent employees at NASA itself.

"The people and brain power from a wide variety of engineers and professionals from many schools and universities always amazed me," he said.

To get a job at NASA, Schlagheck recommends that students pursue an advanced degree and also try to work as an intern or co-op during their last year in college. He also said it was important to be able to communicate with and demonstrate leadership in front of the best technical and scientific people in the world.

Ron Schlagheck works on console for the Hubble Space telescope deployment mission. He was the Flight Operation Director for non-orbit verification.

TO EDUCATION

When **Knox T. Millsaps, Jr.**, first started teaching at the Naval Postgraduate School in Monterey, CA, in 1992, he stood in a classroom and started to lecture. By the time the period was over, he was only halfway through the material.

"That's one of the funny things when you become a professor," he said. "You've probably never taught before, and while you may have experience giving technical seminars, the content pace and the interaction with students is quite different."

But he taught, and he was able to pull from a variety of professional experiences to educate the students in the seats in front of him.

He's been at NPS for about 21 years now and serves both as a tenured faculty member and the Chairman of the Department of Mechanical and Aerospace Engineering.

Even though he's been teaching for much of his career, Millsaps, Jr., made sure to pursue other endeavors to become a well-rounded professional.

When he first graduated from UF in 1983, he became a junior engineer at Pratt & Whitney, both in West Palm Beach, FL, and East Hartford, CT, where he went on to become a staff engineer and then a senior staff engineer.

"I worked in three or four different groups in my first year at Pratt," he said. "I got a lot of exposure to different areas, which is always a good thing for young people."

He later spent two years on Capitol Hill working as an ASME and Brookings Congressional Fellow, and then Staff.

He said these experiences benefited him and his career. For example, one of the achievements he's most proud of is the cooled turbine blade of the F-100 fighter engine he designed at Pratt & Whitney.

Knox T. Millsaps, Jr.

"There's a sense of pride to look at the super alloys and all of their complexity of casting and cooling technology and know that you had a part in designing them," he said. "It's very rewarding."

He said while some people joke that professors aren't always practical, he's glad he can take from his industry, congressional and international knowledge.

"At universities, we teach the fundamentals," he said. "It's very important to know these and know them very well. But that's not the end-all of engineering. You have to be able to apply them to different situations. That's where your industry experience plays a big part."

While some people may not like certain types of work, he said it's important that they try new things.

"I almost never regretted anything I've done," he said. "I've only regretted the things I haven't done."

He recommends that when students graduate, they should stay out of their comfort zones. Even if they want to become professors and go to graduate school, they should try to get industrial, international and/or government experience.

"I liked all of it. Having government and international experience in some area is important; being at a university gives you a different view," he said. "I enjoyed them all. The real question is: What do I want to do next?"

TO INDUSTRY

Alumnus **Patrick Rodi** grew up just south of an airport. He loved watching large airliners fly overhead, and he dreamed of becoming a pilot.

He realized, though, that he didn't have very good vision, so he had to alter his goals.

One day, his dad brought home an encyclopedia on aeronautics, and it had a listing for "aeronautical engineer." Rodi, an 8th grader at the time, looked at the page and thought, "I can do that."

To make his new dream a reality, he pursued an aerospace engineering degree at UF in 1984. After receiving his bachelor's degree, he continued his education at the University of Texas at Austin. He graduated in 1986 and took a job in Computational Fluid Dynamics with Boeing in Washington. He ultimately went on to earn his Ph.D. from UT as well.

From there, Rodi won a post-doctoral fellowship at the National Research Council for three years at NASA Langley in Virginia.

"It gave me a lot of freedom and autonomy to study what I wanted to study," he said.

Following his experience at the NRC, he spent a brief period of time working at McDonnell Douglas before taking a job at the famous "Skunk Works" at Lockheed Martin to work on the X-33.

"It was the biggest hypersonic program in the country," he said. "Lockheed Martin Skunk Works has some of the top designers in the country. It was a very exciting opportunity."

He said the opportunity came about because they needed someone with a lot of heavyweight academic experience in hypersonics.

"They had a niche need, and I filled that niche perfectly. It was a great win-win situation," he said.

Rodi has worked at Lockheed Martin ever since. He currently works as the Houston AeroSciences Lead on the Orion Multi-Purpose Crew Vehicle. AeroSciences is responsible for aerodynamics, aerothermodynamics and rocket plume effects.

He attributes being able to move up in the company to taking on greater and greater responsibility, performing well and having innovative, out-of-the-box ideas that are also practical.

He's recently been named a Lockheed Martin Fellow, an honor given to the top engineering talent within the company.

"I love what I do," he said. "We're trying to send mankind back to deep space. In my mind, that has to be one of the coolest jobs in the world."

Rodi's advice to students is to start making contacts as soon as possible.

"If you're really gung-ho about a specific place, push early to get in on a co-op your freshman or sophomore year," he said. "It's never too early to start looking for a job after graduation."

Dr. Patrick Rodi worked on the X-33 at the Lockheed Martin Skunk Works. Credit: NASA/Marshall Space Flight Center.

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TO MILITARY

Jeffrey Riemer was 14 years old when he started flying, and he never looked back.

He wanted to become an airline pilot, but when he saw the Thunderbirds at an air show at MacDill Air Force Base in Tampa, Fla., he decided he would join the United States Air Force.

While attending UF, he signed up for the ROTC program and pursued an undergraduate degree in aerospace engineering because of his passion for aviation.

"My aerospace education laid a foundation of analytical thinking and problem solving that helps me to this day," Riemer said.

After graduating in 1974, he began his career in the U.S. Air Force, which would go on to last 34 years. He loved every minute of it.

At the beginning, he served as an F-4C Wild Weasel pilot, and with hard work, persistence and a positive attitude, years later he achieved the rank of Major General.

During these three and a half decades, Riemer flew more than 40 kinds of military aircraft, including the X-29, and completed about 24 assignments. His assignments covered a variety of roles, from being an F-16 test pilot to being the commander for the Air Force Security Assistance Center.

"My motivation throughout my career was to make things better," he said.

Riemer retired from the Air Force in October 2008. He currently works as the chief operating officer for InDyne, Inc.

Jeffrey Riemer poses for a picture at Edwards Air Force base. He worked as a test pilot in the F-16 combined Test Force.

"Upon retirement, I was proud of what I had accomplished, and working for InDyne, I still have the opportunity to contribute to the Department of Defense's success as a contractor," Riemer said.

He also serves as the chairman of the UF MAE Department's External Advisory Board and a member of the Dean's Advisory Board for the College of Engineering.

Riemer enjoyed his time at UF, and he advises students not to limit their options. He said the Air Force presents countless opportunities to contribute and make a difference.

"Our country needs individuals willing to serve," he said, "and it provides you with tremendous experience that can be useful as you pursue your passions." ▲

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providing stabilization following ejection from an aircraft," he said. "This is the legacy of Project Excelsior. I had a great team of engineers and technicians that had the same goal as myself and made the project possible."

During his remaining years in the USAF, he participated in three combat tours in Vietnam, shot down a Mig 21, spent 11 months as a POW and earned a B.S. degree from Troy State University. He retired in 1979 as a colonel.

But this hardly marked the end of his professional life. His love for ballooning sent him on additional adventures he'd imagined during the Vietnam War. Many of his flights are noteworthy, from flying solo from Las Vegas to Franklinville, NY, to being the first person to fly solo across the Atlantic Ocean in a helium balloon.

More recently, Kittinger spent more than four years associated with the Red Bull Stratos project, in which Felix Baumgartner broke Kittinger's own records by jumping from the stratosphere.

Kittinger designed the life support system for the space capsule that transported Baumgartner, made the checklists for emergency procedures and served as the communications commander during Baumgartner's three jumps from near space.

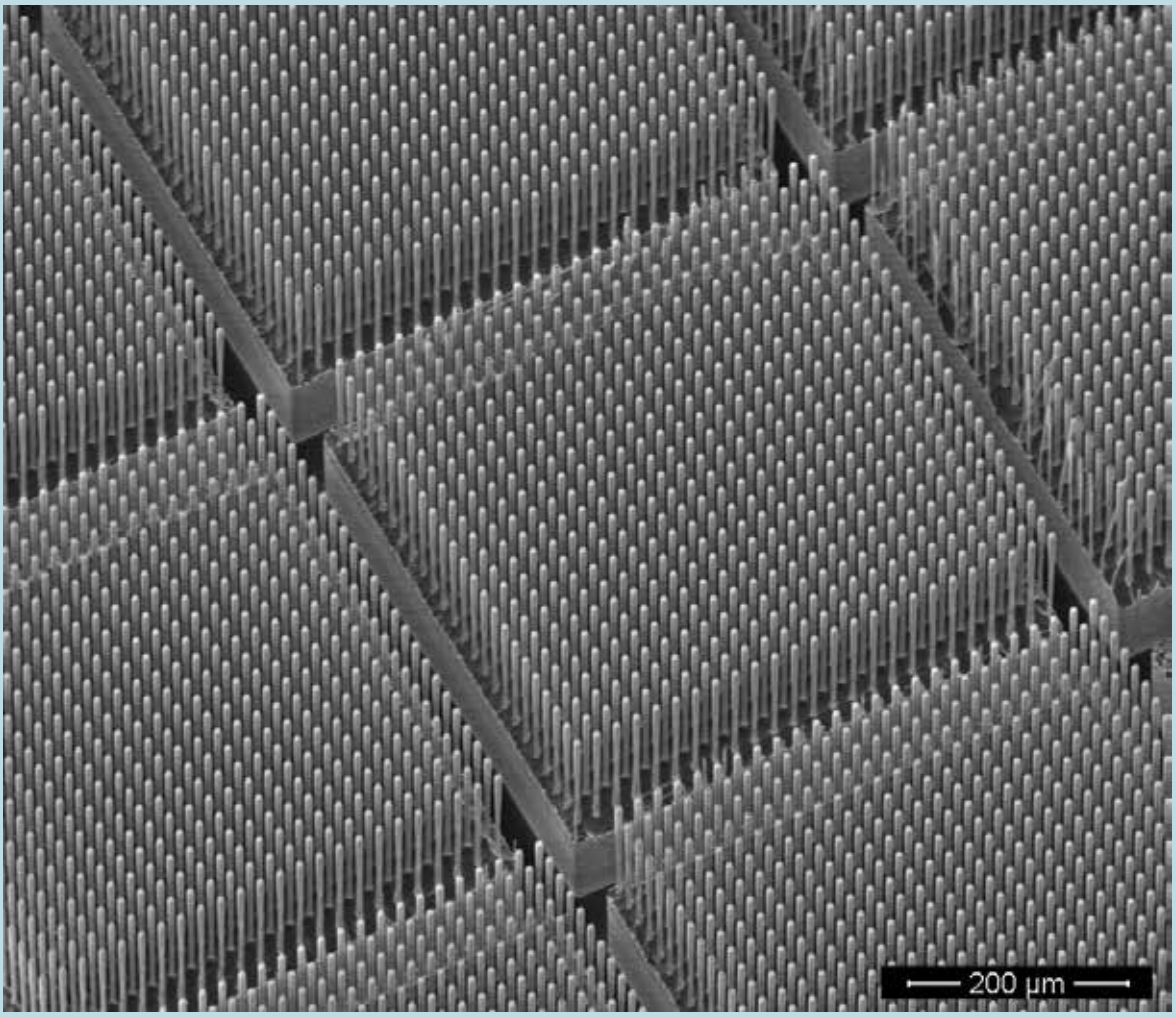
"There was no other person who had experienced what Felix was planning," Kittinger said, "so Felix had confidence in my ability to supervise him during his flights. He knew that I 'had been there and done that.'"

In February 2013, he returned to UF to speak to a group of engineering students and talk about his experiences.

"I am a proud Gator and was delighted when I was invited to speak," he said. "I enjoy sharing the Stratos story particularly. I always stress the importance of teamwork on such a complicated project."

This complements his advice to young people who want to make an impact in their lives.

"Never hesitate to ask assistance on problems that need solutions," he said. "Success depends on hard work. Develop team spirit, set goals and work toward the achievement of these goals." ▲



Saeed Moghaddam's group is developing hierarchical micro/nano-structured devices to enhance phase-change heat transfer.

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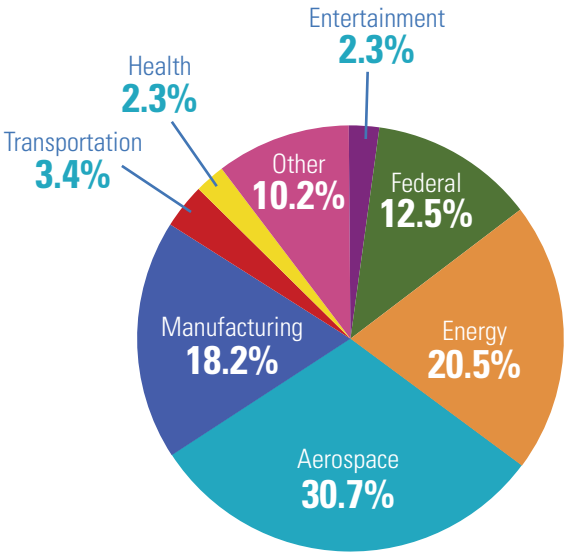

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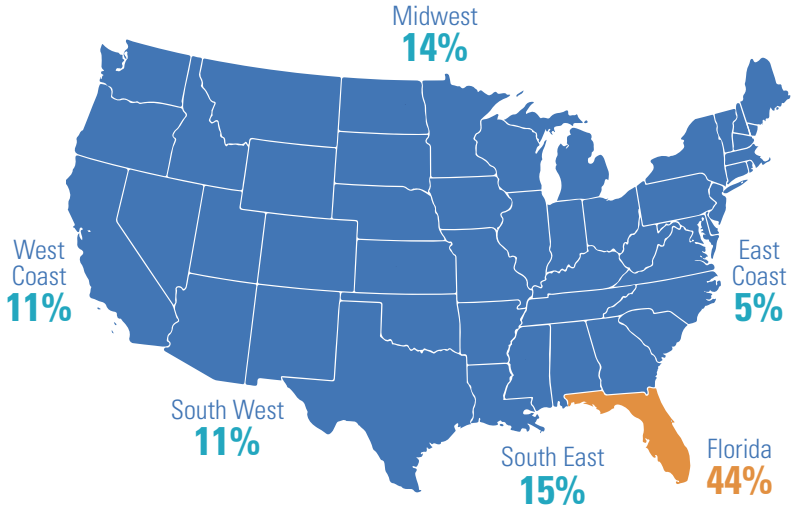

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