Understanding the Unseen Enemy

Biodefense Fellowship Works to Neutralize Chemical Agents
With this issue, we introduce a redesigned and expanded Discovery: Florida Tech research magazine. This university enriches our world by bringing technology full circle through education, research, development and community outreach. Discovery chronicles that spirit of innovation.

Since its founding almost 55 years ago, Florida Tech has taken seriously the notion of education supporting innovation. Florida Tech’s history dates to the first days of NASA. The university’s founder, Dr. Jerome P. Keuper, created Florida Tech when he saw a need for more master’s and Ph.D.-level scientists at Cape Canaveral. Keuper worked for RCA, and was one of many pioneers behind the scenes in America’s Cold War-era race for space. He translated the entrepreneurial spirit found abundantly at the Cape into a drive to build one of the world’s best science and engineering universities. He succeeded in realizing his dream.

Today, recognized as a “Tier One Best National University,” Florida Tech still embodies the spirit of its founder. In addition to its current faculty and staff, former faculty and graduates make important contributions to the high-tech landscape. Several nationally known companies can trace their humble beginnings to Florida Tech dorm rooms of days gone by.

We hope you enjoy this fresh look at Discovery.

Sincerely yours,

A.J. Catanese, Ph.D., FAICP
President & Chief Executive Officer

Discovery is the critical ingredient in the recipe of progress. Without it, humankind remains stale, stagnant.

Florida Tech researchers commit themselves to expanding the current boundaries of knowledge, always pushing to see what’s beyond the next horizon. That commitment is evidenced in the international reputation that many of our faculty currently enjoy.

Biomedical engineering, information security, robotics, automotive engineering, aeronautical science—the list of fields where Florida Tech professors are recognized as world renowned grows annually. Their leadership and expertise serve not only student success, but improve the human condition. Their successes serve us all.

This issue of Discovery: Florida Tech chronicles some of those successes, and takes an inside look at the research that is changing our world for the better. The path to improving the human condition is both challenging and exciting. We hope you’ll join us on the journey.

Respectfully,

T. Dwayne McCay, Ph.D.
Executive Vice President & Chief Operating Officer
Understanding the Unseen Enemy
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There’s about to be a flood of commercial space vehicle (CSV) launches that need a route to and from space.

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There may be as many as five million people living in the United States who suffer from undiagnosed PTSD.

Internal Waves Help Researcher Pilot Steady Course
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Design It. Build It. Dig It.
Some students tackle their culminating project with an eye to competition.

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Behavioral Strategies Fight Chronic Fatigue

Thomas Harrell never gets tired of researching the issue of chronic fatigue, a problem that may plague an estimated 12 percent of working-age adults in the United States.
Understanding the Unseen Enemy

Biodefense Fellowship Works to Neutralize Chemical Agents

Chemical agents once greatly feared for their possible use in warfare are now outlawed worldwide. Nonetheless, “They still exist and need to be stabilized or destroyed to make the world a safer place or new drugs need to be developed for treatment of exposure to the agents,” said Andrew Knight, Florida Tech chemistry professor.
“We are launching a new initiative that will give us the capacity to respond faster and more effectively to bioterrorism or an infectious disease—a plan that will counter threats at home and strengthen public health abroad.”

—President Barack Obama | State of the Union Address | January 27, 2010

The Office of Naval Research (ONR) sponsors an American Society for Engineering Education (ASEE) program for college faculty members to conduct such research during the summer at U.S. Navy Research and Development Centers.

Knight was selected by the ONR to serve as a faculty fellow for the research. He performed his research at the Naval Research Laboratory in Washington, D.C. over last summer.

Knight is researching the interface of inorganic chemistry and other scientific subdisciplines including organic synthesis, nanoscale and layered materials, medicinal chemistry, molecular biology, biodefense and green chemistry.

In the area of biodefense, Knight is studying metal-based compounds, which can be used as countermeasures for biological threats such as Ebola and Venezuelan Equine Encephalitis.

The ONR coordinates, executes and promotes the science and technology programs of the U.S. Navy and Marine Corps through schools, universities such as Florida Tech, government laboratories and both for-profit and nonprofit organizations.

Ultimately, ONR will provide technical advice to the Chief of Naval Operations and the Secretary of the Navy and will work with industry to improve manufacturing processes.

Chemical agents were used during World War I and on a more limited basis in World War II but have been outlawed ever since, he said.

“Most of it has actually been destroyed. It’s not really states or countries that we worry about using them now. It’s their possible use by terrorists.”

Some of the research centers on understanding what “catalyst” can cause the dangerous chemical compounds to degrade or break down, he said.

Another key is developing metal-based drugs—discovered by accident during the research process—which may be useful as a therapy to people exposed to chemical agents.

“For example, early tests on some of the drugs related to the Ebola virus have improved survival rates in test mice from 100 percent fatal to a 20 percent chance of survival,” he said.

“We’re interested in understanding the mechanism of the drug so we can improve on it. We actually have an effective drug, but we don’t fully understand how it works,” he said.

Knight said he is pleased at being able to participate in such important work and hopes funding will continue for the research.

“One of the things about Florida Tech is that it is known as a research facility. I just happened to be in the right place at the right time,” Knight said.

The Department of Defense-funded effort, according to Knight, is about halfway through the five-year program, but, he added, there is much left to do to fully understand the challenges and to create drugs for use as antidotes against the chemical agents.

George White

Rafaela Nita, a second year Ph.D. student in inorganic chemistry, confers with Andrew Knight.
Making Space in the Air

There’s about to be a flood of commercial space vehicle (CSV) launches that need a route to and from space without completely disrupting other types of air traffic.

Under current policies, when a commercial space launch takes off, the range safety officer “seizes” the airspace until the rocket clears the area and achieves orbit.

Creating new Federal Air Regulations to integrate both rockets and aircraft is a huge undertaking involving the adjustment of thousands of regulations for air traffic controllers and others.

Developing a team to come up with the questions needing to be answered to adjust those regulations is the work of Florida Tech Professor Emeritus Nathaniel Villaire.

For the effort Villaire received almost $90,000 in Federal Aviation Administration funding with a matching amount from Space Florida and additional funding from Florida Tech.

“Airspace is a finite quantity, and we can only get so many objects in it. It’s a matter of splitting up the airspace and assigning it to various tasks. It sounds so simple but when you design airspace you presume that someone is going to make a mistake sometime. That’s just the way it is: managing air space is difficult,” he said.

For example, one question pertaining to when a CSV transitions from national air space to space could be: “should high-speed, high-altitude climb corridors dedicated to CSV operations be developed?” And such work is key to the Space Coast as it is one of the few areas conducting space launches while at the same time being a main high-altitude flight corridor for jets serving the East Coast from South America, he said.

The research also takes a comprehensive look at the CSV impact on pre-flight, takeoff, departure, exiting and entering the airspace, arrival and landing.

The goal is to create procedures to adjust timing during the launch so that civil and space vehicles do not come into conflict. If needed, alternate routes may be found that have the least economic impact caused by additional fuel and time requirements, he said.

“The ramifications have a ripple effect. The goal is to have 1,000 launches per year. You can see it coming, and we’re trying to head off the problems. We’re going through the regulations line by line to see if they can be adjusted. We don’t know the answers yet because we’ve never done this before,” Villaire said.

Villaire officially retired in January 2011 but was re-hired part time for the project because of his experience as a pilot, air traffic controller and air space manager.

Other Florida Tech team members include research assistants Nicole Maillet and Jesaiah Feltus, professor of aeronautics John Deaton, professor of physics and space sciences Samuel Durrance, associate professor of mechanical and aerospace engineering Daniel Kirk and associate vice president for research Tristan Fiedler.

“Some adjustments are really simple, but not all of them. If I do my job, it will be an assignment guide of what to research. It’s a lot bigger task than I thought it was going to be. This is the future right here and safety is our number one concern,” Villaire said.

George White

Considering the “what-ifs” when rockets and aircraft share the same space are, from left: Nicole Mailet, John Deaton, Nathaniel Villaire and Jesaiah Feltus.
Snake-Savvy Student Charms Awarding Organizations

“Snakes! Why did it have to be snakes?” wailed Indiana Jones in “Raiders of the Lost Ark.”

Conversely, Florida Tech senior Kim Rigano faces the slithery creatures head-on, likes handling them and makes them the focus of her award-winning biological science research.
A conservation biology major, Rigano won three important research awards and two competitive grants last spring for her work with the visual system of the yellow ratsnake. The topper was national recognition—the John C. Johnson Award for Excellence in Student Research. This was first place honors from Beta Beta Beta (Tri Beta), which she earned at the national biological honor society’s annual convention. The award recognized her work on the visual system of the yellow ratsnake, which it uses to prey upon the threatened Florida scrub-jay.

Rigano has studied the reptile with graduate student Angela Munoz and College of Science Associate Dean and Professor Michael Grace. She and Munoz spent a year observing yellow ratsnakes deep in the Merritt Island National Wildlife Refuge and on Kennedy Space Center land, an important scrub-jay habitat site. They also studied yellow ratsnakes in Grace’s Florida Tech behavioral neuroscience lab, first analyzing the roles of vision and smell in predatory targeting, then investigating the biochemistry and cellular organization of the yellow ratsnake retina.

They determined that yellow ratsnakes can see in both day and night, but their nocturnal vision is relatively poor. Based upon the distribution of light-sensing photoreceptor cells in the retina, they were able to calculate “theoretical visual acuity” and the minimum distances at which snakes can visually detect scrub-jays in the day and in the night. “Native to Florida, yellow ratsnakes are important predators of the Florida scrub-jay, but the work these students have done has even broader implications,” said Grace. “Their research forms a foundation for understanding the impacts of invasive exotic snakes such as the Burmese python. Snakes are amazingly efficient predators and can do tremendous ecological damage.”

Rigano appreciates her mentor Grace. “Dr. Grace has provided me with some great opportunities over the past few years, from working with amazing creatures to learning how to use state-of-the-art equipment. He shares my enthusiasm and has been very supportive,” said Rigano.

The appreciation is mutual. “Kim is a wonderful young scientist. She quietly perseveres whether spending long hours tromping through the wilds of Merritt Island National Wildlife Refuge in search of snakes, or working on the laser-scanning confocal microscope back in the lab. Her enthusiasm is readily apparent and her dedication is an inspiration to others,” said Grace.

Her perseverance has paid off in recognition and grants. In April, Rigano won first place for her research presentation at the southeast regional convention of Tri Beta, held in Athens, Ga. Also that month, she won the Northrop Grumman Science Champion award, the best-in-show award for the College of Science at Florida Tech’s 2012 Northrop Grumman Student Design Showcase.

She also earned competitive research grants from Tri Beta and Sigma Xi, the scientific research society, to support her work.

Rigano took a snake-break during summer 2012 when she participated in the 10-day Galapagos Islands summer field course on ecosystems with Professors Mark Bush and Richard Aronson. The previous summer she was an intern for the National Park Service at the Gateway National Recreation Area in New Jersey. As a shorebird management intern, she helped monitor threatened and endangered birds.

Fall 2012 finds Rigano once again hands-on with the yellow ratsnakes and preparing a paper for submission to a scientific journal. She’s also mulling over graduate school choices with a December graduation in mind.

Back home in York, Maine, Rigano does not have a snake as a pet. “I would love to get one,” she said, “if it weren’t for the fact that I have a rabbit. I don’t think they would get along.”

Karen Rhine
Many show up in crime rates where there are large post-deployments of combat veterans. For instance, Colorado Springs (with nearby Fort Carson) has had 10 times the rate of crime per capita than Detroit, Mich., and more than four times more violent crimes than Los Angeles and New York, combined. A substantial proportion of these crimes have been committed by returning combat veterans. Additionally, PTSD results in significant costs for businesses in lost productivity and human resource issues.

As a behaviorist and business professor, this is of great interest to me, and along with a team of researchers at the University of Minnesota, we are studying physician and sufferer biases about mental versus physical ailments under funding from the Veterans Administration.

There is a stigma in our society about mental ailments. For example, if people view post-traumatic stress disorder as a mental ailment, then physicians are less likely to treat the illness as a disease, and sufferers are less likely to seek treatment. However, the evidence that post-traumatic stress disorder is a physical ailment is compelling. Magnetic resonance imaging (MRI) scans show changes in critical parts of the brain (prefrontal cortex, hippocampus and amygdale) among PTSD sufferers that affects how they respond to perceived threats.

Typically, PTSD is diagnosed using self-reports and physician interviews. For example, the military uses the Warrior Administered Retrospective Causality Assessment Tool (WARCAT) self-report for this. We are investigating a new method, which involves monitoring a person’s central nervous system in response to viewing troubling scenes, such as automobile accidents. We are looking for both under- and over-reactions to these incidents. This takes the self-report problem out of the equation.

The method also uses what is known as a “dual-task test to induce cognitive load.” This serves to distract the participant away from the purpose of the assessment and achieves a better reading.

PTSD is classified in the Diagnostic and Statistical Manual of Mental Disorders, fourth edition, (DSM-IV, American Psychiatric Association) as a nervous disorder. The consequences of this disorder range from extreme detachment to extreme rage, which can result in violent behaviors including suicide and murder. More commonly, however, PTSD sufferers show severe social dysfunction. This includes problems related to self-medication, difficulties holding down a job, and extreme anxiety and depression.

Not everyone who experiences a traumatic episode or endures systematic abuse will develop PTSD. The majority of the population eventually rebounds after tragic life events. But for those people who lack this resilience, early diagnosis and intervention is critical to their long-term prognosis. Likewise, people have limits in their abilities to cope with systematic abuse; even resilient persons may develop PTSD given the situation. More accurate assessment will help lead to earlier interventions and better treatments for PTSD sufferers.

Michael Workman, professor of business
Nathan M. Bisk College of Business
About 20 percent of the 2.4 million U.S. troops who served in Afghanistan and Iraq since 2001 may meet criteria for PTSD from the chaos of wars marked by intense combat with no clear enemy lines, according to congressional researchers and the Rand Corp.
Internal Waves Help Researcher Pilot Steady Course

The double-major Steven Jachec ’01 M.S. chose for his bachelor’s degree recently led to a federal grant of almost a half million dollars.

Combining mathematics and physical oceanography not only joined his primary interests into a future career, but led to numerous grants, including a prestigious Office of Naval Research award. After completing the undergraduate degree, Florida Tech was Jachec’s answer to a graduate school that reinforced his interests in fluid mechanics and coastal engineering. The Chicago native didn’t mind living near the beach, either.

With a doctoral degree in civil and environmental engineering from Stanford University under his belt, he welcomed a stint in industry, where he gained real-world engineering experience. Jachec came back to Florida Tech in 2007 as an assistant professor of ocean engineering. Since then, among the research awards he’s received is a security-related grant of $495,000 over five years from the Department of Defense through the Office of Naval Research (ONR).

His funding is part of a Multidisciplinary University Research Initiative (MURI) grant to support the multimillion-dollar Integrated Ocean Dynamics and Acoustics (IODA) project (acoustics.whoi.edu/ioda). Jachec is a numerical modeling lead for a portion of the project, which is managed by Woods Hole Oceanographic Institution and other prestigious universities and schools.

The IODA project is an integrated ocean fluid dynamics and acoustics study for defense and national security. It encompasses basic research related to the internal (sub-surface) waves and acoustics in the coastal ocean. This type of wave is common in the ocean.

“You see them most energetically in the Luzon Strait, between Taiwan and the Philippines, and in Hawaii, Monterey Bay in California and the Straits of Gibraltar, for example, reaching hundreds of meters high,” said Jachec.

“These waves change the density of fluid which impacts the speed of sound, which in turn impacts SONAR performance.”

For IODA, Jachec performs high-resolution numerical modeling of nonlinear internal waves in the coastal ocean. His work pertaining to IODA is considered “basic research.”

“The overall goal is to improve the understanding and predictability of underwater acoustic propagation when the water density changes. With our team’s computer models, we can predict acoustics and SONAR performance,” he said.

The MURI research complements his ongoing work with internal waves in four other ONR grants. The grants have taken him to Taiwan and Vietnam, where he has exchanged ideas with other oceanographers and engineers, both on land and at sea.

In 2011, the under-40 Jachec was among 21 of 270 applicants to earn the prestigious ONR Young Investigator Program award of $330,000 over three years. The award identifies creative Ph.D.-level researchers in science and engineering.

Though his mind is always on the ocean, he doesn’t live beachside, but a few miles from it in Melbourne. But that will temporarily change in July 2012. Jachec has been granted a one-year sabbatical, which he will spend at Woods Hole Oceanographic Institute on Cape Cod in Massachusetts working on the IODA project as well as his other ONR projects.

As he steers around potential rocks and shoals in his career, he’s remained consistent in his course since his undergraduate days. Now, he said, “I think everything’s moving along really well.”
Internal Waves Help Researcher Pilot Steady Course

The double-major Steven Jachec '01 M.S. chose for his bachelor’s degree recently led to a federal grant of almost a half million dollars. Combining mathematics and physical oceanography not only joined his primary interests into a future career, but led to numerous grants since and a prestigious Office of Naval Research award. After completing the undergraduate degree, Florida Tech was Jachec's answer to a graduate school that reinforced his interests in fluid mechanics and coastal engineering. The Chicago native didn't mind living near the beach, either.

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Karen Rhine and Betty Porter
Design It. Build It. Dig It.

Some students tackle their culminating project with an eye to competition. **Allison Metzger** is one such student.

The senior mechanical engineering major led her five-member team building a robot for NASA’s Lunabotics Mining Competition held May 21–26, 2012 at Kennedy Space Center’s Lunarena.

*Pictured with “Pandia,” the Florida Tech lunabot, are, from left, Vincent Scotti, Michelle Little, Allison Metzger (Captain), Ryan (volunteer), Rafuuddin Ahmed and Ronnal Reichard (Faculty Advisor).*
In its third year, the event is designed to engage and retain university students in science, technology, engineering and mathematics. The students develop innovative lunar excavation concepts that could result in ideas and solutions applicable to actual lunar devices. In 2012 about 60 teams competed from all over the world.

The teams build an excavator—the Lunabot—that can mine and deposit a minimum of 15 kilograms of simulated lunar dust within 10 minutes. Students are challenged by the weight and size limitations of the Lunabot and the ability to telerobotically or autonomously control it from a remote mission control center. Teams are scored on a variety of design and operation factors, such as dust tolerance and projection, communications, vehicle mass, energy or power requirements and level of autonomy. The Lunabots are also judged on the amount of material excavated in the allowed time. This year they shoveled up volcanic material brought in from fields near Flagstaff, Ariz.

“Conquering” the moon implies the development of technologies that will enable future human presence on the moon. This could be for mining, refueling of spacecraft and several other operations envisioned by NASA and other space agencies. The Lunabotics competition raises awareness of these needs and poses a small part of these questions as a challenge for future generations of engineers, said Hector Gutierrez, the team’s faculty adviser.

Metzger’s team had many fans rooting for it in a way that matters the most to young engineers—funding support. The Missile Range and Space Pioneers, an organization of retired engineers from Kennedy Space Center and early missile range, donated $4,000. The Florida Tech College of Engineering contributed another $7,000. “This support pretty much covered the cost of all our material and parts,” said Metzger.

“The best part of this project is starting from scratch. Only one Florida Tech team has previously entered the competition,” she said. “We’re taking our creativity, knowledge and innovativeness, and going through all the steps they’ve taught us in school. We work as a team, putting our ideas together.”

Overall, the team placed 11th in mining, and 2nd in the “drag race” speed competition. Ron Reichard, Florida Tech Lunabotics team adviser, called this a great showing for the project’s first year at the university. “Only 13 of the 58 registered teams were able to meet the minimum qualification requirements. “Pandia” (the lunabot) made a positive impression on everyone as a well-designed, well-built, fast and tough robot. While this was a competition, it was more a competition of the student teams versus the lunar pit arena, with teams sharing information and helping each other to improve their lunabots. Our team also made a positive impression, helping other teams and participating in all the activities,” said Metzger.

“It was a challenge for this hard-working, enthusiastic team,” said Gutierrez. “All students in this team are mechanical engineering majors and many of the problems to solve were electrical, electronic and software related. They definitely learned a lot as they built their robot.”

Karen Rhine
No one knows what causes Chronic Fatigue Syndrome. It is most common in women in their 40s and 50s, but anyone can have it. It can last for years. There is no cure, so the goal of treatment is to improve symptoms. Medicines may treat pain, sleep disorders and other problems.

—Centers for Disease Control and Prevention
Tireless

Behavioral Strategies Fight Chronic Fatigue

**Thomas Harrell** never gets tired of researching the issue of chronic fatigue, a problem that plagues an estimated 12 percent of working-age adults in the United States. Chronic fatigue increases with age, since approximately 32 percent of older adults suffer from the functional impairment of chronic issues such as rheumatoid arthritis. Studies estimate that anywhere from 42 to 80 percent of these individuals are trying to cope with a degree of fatigue that negatively impacts their lives. The numbers will only increase in coming years, said Harrell.

“As the large wave of baby boomers ages, there are going to be that many more people with these issues,” he said.

Harrell, who has lived with chronic fatigue for two decades, knows first-hand how debilitating and life-changing the condition can be. For six years, the director of Florida Tech’s Fatigue Management Institute has studied ways patients can minimize the impact of chronic fatigue.

Chronic fatigue is completely different from the exhaustion caused by increased physical activity or lack of sleep. Reducing exertion or increasing sleep usually controls normal fatigue, but chronic fatigue, on the other hand, does not respond to rest and is unrelated to activity level. Sufferers slog through their days in a haze of exhaustion that never lifts. The fatigue negatively impacts day-to-day existence for an extended period of time.

Primary care physicians, often in a quandary on how to deal with chronic fatigue, have little ammunition to fight the problem.

“We don’t know what causes it, so we have limited options to treat it. It is one of the least understood afflictions. It is such an unpredictable phenomenon.”

The need to rule out other symptoms, plus the limited medication options available for treatment, can make treatment of chronic fatigue frustrating for both doctor and patient.

Harrell’s research-based behavioral modification intervention has proved effective in reducing fatigue levels and improving participants’ quality of life. Local health providers have been encouraged to refer patients suffering from rheumatoid arthritis, cancer, multiple sclerosis and other chronic illnesses to the institute’s free self-management courses.

The core of the program focuses on providing participants with tools to make them feel in control of their fatigue.

“People tend to make a lot of mistakes when dealing with chronic fatigue,” said Harrell.

“They try to adapt to chronic fatigue as if it were exertion, but that is simply not effective. We try to help them understand that chronic fatigue may not be curable, but it is manageable.”

The classes, developed with input from a national survey on chronic fatigue and chronic medical conditions, focus on developing important behavioral strategies, such as prioritizing activities.

“Individuals with chronic fatigue often make efforts to be as active as possible, but feel they only have enough energy to do things they think they have to do rather than the things that are enjoyable to them,” said Harrell.

“That leaves them with a sense of ‘what’s the point?’ and increases depression. We teach them to balance their schedule to include activities they want to do. Even though we can’t eliminate fatigue, we can teach people to better manage it.”

To reach Florida Tech’s Fatigue Management Institute and Thom Harrell, send email to: tharrell@fit.edu.

*Maria Sonnenberg*
Unwritten Rules: Building Cultural Competence for International Relations

Nike’s notable foot-in-mouth mishap illustrates the dangers of navigating the culture of foreign lands without a good map.

The footwear giant meant to honor the Irish by naming its newest sneaker after the black and tan alcoholic beverage made from a combination of stout and lager. As it turns out, the Irish drink isn’t really that beloved in Irish bars, for the “Black & Tans” was also the name of a British paramilitary organization despised in Ireland for its brutality on civilians.

Nike hurriedly issued an apology and stated that the sneaker had another, kinder, gentler official name, but the damage was done. Ignoring cultural differences and the history of other countries can be costly for businesses. For members of the military, it can be deadly.

“Cultural insensitivity can cost lives,” said Richard Griffith, director of Florida Tech’s Institute for Cross Cultural Management (ICCM) and author of The Age of Internationalization. Griffith’s work in cross-cultural training has been featured in The Wall Street Journal and Time magazine.
The Institute for Cross Cultural Management is currently working with the Department of Defense and Harris Corporation to develop research-based solutions for cultural training, concentrating on issues that affect the day-to-day conduct of personnel sent overseas, as well as on strategies for more effective global leadership and negotiation.

The United States military is very serious about creating cross-culturally competent forces, as witnessed by Secretary of Defense Leon Panetta’s mandate that every United States soldier must be trained in cross-cultural competency. The Department of Defense’s Transformation Roadmap states that language, culture and regional expertise are considered “defense core competencies.”

“Cultural sensitivity is especially important for the military entering international situations,” said Griffith.

“Understanding how to interpret actions in the light of the local culture allows our soldiers to respond appropriately under tremendous stress.”

With the military, ICCM focuses on research to evaluate, develop and validate measures of cross-cultural competence and to develop region-specific cultural knowledge databases.

The whole point is to avoid cultural misunderstandings that can threaten missions and warfighters’ lives, such as the 2003 riots in Iraq that left 10 coalition soldiers dead. The incident erupted from the soldiers’ use of search dogs, considered unclean in Islamic society, and the military’s approach to subduing residents for questioning. Forcing the individuals’ foreheads to the ground before questioning them was considered highly offensive, since this is a gesture reserved for prayer in that culture.

For Harris Corporation, ICCM is coaching high-potential employees on the nuances necessary to effectively communicate and interact with culturally diverse individuals. ICCM’s global leadership course examines how leaders are viewed differently in different societies.

“You have to understand the culture,” said Griffith.

“For example, if you are only five minutes early to a meeting in Germany, you can cause stress because the group you are meeting with will wonder if you will be late. If you are two hours’ late to a meeting in Spain, you may actually be the first one there.”

ICCM currently has partnerships with universities and consulting firms in Norway, Poland, Spain and Germany. Griffith and his team traveled to Shanghai and Hong Kong to forge additional associations last summer.

Sensitivity to cultural differences is all about building trust by respecting the differences and sharing common ground.

“The missions may be different, but the basis of cultural misunderstanding is often the same,” said Griffith.

“You don’t always get a second chance.”

—Maria Sonnenberg

“I do not wish my house to be walled on all sides and my windows stuffed. I want the cultures of all lands to be blown about my house as freely as possible.”

—Mahatma Gandhi
Alumnus Sungjin Park Has an Ear for Sound

Sungjin Park ’03 Ph.D., president and CEO of The Vine Corp, is a connoisseur of sound. It all began when he was in middle school and wanted a Mark Levinson audio system.

“It was tops in the 1980s, but it was so expensive, of course I couldn’t buy it,” Park said. Instead he bought a lower priced system. Sadly, it was soon on the blink, and he was unable to get it fixed because of the expensive repair cost.

Park later went on to a university in his native South Korea and majored in electronics engineering. In an introductory course for freshmen, he told his instructor that he had come to the university so he could fix his stereo.

“Of course, I did fix the sound system myself, and my audio career started from that point,” Park recalled.

Today his company creates software algorithms to improve the voice quality of mobile phones and electronic devices. He launched his first major product in 2009, the Voice Clarity solution for selected mobile phones. This and related speech enhancement software technologies have since become very popular and are now embedded in more than 20 million mobile phones.

“Voice Clarity solves the problem of ambient noise communication disturbances,” said Park. “It enhances voice quality in mobile phones through a patented consonant-restoration technology, which dramatically enhances the intelligibility of speech and audio signals that are received in mostly noisy environments. The solution is based on mathematical algorithms and much research in psychoacoustics and speech perception.”

Prior to founding The Vine, Park worked for 10 years at electronics firms where he directed or co-directed major R&D projects in Israel, India, Russian, Switzerland and the U.S. Also, in 2003–2004, he was a visiting professor at Florida Tech, teaching electrical circuits and conducting research for The Boeing Company with Fredric Ham, now dean of the College of Engineering.

Throughout his career, he has been recognized for his contributions and industry leadership. In 2011, he received the Men of the Software Industry Merit Award from the South Korean Ministry of Knowledge and Economy. He also earned the Authentication of Merit from the governor of South Korea’s Gyeonggi Province in 2011. In 2010, Park was named Outstanding Alumnus in the College of Science at Florida Tech.

Today a Mark Levinson audio system is likely within Park’s financial reach. Better than that, though, while working in industry he met Levinson.

“Now, he and I are the best of friends,” said Park. “Just the other day we had a Skype chat for three hours.”

He didn’t mention the quality of the sound.

Karen Rhine

Sungjin Park received the Men of the Software Industry Merit Award in 2011.
Florida Tech Online Research Briefs

Faculty members who teach for Florida Tech University Online are a diverse and busy bunch. They teach, hold other jobs—sometimes run their own businesses—often study for Florida Tech advanced degrees and, in many cases, conduct research. A recent query to these instructors and professors revealed a variety of research projects encompassing psychology, poetry, medical applications and more.

Kathleen Bartlett (communication) is working on instructional design and delivery for the U.S. Marine Corps. She's looking at the best ways online delivery can support a wide array of Marine training applications. She's also researching best practices in communication and verbal cues.

Khaled Abdel Ghany's (accounting) project looks at the value of a statement of financial position vs. a statement of net position.

Marilyn Carter (humanities) researches Basho, a leading Eastern poet credited with establishing the literary form of Haiku. She has traveled to Japan to walk in the footsteps of Basho.

Beth Gitlin (business) is contributing to a book on international organizational psychology, providing her knowledge on international MBA programs.

Quiana Bradshaw (health care) is developing an application involving a sensor that integrates with physical monitoring of diabetic patients who have seizures and hypoglycemia.

Margaret Lee (project management) has worked with Nathan M. Bisk College of Business faculty member Deborah Carstens to apply rubrics to enhance and increase project management student participation in online discussions.

Steven Seay (business) is researching the behavior of people following management training programs, with regard to their culture.

Natalie Fala's (psychology) work looks at the process for veterans applying for disability due to post-traumatic stress disease through the Department of Veteran Affairs, with a view to their personality assessment profiles.
The Florida Tech Research Park (FTRP) is a concrete response to the needs of industry.

In this research, science and technology enterprise, the elements for innovation, development and economic growth partner with business and the community in collaboration with a national research university.

Discover the Florida Tech Research Park at Melbourne International Airport

Located within the Melbourne International Airport (MLB), the park represents the largest research park located at an FAA-approved airport. This intermodal hub is home to many high-tech companies and research-based facilities. Site incentives are in place for prime office and research space as well as available build-to-suit sites for immediate development. The FTRP’s first phase of 100 acres, envisions 10 major buildings offering up to 600,000 square feet of office/research space and as many as 3,000 jobs. Future phases offer an additional 500 acres of developable land and could boost space to more than 1 million square feet and as many as 10,000 jobs.

Your High-Tech Future Starts Here!

When you locate your company to the Florida Tech Research Park, get ready for things to happen. This park presents technological and innovative businesses of all sizes with the opportunity to join one of the most promising research parks in the country. The park’s ideal location on Florida’s Space Coast offers exceptional quality of life, convenient support services and amenities, a high-tech work force, business-friendly incentives, strong research partners and key intermodal transportation links by land, sea, air and space, making it a natural incubator for research, innovation and success. The park is located in Foreign Trade Zone No. 136, which can offer significant savings to companies that import and export products. Industry leaders from around the globe are quickly learning that their access to a skilled workforce, along with the prestige of being in a research park associated with a world-class national research university and its resources, access to the pool of knowledge the Space Coast has to offer, and Melbourne’s business-friendly climate are all reasons to call the Florida Tech Research Park home.

For more information:
www.FIT.edu/researchpark
ftrp@fit.edu (321) 914-0742
With a grant from the Federal Aviation Administration (FAA), Donna Wilt and John Deaton, College of Aeronautics faculty members, are working to identify NextGen operational issues for single pilots. They are also developing a multiyear R&D plan to address single-pilot operations and procedures in the NextGen environment.

NextGen is a comprehensive overhaul of our National Airspace System to make air travel more convenient and dependable. NextGen will improve the system by using the latest technology to modernize communication, navigation and surveillance systems to promote new operational capabilities. Many NextGen capabilities will require new advanced avionics, which could increase task demands and complexity for flight crews.

In addition, the anticipated NextGen operational challenges for single-piloted aircraft will require human factors research and development to ensure that the single pilot can safely operate while meeting requirements and constraints imposed in the National Airspace System.

The FAA’s human factors R&D efforts aim to support the FAA’s Aviation Safety and Air Traffic Organization mission requirements, specifically by identifying and resolving human factors issues through research activities.

This is anticipated to result in:

- Tools and recommendations to guide aircraft certification personnel in evaluation of technologies that enable NextGen
- Recommendations to support flight standards personnel in developing and approving NextGen procedures and pilot training requirements
- System design requirements with supporting scientific and technical data that inform NextGen program offices and policy makers at key decision points and acquisition milestones in the broader NextGen context.

From left, Nestor Fenoy Bermudez, Donna Wilt and John Deaton look at how to make single pilot operations safer.
The International Space University (ISU) opened its 25th Space Studies Program (ISU/SSP12) at Florida Institute of Technology and Kennedy Space Center on June 4.

The 2012 program, which ran through Aug. 3, offered its participants, who are post-graduate university students and professionals, an education like no other. This year, a record number of 143 attended from 30 countries.

Pictured from left are Anthony J. Catanese, Florida Tech’s President; Bob Cabana, NASA-KSC Director; Angie Bukley, Dean VP for Academic Affairs, ISU; and Guy Boy, Florida Tech Professor and Director HCDL.