engenuity

MAGAZINE
FALL 2014

FLORIDA INTERNATIONAL UNIVERSITY COLLEGE OF ENGINEERING & COMPUTING

Celebrating 30 years of growth and innovation

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On the cover

FIU came on strong at the inaugural eMerge Americas Techweek Conference in Miami Beach, a gathering of technology leaders in May. From its anchor position on the exhibit floor, FIU showcased its most promising research. Among the big draws: The Discovery Lab's TeleBot, a robot designed to help put disabled veterans to work as police officers. (See page 8 for the full story.) Other College of Engineering & Computing innovations on display included Terrafly, a geographical database-management system; a revolutionary prosthetic arm; and brain mapping research.

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FIU COLLEGE OF ENGINEERING & COMPUTING MAGAZINE | FALL 2014

Dear alumni, supporters and friends:

Welcome to our first annual issue of *Engenuity*, a showcase of our latest activities and accomplishments.

As we celebrate our 30th anniversary, we look back on three decades of solid progress. In the 2013-2014 academic year alone we achieved records and earned recognition that continue to confirm our place as an education and research institution of distinction within the fields of engineering and computing, including:

- A 10 percent increase in our student body to a record high of about 6,000
- A record high of 1,042 students graduated
- An all-time high of $15.8 million in research expenditures
- Near record high external research awards of $18.7 million
- Ranking as the nation's 20th largest undergraduate engineering program
- Ranking 41st best online graduate engineering program in *U.S. News & World Report*

These numbers represent only half of our story. The other half is told each and every day by our nearly 20,000 alumni who are making a difference through their professional contributions in their field to their community. I wish to thank them for investing their trust in us. Through their commitment, alongside that of our excellent faculty, we have become a diverse engineering education powerhouse, serving as the top producer of Hispanic engineers and computer scientists in the nation and the sixth largest producer of African-American engineers.

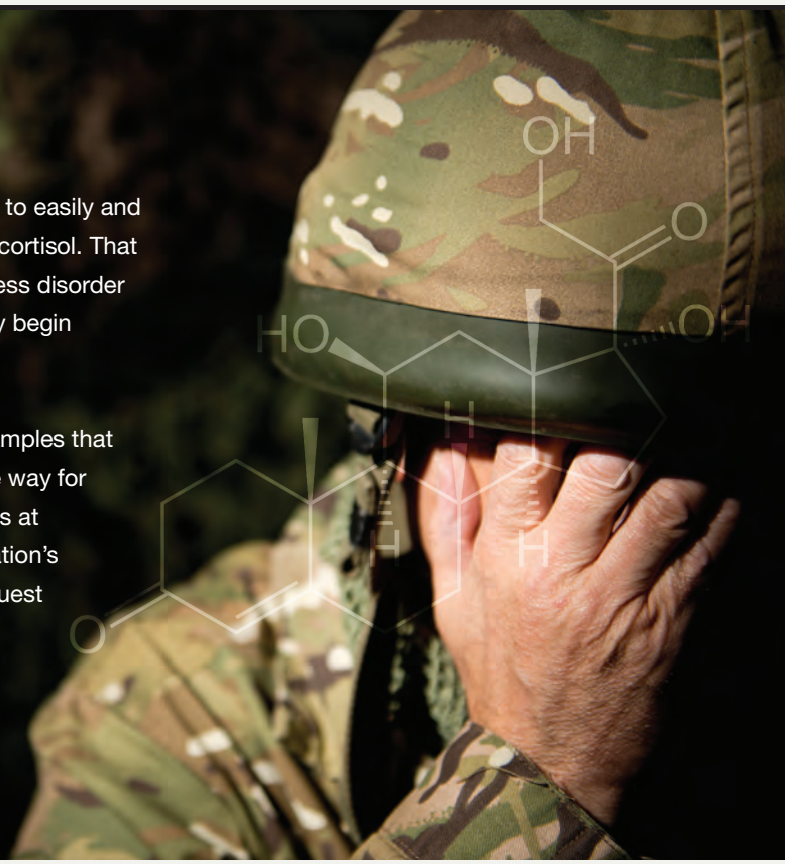
Our success speaks for itself. We have shown that if we can dream it, we can engineer it. Join us for the next leg of this exciting journey!

Amir Mirmiran, Ph.D., PE, Fellow ASCE, Fellow ACI
Vasant H. Surti Professor and Dean

FIU Engineering & Computing
FLORIDA INTERNATIONAL UNIVERSITY

The FIU College of Engineering and Computing is South Florida's leading engineering education resource. The college offers a complete range of fully accredited engineering baccalaureate, master's and doctoral degree programs in biomedical, civil and environmental, electrical and computer, mechanical and materials engineering; construction management; and computing and information sciences. The college is committed to diversity and is the country's largest producer of Hispanic engineers as well as one of the top producers of African-American engineers and females with doctoral degrees in engineering. Learn more at **cec.fiu.edu**.

New “stress test” could help soldiers manage PTSD in real time



FIU researchers are developing a test that would allow individuals to easily and quickly measure their own levels of the so-called stress hormone cortisol. That would mean soldiers and others suffering from post-traumatic stress disorder could check on their health anywhere at any time and immediately begin managing their condition.

Cortisol levels currently are measured by taking blood or saliva samples that then must be sent to a lab. The team’s goal is to develop a simple way for individuals to test and secure a measurement using saliva samples at home or work. A $50,000 grant from the National Science Foundation’s Innovation Corps program is supporting the researchers in their quest to get the home test to market.

Released by the adrenal gland as part of the fight-or-flight mechanism, cortisol in elevated levels can cause depression, mental illness and heart disease, among other problems.

3D lab a boost to school of construction

Faculty and students in FIU’s OHL School of Construction have a new visualization and simulation lab, thanks to a $250,000 gift from Moss and Associates, the state’s third-largest building contractor.

The Moss and Associates Built Environment Informatics Laboratory will allow the school to move forward built-environment research that has the potential to benefit academic and industry partners across the nation.

The lab will support researchers who rely on high-performance computing and computation infrastructure to perform modeling, analysis, simulation and optimization. It will assist both faculty and students in their development of strong research proposals in construction engineering and management. At the same time, the lab will serve as an important educational tool.

The work made possible by the lab will solidify FIU’s position as a leading teaching and research institution for the construction industry.

“Construction education relies heavily on real-world data and case studies to facilitate student learning in the classroom,” said Irtishad Ahmad, director of the OHL School of Construction. “Virtual simulation of building and construction processes help deliver nearly real-life experience to students.

With this new laboratory we will be able to explain complex construction processes to our students very effectively.”

FIU writes the book on building bridges

As the nation struggles to address its crumbling transportation infrastructure, a new guide developed by a multidisciplinary team of experts will help engineers better design bridges to withstand the test of time.

The 800-page *Design Guide for Bridges for Service Life* is intended to be version 1.0 of a living document that provides a systematic framework for creating bridges that last 100 years or more. The comprehensive publication took five years to complete and is part of the $256 million Second Strategic Highway Research Program approved by Congress in 2006.

"It's a paradigm shift in our thinking and the way we look at bridge design," said Atorod Azizinamini, principal investigator on the project and director of FIU's federally funded Accelerated Bridge Construction University Transportation Center. "This document makes you think through the process, go through the what-ifs and come up with a solution."

FIU accepts "electrifying" donation

Florida Power & Light donated an electric vehicle to the College of Engineering & Computing to energize student research and testing of wireless charging technology. Work coming out of the college could ultimately help boost continued adoption of electric vehicles in Florida. The utility company began "greening" its own fleet in 2006 and today operates more than 600 electric and hybrid vehicles throughout the state.

TOP50

U.S. News ranks FIU Top 50 among online graduate engineering programs

The online graduate engineering program offered by FIU's College of Engineering & Computing is among the nation's best, according to the latest rankings by *U.S. News & World Report*.

FIU ranked among the top 50, tied with the University of Illinois–Chicago and the University of Nebraska–Lincoln. FIU ranked third among all the schools ranked in the report in faculty credentials and training. Other areas *U.S. News* ranked online programs include student engagement, student services and technology, admissions selectivity and peer assessment.

"Given the rapid growth of online engineering programs around the country, it is crucial for FIU to be at the forefront in this arena," said Amir Mirmiran, dean of the College of Engineering & Computing. The college has increased its enrollment to nearly 6,000 students, and future growth needs to be accommodated through online and high-tech modes of delivery. At the same time, the college is adopting a high-touch approach to its high-tech education.

The OHL School of Construction has offered online graduate courses that lead to the Master of Science in Construction Management, FIU's only fully online graduate engineering program. One of the first fully online construction programs in the country, the program has steadily grown and is popular among professionals working in the construction industry and in governmental agencies. Students from all over the United States, as well as from Norway, Germany, Iraq and many Latin American and Caribbean countries have enrolled in the program.

Wall of Wind testing could help make homes, buildings safer in storms

The National Oceanic and Atmospheric Administration forecast El Niño conditions in the Atlantic in 2014, predicting a smaller number of hurricanes than average. But the overwhelming consensus among scientists worldwide is that storms will continue to increase in both frequency and severity over the middle and long runs. And even a small storm can inflict huge losses if a structure is not strong enough.

"The general public thinks they're safe if the building or their home is built to code. But that begs the question: safe against what?"

Building code provisions, particularly for the Miami-Dade High Velocity Hurricane Zone, have been revised and tightened in the last two decades based on lessons learned from previous storms. But until FIU's International Hurricane Research Center (IHRC) introduced the Wall of Wind (WOW) – the largest and most powerful university storm research facility – it was impossible to gauge just how South Florida construction would fare in the face of a major storm. By the next hurricane season, the Wall of Wind — in partnership with Miami-Dade County – hopes to have completed tests on how well different building products hold up under different natural disaster scenarios.

Currently there is a mandatory building code, but this is a negotiated, consensus–based minimum for the level of hazards and risk that a community faces, explains Rich Olson, director of FIU's Extreme Events Institute and the IHRC. The problem is in the "minimum." And "the general public thinks they're safe if the building or their home is built to code. But that begs the question: safe against what?" asks Olson. Since the code mainly targets mid-level hazards, like a Category 3 hurricane, this means buildings and homes are inherently at risk from anything stronger, such as a Category 4 storm, let

Wall of Wind takes national stage

A scaled replica of FIU's powerful, one-of-a-kind hurricane simulator, the Wall of Wind (WOW), is the centerpiece of an exhibition at the National Building Museum in Washington, D.C. Running through August 2, 2015, Designing for Disasters explores new solutions to a range of natural hazards, among them earthquakes, storm surge, tsunamis, wildfires and hurricanes.

The WOW feature spotlights FIU's role as a national leader in hurricane mitigation research and gives museumgoers an opportunity to interact with a mini version of the Miami-based facility, which is the only one in the world capable of generating wind speeds equivalent to Category 5 hurricanes. Visitors can control the fan on display as they, literally, try to blow the roof off a house.

"The exhibit is striking and highlights that we need not be passive in confronting risks of all kinds, including hurricanes," said Richard Olson, director of FIU's Extreme Events Institute and the International Hurricane Research Center. "We are honored to be contributing to public awareness efforts."

alone a Category 5. Just because something is "built to code" doesn't mean that it's necessarily safe or secure in a higher category storm. And, as a hurricane is so often a "multi-hazard event," it is the combination of wind and storm surge that has the most devastating impact.

"The second part of the problem is that the events appear to be changing," Olson notes. "So that basically means you're getting sliced from two sides of the same sword. Code isn't what people think it is — and the hazards are increasing," he says.

Miami-Dade County official Jaime Gascon recognized the level of uncertainty even in brand new construction so he began working with IHRC and the WOW to create an enhanced building code. "We want to see what is working and where we need to tweak things," says Gascon. "This is the science and the research to show where it is necessary."

Arindam Chowdhury, director of IHRC's Laboratory for Wind Engineering Research, says WOW is testing new ways to ensure that structures survive natural catastrophes. "It is not enough to test winds straight on," he says. "We are looking at different wind directions combined with wind-driven rain to see where there are vulnerabilities in a building and whether prescriptive code guidelines are actually effective." These distinctions will be critical in the many storm seasons to come.

After all, South Florida knows well that NOAA forecasts do not necessarily equate to calm conditions in this tropical climate. There were El Niño conditions in 1992 when Hurricane Andrew blew through the region and led to a new building code in Miami-Dade County. As the saying goes in hurricane country, "It only takes one storm if it's a direct hit."

ORIGAMI

ANCIENT ART INSPIRES A NEW GENERATION OF COMPACT ANTENNAS AND ELECTRONICS

Professor Stavros Georgakopoulos, right, in the lab with doctoral student Shun Yao

FIU researchers are using technology and principles derived from the traditional Japanese art of origami to create remarkably compact and incredibly efficient antennas and electronics.

"By using origami geometries we can reconfigure antennas to whatever shape fits our purpose," said Stavros Georgakopoulos, assistant professor in FIU's Department of Electrical & Computer Engineering. "These geometries offer unique advantages of collapsibility. That's important for a number of applications, such as technology that needs to be launched in space or used on the battlefield."

Georgakopoulos is working with colleagues at Georgia Tech with the support of a $2 million grant from the National Science Foundation. The team is working on the development of unique antenna shapes that can be folded down to a couple of centimeters and expanded into much larger spaces with powerful, ultra-broadband capabilities.

Possible applications for the antennas include a range of military and commercial uses, including communications equipment, wireless sensors, health monitoring sensors, portable medical equipment and many other applications.

A traditional paper-folding art, origami includes both modular and moving types of structures. Mathematicians recently have focused on the theoretical and practical questions raised by origami, resulting in technical advances in many areas.

"A SOLDIER WILL BE ABLE TO CARRY A POWERFUL ANTENNA INTO COMBAT FOLDED IN HIS BACK POCKET."

Origami structures can be fabricated from a wide variety of materials. While Georgakopoulos mainly uses paper, he is also exploring plastics and flexible dielectrics. The researchers use sophisticated inkjet printing to deposit conductive materials such as copper or silver onto paper to create antennas with novel signal reception and other capabilities.

In January 2014, Georgakopoulos organized a workshop at FIU for academics, industry and government representatives, and renowned origami artists. A second workshop is planned for 2015.

Discovery Lab

Students build their own version of RoboCop

Researchers and students in FIU's Discovery Lab have developed the initial prototype of a

TeleBot

— which combines telepresence and robotics — to allow disabled police and military personnel to serve as patrol officers.

FIU students collaborate on a variety of projects.

Demonstrations of the prototype have been taking place throughout 2014, and the project has received incredible media attention, including features on Fox News and the Discovery Channel. Unlike the RoboCop of the movie, the FIU TeleBot is not expected to cause damage to life or property.

Researchers and students have worked for more than 18 months to refine technology that will allow a disabled person to control the robot remotely, see everything the robot "sees" and interact with members of the public.

"This kind of project requires a lot of hard work, technical expertise and resources," said Amir Mirmiran, dean of the FIU College of Engineering and Computing. "We had to build everything from scratch. The students are very motivated and feel like they are making a real contribution."

Having overcome multiple challenges, chief among them proper hand functioning, the team has finished work on a prototype that stands six feet tall, weighs about 75 pounds and can be controlled from a remote location.

The TeleBot project began in 2012 when Jeremy Robins, a lieutenant commander in the U.S. Navy Reserves, donated $20,000 to the Discovery Lab to develop an idea he had to bring disabled law enforcement officers, as well as disabled combat veterans, back to the force.

"What impresses me most about the TeleBot prototype is that most of the work was performed by undergraduate students operating under very tight budget and time constraints," Robins said.

Mirmiran said the TeleBot is a product of the imagination of faculty and students who apply out-of-the-box thinking to tackle real problems with smart solutions at affordable costs.

"The project has far-reaching impacts on the education side as well, since we know that robots are great tools to get students of all ages engaged in engineering and computer coding," Mirmiran said.

FEATURES

Three HD cameras for a 360-degree view with zoom and auto-focus functions

Stereo speakers and microphone for interaction with the public

GPS-synchronized map and autopilot function for easy navigation in patrol areas

Perimeter sensors to warn of approaching objects

EYE RESEARCH

RETINAL IMPLANT

COULD RESTORE SIGHT FOR THE BLIND

People who are blind as a result of certain diseases or injuries may have renewed hope of seeing again thanks to a retinal implant developed with the help of Florida International University's W. Kinzy Jones, a professor and researcher in the College of Engineering & Computing.

A tiny video camera mounted on special glasses captures the scene in the patient's environment, and a pocket controller relays the captured video signal to the implant. Inspired by cochlear implants that can restore hearing to some deaf people, the retinal implant works by electrically stimulating nerve cells that normally carry visual input from the retina to the brain, and bypassing the lost retinal cells.

The Boston Retinal Implant Project, a highly-specialized, academically-based team of 30 researchers that includes Jones, was responsible for bringing the implant to light. The group comprises biologists and engineers from Harvard, Cornell, Massachusetts Institute of Technology (MIT) and others who are developing new technologies for the blind.

"Jones' work was one of the most important technological developments needed to make the device possible," said Douglas Shire, engineering manager for the Boston Retinal Implant Project. "As a result, users of the retinal implant will be able to adjust the implant according to their needs."

Jones has been working for years to advance the airtight sealed titanium housing and feed-through component that transfers the signals from the implanted microchip to the electrodes. His improvements in the density of that feed-through will greatly improve the quality of the image the person wearing the device will see.

The retinal implant was designed for people who lost vision due to injury to the eyes; progressive vision loss caused by eye disorders (also known as retinitis pigmentosa); or age-related macular degeneration, when the center of the retina that is responsible for central vision deteriorates. According to the National Institutes of Health, age-related macular degeneration is a leading cause of vision loss in Americans 60 years of age and older.

"The impact of this technology, which increases the available pixels that can be stimulated, will bring enhanced visual acuity to people with debilitating eye loss," Jones said. "My mother had macular degeneration, and I saw the quality of her life degrade as the disease progressed. Hopefully, when these devices are available for FDA-approved use, total loss of eye sight from macular degeneration or retinitis pigmentosa will be a thing of the past within 10 to 15 years."

"The impact of this technology will bring enhanced visual acuity to people with debilitating eye loss."

Recently, a similar device that features 60 electrodes was approved for use in patients and has proven successful in allowing people who were blind to read words on a screen.

Shire explained that the device that the Boston Group is building with Jones' help has more than 256 electrodes and therefore allows for images with a larger number of pixels, which is expected to give patients a meaningful visual experience.

Using tiny particles to fight powerful disease

Physicians will tell you: They are not winning the war on ovarian cancer. It is the most lethal gynecologic cancer, with survival rates declining significantly after five years. But Florida International University researchers have combined medicine and advanced nanotechnological engineering to create a smarter, more targeted therapy that could overcome the deadly cancer.

The difficulty in eradicating ovarian cancer makes its diagnosis especially defeating. "It is a very frustrating cancer for the patient and the treating physician," says Carolyn Runowicz, M.D., executive associate dean for academic affairs and professor of obstetrics and gynecology at FIU's Herbert Wertheim College of Medicine (HWCOM).

Once symptoms of ovarian cancer appear, the disease has usually spread. "It initially responds to surgery and chemotherapy and more than 80 percent of patients will go into remission. Their tumor markers are normal, you can't feel anything, you can't find anything on a CAT-scan or a PET-scan, but, in the majority of those patients, the cancer will recur. And there lies the Achilles heel. And that's why we have a need for better, smarter treatments," she says.

Surgery and chemotherapy for ovarian cancer have been the established treatment protocol for more than 50 years. But the outcomes for patients with ovarian cancer have improved—but most will still ultimately die of ovarian cancer.

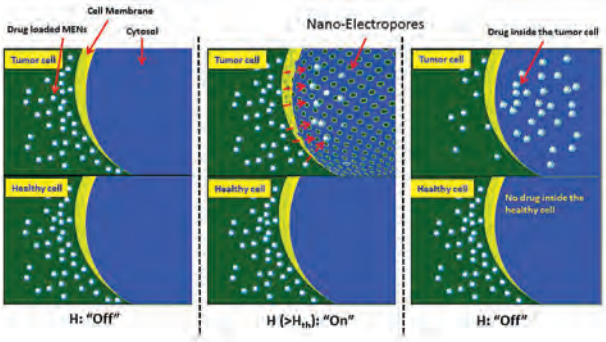
In 2011, FIU professor Sakhrat Khizroev, a physicist and electrical engineer by training, created a new technique using magneto-electric nanoparticles, or MENS, that was able to overcome the powerful blood-brain barrier to deliver and direct life-saving therapies to specific targets in the brain.

Dr. Runowicz serves as the head of research at HWCOM, and when she learned of this innovative nanotechnology, she thought "if it's possible to get through to the brain with MENS, it's likely that MENS can get to the peritoneum, this big sack where ovarian cancer lives." She discussed the idea with Khizroev, who very quickly came up with some "great ideas for the nanotechnology," she says. These great ideas led to incredible results.

In a study published in 2013 in *Scientific Reports*, Khizroev and Runowicz reported that loading Taxol, a chemotherapy drug used to treat ovarian cancer, onto MENS guided remotely by a magnetic field, penetrated tumor cells and completely destroyed the tumor within 24 hours. Normal cells, usually collateral damage in chemotherapy, were spared.

"The idea of the traditional approach of treating cancer has been to target the overexpression of cancer cells, to develop chemicals and use chemistry to develop certain compounds that find and destroy the overexpressed proteins. It has been working very well so far but still it's not ideal—it kills cancer cells but it also kills normal cells. Our approach was a little different," Khizroev says.

"What we try to do is understand that the cell is a device, a very complex computing device, and from that perspective we can control the function of the cell to regulate proliferation and stop cancer development as soon as possible. It's a relatively new approach and



nanotechnology allows you to do that."
MENS can be controlled and directed remotely, and perhaps most critically, can recognize cancer cells versus healthy cells by understanding the differing electric properties of each.

In vitro, the cancer cells were eradicated within 24 hours. "We knew the concept worked but we had to look to test it with larger tumors," says Khizroev.

Khizroev's lab demonstrated that this same technique worked—with a slightly longer time frame of approximately one month—in a mouse model. In June, Khizroev and Runowicz began a three-year study based on those results supported through funding from the National Science Foundation. "Nano-electroporation for high-specificity drug uptake using magneto-electric nanoparticles" will enable the researchers to test the protocol in a larger animal model. Both Runowicz and Khizroev are confident that they will continue to perfect the approach and that it could eventually be used to treat many other cancers.

"To fight other cancers, all we will have to do is program our particles a little differently. Ideally it can be applied to treat any cancer. It may sound arrogant but we're scientists. That's our dream," Khizroev says.

"We are delivering a new way of treating a disease that's been very hard to deal with," Runowicz adds. The size and youth of the medical school has helped move the concept quickly. "This is really team science—a college of engineering and a college of medicine getting together," says Runowicz. "The sum of the parts has been so much greater than the individual parts."

Sakhrat Khizroev, Ph.D., professor of electrical and computer engineering, FIU College of Engineering & Computing, and professor of cellular biology and pharmacology, Herbert Wertheim College of Medicine

"This is really team science—a college of engineering and a college of medicine getting together."

Carolyn Runowicz, M.D., executive associate dean for academic affairs and professor of obstetrics and gynecology, Herbert Wertheim College of Medicine

FIU Engineers on Wheels rolls into public schools

The College of Engineering & Computing is taking its show on the road.

FIU Engineers on Wheels aims to bring engineering education to South Florida's public schools via a specially outfitted van that transports hands-on activities and engineering experiments that build upon science, technology, engineering and mathematics curriculum concepts.

College of Engineering & Computing student Alejandro Diaz, second from right, shows off a specially made racing car at Booker T. Washington High School as part of the Engineers on Wheels program.

The mobile program follows on the success of the college's now 13-year-old Engineering Expo, an annual event that draws more than 1,000 K-12 students to campus for a day of interactive fun. With keys and a full gas tank at the ready, FIU undergraduates, who staff the van under the guidance of FIU faculty, can now go into the community to get even more kids interested in science.

"Engineers on Wheels gives our students an opportunity to take our lab experiments and instruments to the schools and impact a larger audience, tell them what an engineering profession is and what it takes to pursue an engineering major," says Amir Mirmiran, dean of FIU's College of Engineering & Computing. "It is also a learning opportunity for our undergraduate engineering students on how to communicate their passion to those in the pipeline."

Funded by a $15,000 gift from The Chyrsler Foundation, the program includes a customized vehicle donated by The Chrysler Group which made its first stop at Booker T. Washington High School in Miami, one of two schools participating in the Education Effect, a partnership between FIU and Miami-Dade County Schools that aims to improve the graduation rates of underperforming inner-city schools.

Student competes to join Formula One engineering team

When not participating in the College of Engineering & Computing's new Engineers on Wheels program or attending class, mechanical engineering major **Alejandro Diaz** serves as president of FIU's chapter of the Society of Automotive Engineers.

That interest in cars landed him in a unique position this past summer as one of 12 finalists from around the world vying for a dream position: a yearlong, fully paid engineering position with a Formula One racing team.

The 23-year-old attended a three-day race in England during which he faced a series of intensive interviews, practical tests and technical challenges. Engineers oversee vehicle mechanics, organize testing schedules and use data analytics to strategize with drivers.

Although he did not win, seeing his first Formula One race live and in person is something Diaz will never forget. "Being able to go behind the scenes and interact with the team during a race weekend was an incredible experience."

FIU responds to IT and computer science workforce needs

As part of an ambitious effort to align university and college degrees with the state's workforce needs, Florida's Board of Governors in March awarded $4.9 million to a newly formed consortium that includes FIU. The money will be used to produce more students for careers in information technology and computer science.

The Florida Consortium of Metropolitan Universities also includes the University of Central Florida and the University of South Florida. The three institutions are located in Florida's largest metropolitan areas and collectively serve about half of the students in the State University System. Together they confer more than 25,000 bachelor's degrees annually, including nearly 1,000 in the targeted fields.

Through this consortium, the universities will share best practices, policies and programs to provide maximized career-readiness, particularly among under-represented and limited-income students. Examples include enhanced predictive analytics to better track students' degree progress, more targeted support through mentors and advisers, and closer partnerships with local companies to open up more internship or practicum opportunities.

The universities will also explore ways to maximize efficiencies by sharing things like software programs and student tracking systems to continue upward trends in student retention, completion and career placement.

"In collaboration with UCF and USF, we are now positioning ourselves to enhance the number and quality of graduates in IT and computer science areas. This partnership will solidify the growth of IT companies in Florida."

"At FIU we pride ourselves in being a solutions center and preparing our students not only to take good jobs but to create good jobs," said FIU President Mark B. Rosenberg. "The Florida Consortium of Metropolitan Universities accepts these grants as a vote of confidence and a challenge to work smarter for all Floridians."

// FIU INSPIRES KIDS TO CODE

In the past year FIU faculty and students in the School of Computing & Information Science have lent their talents to a growing movement to get youngsters interested in programming, robotics and related activities—all part of a national effort to develop tech-savvy professionals for the future.

Most recently, FIU invited local summer campers—enrollees in the local Girls Who Code immersion program, part of a national organization committed to attracting women to computing-related fields—for tours of research labs and a workshop on how to build a web-based mapping app. And during the school year, FIU faculty and volunteers led Sunday afternoon sessions for youngsters at Miami's Frost Museum of Science. The 8- to 17-year-olds learned coding basics using a kid-friendly programming language, and some even programmed small robots.

In December 2013 the school co-hosted the first CodeFest Miami. Miami-Dade County Public Schools held online contests and workshops for middle and high school students that culminated in a grand finale at FIU, where children participated in a team-based programming challenge. And in November 2013 at the first Miami Mini Maker Faire, a showcase of local creativity and innovation, FIU sponsored a group of young people whom faculty had coached to create code-controlled

creatures they built from electronic components. At the same event, FIU Women in Computer Science conducted a soldering workshop where they trained nearly 200 young people to build USB-charged LED flashlights.

Teaching children how to use programming code at an early age is key to developing their interest and breaking the stereotype of nerds and geeks, explained Steven Luis, a director in the school. "We need to empower them with the capability to manipulate the digital world, where information lives, and that capability is programming," he said. "'I've seen kids do amazing things with very little training."

Iyengar inducted as a Fellow in the National Academy of Inventors

Induction ceremony: S.S. Iyengar, center, flanked by Paul R. Sandberg, president of the National Academy of Inventors, left, and Andrew Faile, deputy commissioner for patent operations, U.S. Patent and Trademark Office

Distinguished Ryder Professor S.S. Iyengar has been named a Fellow of the National Academy of Inventors. The director of FIU's School of Computing & Information Sciences is widely recognized as one of the principal pioneers in sensor networks and image processing.

"I felt like I was winning the Noble Prize in computing," Iyengar said of the distinction. "It was really an honor to receive this designation because of its implications of my foundational research and its impact on real-world applications, which has touched the lives of many people."

Election to NAI Fellow status is a high professional distinction. Academic inventors and innovators elected to the rank of NAI Fellow are nominated by their peers for outstanding contributions to innovation in areas such as patents and licensing, innovative discovery and technology, significant impact on society, and support and enhancement of innovation. Collectively, the new cohort of Fellows holds more than 5,600 U.S. patents.

Iyengar has published more than 500 research papers and has authored, co-authored and edited 18 books. He is also a member of the European Academy of Sciences, a Fellow of the Institute of Electrical and Electronics Engineers (IEEE), a Fellow of the Association for Computing Machinery, a Fellow of the American Association for the Advancement of Science, a Fellow of the Society of Design and Process Program and a Fellow of the Institution of Engineers. He has been awarded a Distinguished Alumnus Award of the Indian Institute of Science, Bangalore, and was awarded the IEEE Computer Society Technical Achievement Award. He has received a Lifetime Achievement Award conferred by the International Society of Manufacturing in recognition of his career and lifelong contributions to the fields of engineering and computer science at the Indian Institute of Technology.

Iyengar's research has been funded by the Defense Advanced Research Projects Agency, the National Science Foundation, the Office of Naval Research, U.S. Army Research Office, and many other state agencies. His papers have been cited more than 6,000 times and he has been on the editorial board of many IEEE journals. His research work has been used by Raytheon, BBN Technology Corporation, etc. The impact of his work has been very significant as a powerful cost saver for designing fusion algorithms.

Iyengar is the second FIU professor in two years to be named an NAI Fellow. Sakhrat Khizroev, a professor in FIU's Department of Electrical & Computer Engineering and a world-renowned inventor in the area of nanotechnology, was one of 98 charter fellows named by the NAI in 2013.

S.S. Iyengar is a co-holder of several patents, including those listed here with their official patent titles:

- System and architecture for robust management of resources in a wide-area network
- Method for allocating web pages using neural networks
- Data set request allocations to computers
- A framework for detecting glaucomatous progression in the optic nerve using orthogonal decomposition
- Chip to indicate pressure in the eye due to glaucoma by means of optical image analysis

DOCTORATES
50 Record number of doctoral degrees awarded in academic year 2012-13

HISPANICS
1 National ranking in number of undergraduate engineering degrees awarded

STUDENTS
6,000+

NATIONAL RANK
4 National ranking in number of computer science degrees awarded

FACULTY
43 New faculty welcomed in the last four years

FIU COLLEGE OF ENGINEERING & COMPUTING
30 years of excellence in engineering

INTERNATIONAL
100 Countries represented within the college's student body

NATIONAL RANK
20 National ranking in number of undergraduate degrees awarded

NATIONAL RANK
41 National ranking in *US News and World Report* for best online graduate programs in engineering

RECENT GRADUATES
1,042 Number of students graduated in academic year 2013-14

AFRICAN AMERICANS
6 National ranking in number of undergraduate degrees awarded to African Americans

FLORIDA
3 State ranking in number of engineering programs offered

WOMEN
2 State ranking in numbers of both undergraduate degrees and doctorates awarded to women

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SAVE THE DATE

30th Anniversary
Distinguished Lecture

Dr. C. D. (Dan) Mote Jr.
President
National Academy of Engineering

November 20, 2014
11 a.m.
CBC 155

For more information about our 30th anniversary celebration, visit **www.cec.fiu.edu/30**