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The Guide to Florida's High Tech Corridor floridahightech.com



3 UNIVERSITIES: The Power of Economic Development

THE LEGACY OF A GATORADE GREAT
Simulation Training Synergies

Faces of Technology Meet 12 Corridor Pioneers





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City of Deltona
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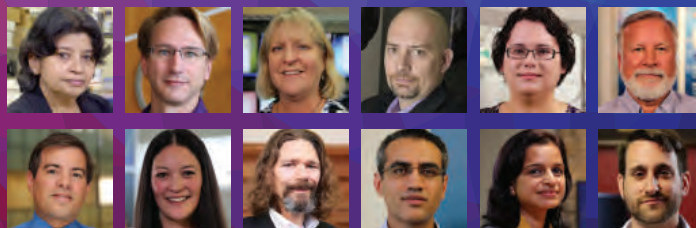
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Read about 12 Corridor pioneers in profiles throughout this magazine



Welcome to tomorrow land.

The future is now in Orlando, home to one of the top incubation systems and research parks in the country. Here, forward-thinking researchers are on the cutting edge of discovery in specialized fields like diabetes and obesity, advanced manufacturing, the Internet of Things, and more. So, if you still think Orlando is all just fun and games, it's time for more research.

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THE FLORIDA HIGH TECH CORRIDOR

A regional economic development initiative of:



From the Publisher



Welcome

This year, our publication commemorates 20 years of Florida High Tech Corridor achievements. However, there are no words that can appropriately acknowledge the tremendous efforts of our public and private partners to grow our 23-county Corridor region from a vision set in 1996 to the nationally recognized hub it has become today.

Ongoing collaboration among Corridor universities – the University of Central Florida, the University of South Florida and the University of Florida – has proven to be an unstoppable force driving high tech industry and innovation in our region. The three Corridor university presidents continue to play an integral role, not only offering strategic leadership as co-chairs on the Corridor Council, but also in collaboration with key economic development, high tech and workforce partners. I invite you to read more about the impact of each unique university in our cover story highlighting their cohesive efforts to inspire transformative growth.

Here, you will also read about the revolutionary Gatorade formula developed by former University of Florida nephrology professor, Dr. Robert Cade, and his research team that changed the sports industry and ignited Gainesville's vibrant spirit of innovation.

Individuals such as Cade are the lifeblood of our Corridor region. More important than the grants, patents or awards they earn, the life-altering technologies these researchers forge are making our world a better place.

Likewise, our 2016 "Faces of Technology" are changing the world and elevating The Corridor through advancements in a range of industries, from information technology to agriculture. You can read their fascinating stories in these pages and hear directly from each of them – and more than 100 others – at FacesofTechnology.com.

I am honored to stand alongside the many talented individuals who continually help make our vision for The Corridor a reality, and thank you for taking a glimpse at their work through the pages of *florida.HIGH.TECH* 2016.

Best regards,

Randy Berridge

famousINVENTORS:

welcomed to the Florida Inventors Hall of Fame

A trio of Corridor inventors is among the latest inductees into the Florida Inventors Hall of Fame.

- Inventors know **Dr. Paul Sanberg** for any number of achievements, including discoveries that have led to 41 U.S. and 70 foreign patents in neuroscience. People in higher education know him as the senior vice president for research, innovation & economic development at the University of South Florida (USF). And he is widely appreciated for having been the driving force behind the creation of the National Academy of Inventors, headquartered at USF in Tampa. Sanberg has been instrumental in understanding and developing new pharmaceutical and cellular therapeutics for stroke, Alzheimer's, ALS, Huntington's, Parkinson's disease and Tourette syndrome.
- The work of University of Florida Distinguished Professor of Entomology **Dr. Nan-Yao Su** is of great importance to virtually everyone who lives in Florida ... but also to countless millions

worldwide. His studies of subterranean termites led him and colleagues at Dow AgroSciences to a revolutionary approach to protecting homes and other structures from the wood-eating insects. Since Dow's Sentricon® system was made commercially available in 1995, it has been installed in millions of homes and prevented the application of nearly 10,000 metric tons of insecticide that would otherwise have been used. The product is in use across the U.S. and from Chile to China, New Zealand to Vietnam.

- Cat lovers everywhere are indebted to **Dr. Janet Yamamoto**, professor of retroviral immunology in the College of Veterinary Medicine at the University of Florida, and credited with co-discovery and co-patenting feline interferon-omega ... a supplemental therapy against viral diseases of cats. She is part of a worldwide effort to create a small animal model for HIV/AIDS and in 1986 co-discovered the feline immunodeficiency virus, FIV, the feline counterpart of HIV. She also invented the first commercial FIV vaccine.

The three were honored alongside four other Florida inventors, including a posthumous honor for the late Henry Ford, who conducted much of the innovation in transportation, manufacturing production and finding natural solutions to industrial problems in Fort Myers. ■



(from left) 'Henry Ford', Chris Pendleton, Jerry Pratt, Nan-Yao Su, Robert Howard Grubbs, Janet Yamamoto, Gary Ostrander, Paul Sanberg

Investment Impact

There's a renewed sense of adventure these days along Florida's Space Coast. Less than four years after the last U.S. Space Shuttle flew sparking fears that workforce reductions would send Brevard County's highly talented aerospace talent pool elsewhere; new investment is injecting excitement into the air.

Northrup Grumman announced it would bring 1,500 jobs and "America's most innovative design center for military aircraft" to Melbourne when it won a \$50 billion contract to build the next generation of long-range stealth bombers.

The expansion is estimated to have a \$300 million impact on the region.

After a \$4.4 billion acquisition in February of defense contractor Exelis Inc., Harris announced plans to consolidate the companies, headquarters and senior management teams. Fears rose that Exelis' Washington, D.C., home could lure the defense giant.

But in July, Harris said Melbourne would remain home ... where it had been since 1978, sustaining its 6,000 Florida employees (including 3,200 engineers and scientists) and keeping its \$1 billion research and development activity at the new Harris Technology Center in Palm Bay.

Then in September, Amazon billionaire Jeff Bezos announced he would bring a rocket factory and private launch company with hundreds of jobs to Titusville. Blue Origin announced it would build and launch from the Space Coast after winning a national competition pitting Florida against at least 10 states.

Coupled with increased launch activities by United Space Alliance and SpaceX, the Space Coast is humming with tech activity. ■



Long Range Planning

They say "he who wins at workforce development wins at economic development," and it appears that The Corridor may have an ace up its sleeve with the latest element of its 20-year-old techPATH initiative, which began 20 years ago with techCAMP, a program to bring classroom teachers into high tech environments in industry to learn new ways to teach their students about the importance of studying science, technology, engineering and math (STEM).

Now, stemCONNECT takes advantage of Internet technology to bring experts to their classrooms for live, two-way sessions that let students have that same opportunity. Entire classrooms have "visited" such unique environments as Florida Hospital's Celebration-based Nicholson Center for Robotic Surgery, where thousands of surgeons from around the world train, and inside the labs of Simetri, a



Central Florida-based modeling and simulation firm whose entire team of scientists demonstrated unique training tools developed for teams of military medics.

"The idea is to create awareness with students and teachers of what it's like to work in a high tech company," said Randy Berridge, president of the Florida High Tech Corridor Council. "For those experiences we try, in a meaningful fashion, to convey why STEM curriculum is so important."

The Corridor partners with the Central Florida STEM Alliance to promote the programs to schools throughout the 10-county Central Florida School Boards Alliance and The Corridor's STEM Team of Dr. Jeff Bindell and Vicki Morelli connects industry volunteers with schools throughout the entire 23-county Corridor region. ■


FLORIDA'S SPACE COAST



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WHAT A STORY.

THE SUCCESS OF THE FLORIDA HIGH TECH CORRIDOR COUNCIL IS QUITE A STORY. From the International Space Station, the region's glow is a clear statement with a bright future powered by three great universities dedicated to ... attracting, retaining and growing high tech industry and the workforce to support it.

We've been proud to have the opportunity tell this story for the last two decades. As story tellers, **THAT'S THE KIND OF STORY YOU LOVE TO TELL.**

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Culturing Patient Tumor Cells for Cancer Cure

According to the American Cancer Society, there were an estimated 1.6 million new cancer cases diagnosed in the U.S. in 2015. It's an alarming statistic that hits home for Dr. Subhra Mohapatra, co-founder and advisory chief scientific officer of Tampa's TransGenex Nanobiotech, and also an associate professor at the University of South Florida Morsani College of Medicine.

Mohapatra has been involved in cancer research for more than 15 years and has seen the disease's devastating effects.

"I lost my mother-in-law to cancer, so I've been thinking about how to find the right drug for the right cancer for years," she said.

Her years of research finally paid off in 2013 when a graduate research assistant stumbled upon culturing cancer cells on a nanofiber scaffold that would eventually become TransGenex Nanobiotech's "Tumor-on-a-Dish."

"One day, she came running perceiving that her cells were rounding up and dying," Mohapatra said. "She showed me the results that showed cells forming 'spheroids' and this is what I've been looking for for years – a platform that allows cancer cells to grow [in a lab] like a tumor that grows in patients."

Tumor-on-a-Dish is a 3-D cell culture platform that artificially grows patient biopsy cells to tumors just as the tumor would grow in the patient's body. It helps researchers learn more about the drug response behavior of cancer cells, so they can discover what personalized treatments will be most effective. In comparison to other 3-D models, 'Tumor-on-a-Dish' stands out for its cost-effectiveness, simplicity and speed. Mohapatra says the advanced platform more accurately mimics the growth of a real tumor than traditional methods.

"Within a week to 10 days, we can find out which drug treatment will work for that particular cancer patient," said Mohapatra. "So, we avoid giving the patient drugs that might not work and increase the cancer's drug resistance."



Subhra Mohapatra

Co-Founder and Advisory Chief Scientific Officer

TransGenex Nanobiotech Inc. | www.transgenex.com

Associate Professor,

Morsani College of Medicine | University of South Florida

Education: Ph.D., Immunology, University of Manitoba (Canada)
M.S., Chemistry, Ravenshaw College, Utkal University (India)

Company: TransGenex Nanobiotech is the developer of an optimized three-dimensional cell culture platform for oncology research, drug discovery and personalized cancer treatment. The company also offers customized nanoparticle-mediated delivery systems to fit clients' needs and drug-screening services utilizing the three-dimensional platform.

Although TransGenex Nanobiotech launched this platform just two years ago, the company has experienced immense success. In addition to helping current patients, Mohapatra is most excited about using Tumor-on-a-Dish to increase cancer stem cell numbers. These cells, although making up only a small percentage of a tumor, are most likely to resist various treatments and spread throughout the body. Mohapatra illustrates "it is like a plant: if the leaves are plucked but the stem remains, the plant will grow back." Similarly, if cancer stem cells aren't killed, the cancer will come back more aggressively over time. Mohapatra hopes Tumor-on-a-Dish research will someday result in therapies that kill the cancer stem cells and 'cure' cancer.

"Since this platform enables the tumor formation by expanding the rare tumor-initiating cells, this has given me even further hope that this platform is going to be very promising."

Growing Nutrients for a Growing World

Paul Kucera was preparing to graduate with a chemical engineering degree from the University of South Florida with three job offers on the table.

"Two of them were in Michigan and one was in Florida. I'm originally from Buffalo, New York, so I already knew what Michigan was like," he joked.

But it wasn't just Florida's temperate climate that convinced Kucera to take a job with Cargill Crop Nutrition, a predecessor of The Mosaic Company. "That was just icing on the cake," said Kucera.

He understood the company was leading the industry in helping to grow the world's food with an environmentally conscious approach. Today, after 23 years with the phosphate industry, Kucera continues contributing to that mission as senior engineer advisor for research and development. He guides decision-making to set the stage for Mosaic's future innovations in mining and manufacturing phosphate essential to making fertilizer.

One of Kucera's proudest moments was working on the team that established the company's signature MicroEssentials fertilizer. When a customer approached them in 1997 for a better way to grow canola, they were tasked with finding the most appropriate, efficient way to deliver essential nutrients to the plant. The result was combining essential nutrients into one powerful granule, MicroEssentials, a formula still unmatched in the industry.

Kucera equates it to a bag full of marbles. "If you mix them all in a bag and grab a handful, you're going to get a variety of different colors."

But MicroEssentials is like a swirly marble. All the essential macronutrients, along with micronutrients like zinc, are fused into one granule, ensuring every plant in a crop receives the nutrients it needs in perfect amounts. Farmers know exactly what they will pull out of the bag every time.



Paul Kucera

Senior Engineer Advisor, Research and Development

The Mosaic Company | www.mosaicco.com

Education: B.S., Chemical Engineering, University of South Florida

Company: The Mosaic Company is the world's leading producer and marketer of concentrated phosphate and potash. It employs approximately 9,000 people in six countries and participates in every aspect of crop nutrition development. In the U.S., Florida is home to Mosaic's phosphate operations headquarters and many of its phosphate production facilities.

"It's been a tremendous breakthrough," said Kucera. "We went from being a very small production to making nearly 2 million tons of the MicroEssentials product every year."

Technologies like MicroEssentials align with Kucera's passion for doing more with less. In a world with 7 billion people and growing, efficiency is more important than ever. The company will undoubtedly face competition as others join in the micronutrients arena, but it's a challenge Kucera embraces.

"We'll continue to innovate and pave the way. We'll find the next step and others will follow our lead," he said. "That will only be good for the world in the long run – when everybody's crop yield improves because everyone is using high-performance fertilizer."

Bridging the Gap with Telecommunications

Lydia Runnels was leading research and development teams of more than 200 engineers at a large telecommunications corporation when she was presented with the opportunity to work for ZVRS in Clearwater. It was an opportunity she couldn't refuse.

"I felt like it was the perfect way for giving back to a wonderful community – the deaf community – and it married technology and my passion for working with people," said Runnels.

As vice president of product development and engineering for ZVRS, also known as "The Z," Runnels oversees product innovations and feature enhancements, as well as growing and maintaining the information technology infrastructure. As the first company to introduce unique video communication technology for the deaf, The Z sparked an industry that now enables the deaf and hard of hearing to speak on the phone with the help of an American Sign Language interpreter.

"A deaf person has a 10-digit phone number just like you and me," said Runnels. "However, when they pick up the phone to call their doctor, lawyer, or anyone in the world, our system recognizes they need an American Sign Language interpreter and they can communicate through video. The interpreter has a headset and can also speak simultaneously to the hearing person."

Runnels and her team of engineers created The Z's mobile phone and computer applications to be compatible with a wide range of devices. Similar video services exist, but The Z's innovation lies in its research and integration of other technologies. Runnels and her team constantly search for leading-edge discoveries they can use to improve The Z's features, functions and video quality. She has even worked alongside engineers from companies such as Apple to align The Z's products with some of the world's revolutionary mobile technologies.

As The Z continues its mission to improve quality of life for the deaf, Runnels is excited about



Lydia Runnels

Vice President, Product Development and Engineering

ZVRS | www.zvrs.com

Education: B.S., Computer Engineering, University of South Florida

Company: ZVRS provides videophone services to the deaf and hard of hearing including Video Relay Service (VRS). This service allows the deaf to call anyone with the help of an American Sign Language (ASL) interpreter. ZVRS has 30 call centers across the United States and employs more than 600 ASL interpreters.

projects on the horizon, specifically with advancements in emergency services. She's leading efforts to integrate The Z's technology into existing 9-1-1 emergency communications systems, as well as the creation of a device that knows its user's geolocation, which will help emergency personnel more quickly find the person in need.

Along with learning from top computer engineers and projects on the horizon, Runnels is excited about learning more about deaf culture and assisting people in need.

"A third of my staff is deaf or hard of hearing," said Runnels. "It's enlightening working in that culture, understanding their needs and what we need to do for them. Listening to them has been critical."

research

The technology industry clusters are based upon a modification of standard, published definitions from TechAmerica (formerly AeA) using specified NAICS (North American Industrial Classification System) industries. For each technology industry cluster, data retrieved from the Quarterly Census of Employment Wages (QCEW) is aggregated for each of the NAICS industries identified via TechAmerica. The statistics are based upon QCEW employer data from the Florida Department of Economic Opportunity, aggregated at the county-by-county level for the 23-county Florida High Tech Corridor region. The data used in this study is the most recent data available from the first quarter of 2015.

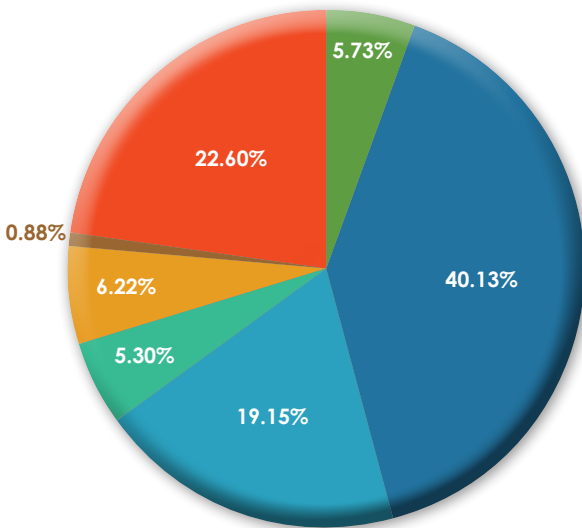
overview

In 2015, the Corridor supported an estimated 20,747 technology establishments and 230,654 technology jobs, with an average salary of \$78,638. Financial Services remains as the largest sector with an estimated 92,557 jobs. The highest paying technology sectors are Aerospace and IT, both of which pay more than \$84,500 per year in average salaries. The Microelectronics sector has the largest individual employers, averaging over 52 employees per establishment.

corridorclusterEmployment

Sector	Establishments	Employment	Payroll	Average Employment	Average Salary	% Emp
Aerospace	296	13,207	\$1,138,795,456	44.62	\$86,227	5.73%
Financial Services	10,048	92,557	\$7,352,454,784	9.21	\$79,437	40.13%
IT	5,182	44,164	\$3,734,306,084	8.52	\$84,555	19.15%
Medical Technologies	686	12,233	\$763,027,036	17.83	\$62,374	5.30%
Microelectronics	272	14,351	\$1,141,263,148	52.76	\$79,525	6.22%
Photonics	163	2,020	\$128,334,772	12.39	\$63,532	0.88%
Other tech <i>(Research and Engineering, Media and Telecommunications)</i>	4,100	52,122	\$3,879,997,404	12.71	\$74,441	22.60%
Total	20,747	230,654	\$18,138,178,684	11.12	\$78,638	100.00%

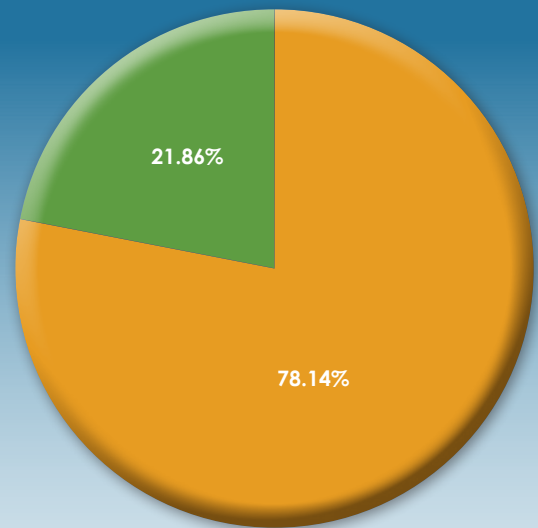
corridorCluster



corridor cluster Employment

Aerospace	5.73%
Financial Services	40.13%
IT	19.15%
Medical Technologies	5.30%
Microelectronics	6.22%
Photonics	0.88%
Other Tech	22.60%

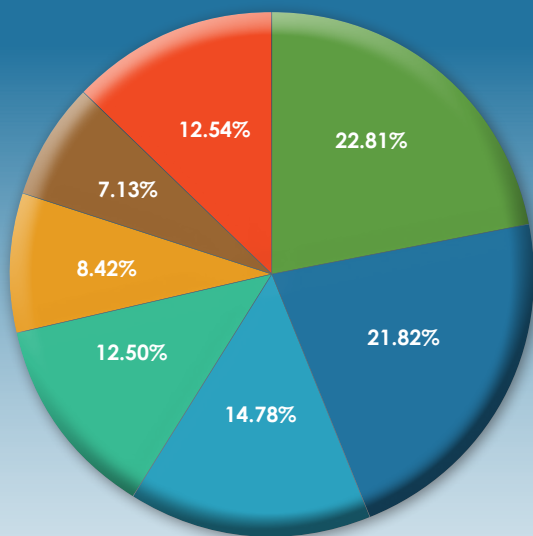
aerospace



aerospace sector Employment

Navigation, Measuring, Electromedical and Control Instruments Manufacturing	78.14%
Aerospace Product and Parts Manufacturing	21.86%

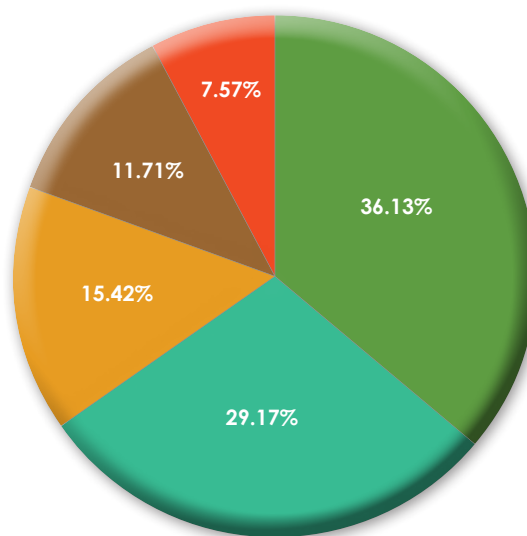
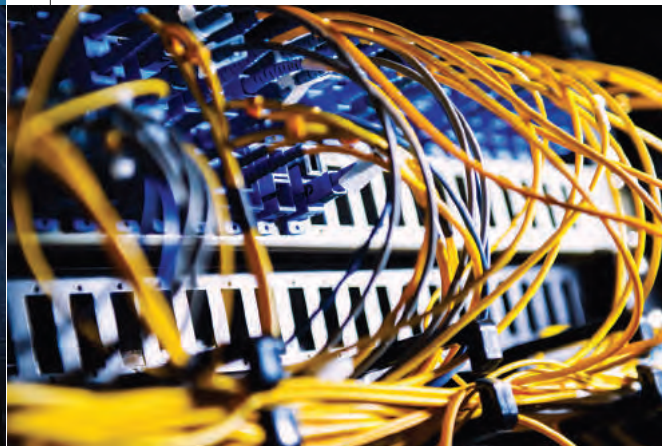
financialServices



financial services sector Employment

Direct Insurance Carriers (except Life, Health and Medical)	22.81%
Insurance Agencies & Brokerages	21.82%
Other Insurance-Related Activities	14.78%
Other Nondepository Credit Intermediation	12.50%
Financial Transactions Processing, Reserve and Clearinghouse Activities	8.42%
Securities Brokerage	7.13%
All Other Financial Technology Sectors	12.54%

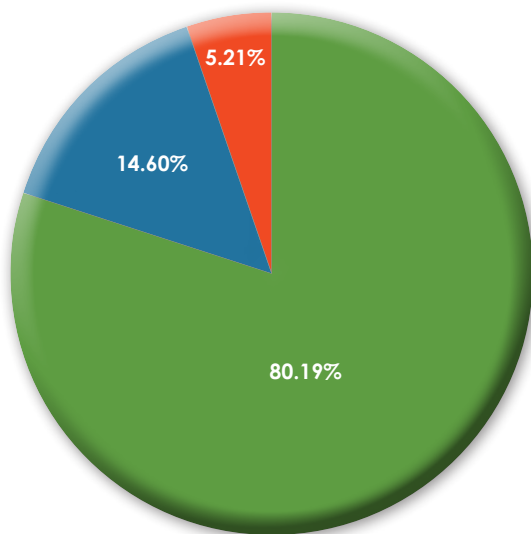
informationTechnology



it sector Employment

Custom Computer Programming Services	36.13%
Computer Systems Design Services	29.17%
Data Processing, Hosting and Related Services	15.42%
Software Publishers	11.71%
Other Computer-Related Services	7.57%

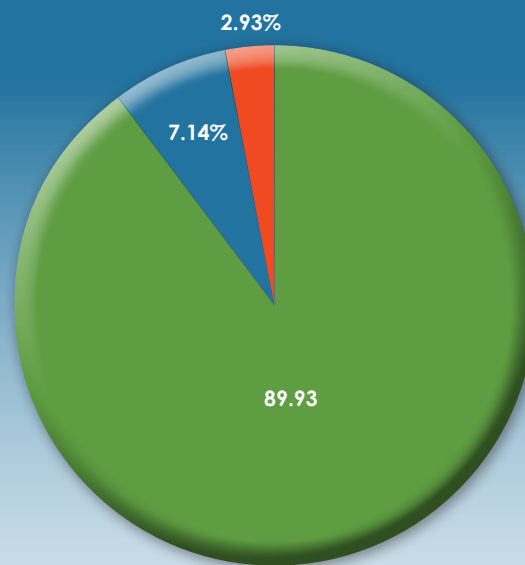
medicalTechnologies



medical technologies sector Employment

■	Medical Equipment and Supplies Manufacturing	80.19%
■	Pharmaceutical and Medicine Manufacturing	14.60%
■	All Other Miscellaneous Electrical Equipment and Component Manufacturing	5.21%

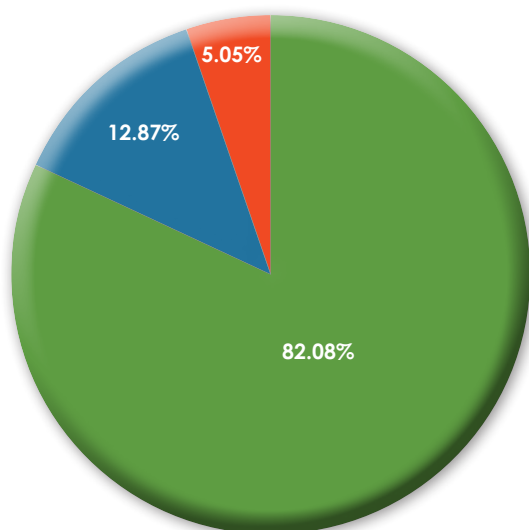
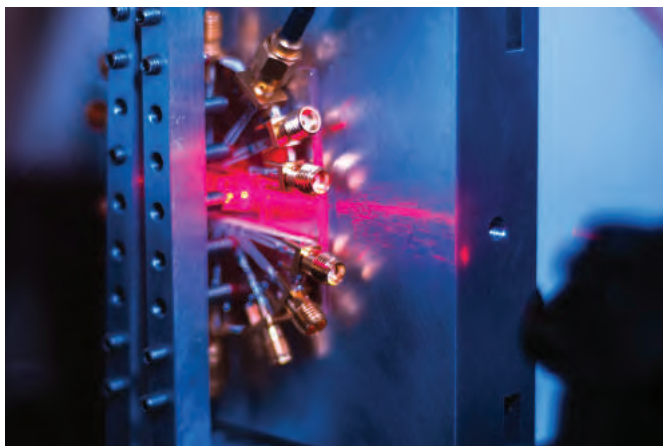
microelectronics



microelectronics sector Employment

■	Semiconductor and Other Electronic Component Manufacturing	89.93%
■	Computer and Peripheral Equipment Manufacturing	7.14%
■	All Other Electrical Equipment and Component Manufacturing	2.93%

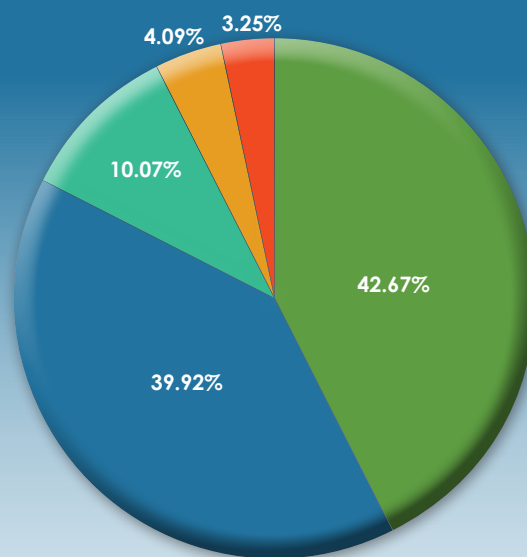
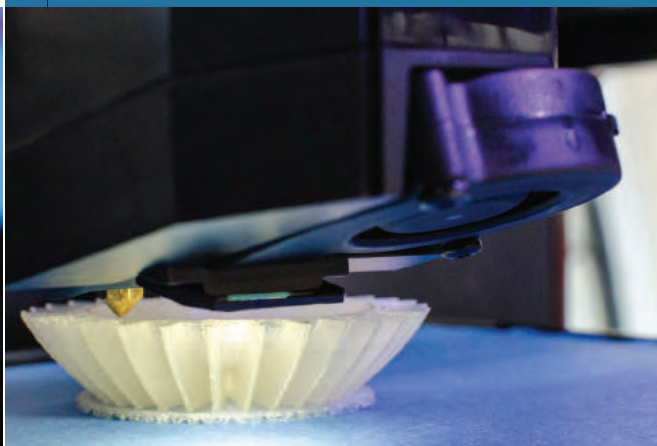
photonics



photonics sector Employment

■	Commercial and Service Industry Machinery Manufacturing	82.08%
■	Instruments and Related Products Manufacturing for Measuring, Displaying and Controlling Industrial Process Variables	12.87%
■	Other Measuring and Controlling Device Manufacturing	5.05%

otherTech



other tech sector Employment

■	Engineering Services	42.67%
■	Wired Telecommunications Carriers	39.92%
■	Other Scientific and Technical Consulting Services	10.07%
■	Testing Laboratories	4.09%
■	Other Communications Equipment Manufacturing	3.25%

A “Novel” Approach to Engineering

Within its first two weeks, any remote-controlled or electronic toy Christopher Marot received would be completely disassembled and put back together with a new functionality.

“I often still joke that I don’t know what I want to do when I grow up,” said Marot, president and COO of Novel Engineering, located in Satellite Beach. “But in hindsight, engineering is absolutely the right path for me.”

Marot’s curiosity and desire for a challenge set him on the path toward a technology career. After graduating from the Florida Institute of Technology (FIT), he passed on job offers from well-known corporations for the opportunity to join an engineering firm with just three employees. The small business environment sparked his passion for entrepreneurship and he later had a hand in the launch of six startup companies, including Novel Engineering.

Today, Marot leads the company’s engineering team in the construction of next-generation solutions for aerospace, transportation, controls and government applications. Novel Engineering’s embedded software and electronics are similar to the computer found in a car. Its signature Internet of Things product, Remora, uses sensor technology to collect and report on a range of real-time environmental data, with uses ranging from water quality monitoring to biometric identification.

Marot also leads the research and development of a virtual reality project, Envision. Far from traditional 3-D glasses, Envision simulates the same bird’s-eye view of a 360-degree camera for users sitting in a human-size bubble. He describes the technology as “something you would see in a movie.”

In addition to these projects, Marot is excited about Novel Engineering’s joint effort with Cape Canaveral-based Craig Technologies to compete in NASA’s Cube Quest Challenge. In NASA’s first in-space competition to create an advanced cube satellite and send it into orbit, Marot’s team has advanced past the first round of the competition and will continue to



Christopher Marot

President/COO

Novel Engineering | www.novel.engineering

Education: B.S., Applied Mathematics, Florida Institute of Technology

Company: Novel Engineering is a woman-owned small business that offers the highest quality and most reliable software, embedded electronics, and systems engineering services for aerospace, transportation, controls and government/DoD markets. With expert knowledge in the complete development lifecycle, Novel can help companies achieve product actualization beginning at any stage of involvement.

compete in 2016 for the grand prize of \$5 million. The team’s goal is to place the satellite in lunar orbit, and eventually demonstrate its communication ability and durability at nearly 2.5 million miles into deep space.

Marot’s passion for projects like the NASA challenge stems partly from his love of team competition. A competitive rower for nearly 10 years, Marot was a crew member at FIT where his former coach shared valuable lessons about cooperation, leadership and motivating a team – skills he employs every day at Novel Engineering.

“Engineering is ones and zeros – it’s very textbook – but being in business takes teamwork.”



Market-Relevant Curriculum.

Florida Polytechnic University collaborates with more than 90 industry partners to maintain a market-relevant curriculum that will ensure a pipeline of talent in the core STEM fields of technology and engineering for years to come. Industry partners have the opportunity to serve on advisory boards, participate in joint research and connect with some of the best and brightest students in Florida for internship and job opportunities.



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University Research Growing High Tech Industries

High tech industries get a boost from research universities around the world and this holds true in The Corridor. Corridor universities – the **University of Central Florida (UCF)**, the **University of South Florida (USF)** and the **University of Florida (UF)** – have created a more than \$1 billion economic impact in the region over the past 20 years through research projects that continue to further high technology.

By leveraging an investment of more than \$65 million from The Corridor, UCF, USF and UF partner with local businesses through The Corridor's Matching Grants Research Program (MGRP) to advance high tech innovations and commercialize new technology. Together, they are responsible for helping to grow technology that reduces plastic waste, trains medical professionals, aids stroke patients back on their feet and more.

University researchers and scientists, including students, have worked on groundbreaking concepts since inception of the program in 1996. Their work, alongside private industry researchers and scientists, helps spur the spirit of innovation in the Corridor and mark the region as a high tech hub boundless in capabilities.

In these pages, you'll read a sampling of MGRP projects conducted by UCF, USF and UF this year and more on each university's achievements. It is important to remember these stories of innovation are merely a handful of experiments in the lab and people collecting data and thinking creatively. These researchers represent varied clusters of high tech activity in the Corridor and numerous stories have yet to be told. ■



From the President



The University of Central Florida (UCF) is synonymous with the economic prosperity of Central Florida and the Sunshine State.

Much of UCF's impact derives from our drive to be America's leading partnership university. UCF's collaborations with state, local and federal government leaders and private businesses led to the construction of the UCF College of Medicine at Lake Nona, which is the cornerstone of a Medical City featuring a growing cluster of biomedical facilities. The Medical City – which is well on its way to producing thousands of jobs and billions in annual economic impact – is said by many to be the biggest economic catalyst for Central Florida since Walt Disney World.

As part of the Florida High Tech Corridor, research professors and students from UCF, the University of Florida and the University of South Florida work with companies from throughout Central Florida to develop new technologies and innovations that create well-paying jobs. In the Central Florida Research Park adjacent to the UCF campus, UCF shares three partnership buildings with the Department of Defense and private industry that are at the heart of Florida's thriving modeling, simulation and training industry. That industry supports more than 1,000 companies, 60,700 jobs and nearly \$5 billion in revenues. In addition, UCF is a leading partner with Osceola County and The Corridor in establishing the International Consortium for Advanced Manufacturing Research that is attracting companies to develop, test and manufacture sensors and photonic devices.

Partnerships also distinguish UCF on many other fronts. For instance, UCF is a founding member of the University Innovation Alliance, an unprecedented group of 11 large public research universities committed to eliminating family income as a predictor of success in college. Through the Florida Consortium of Metropolitan Research Universities, UCF teams with Florida International University and the University of South Florida to better serve the workforces in Florida's largest urban centers.

UCF is becoming a national pacesetter in providing a high-value education that is accessible, affordable and impactful. Students are taking note. UCF attracts more students than any other Florida university, and for the past two years has enrolled the most freshman National Merit Scholars in Florida. For students, employees and Central Florida employers, UCF stands for opportunity.

Cordially yours,

Dr. John C. Hitt
President, University of Central Florida

Colleges

College of Arts & Humanities
College of Business Administration
College of Education & Human Performance
College of Engineering & Computer Science
College of Graduate Studies
College of Health & Public Affairs
College of Medicine
College of Nursing
College of Optics & Photonics
College of Sciences
College of Undergraduate Studies
Rosen College of Hospitality Management
The Burnett Honors College

Academic Degree Programs (Fall 2015)

Baccalaureate Programs	93
Master's Programs	84
Specialist Programs	3
Doctoral Programs	31
Professional (Medicine)	1

Number of Degrees Awarded (as of Summer 2015)

Baccalaureate	230,929
Master's	46,000
Specialist	603
Doctoral	4,050

Personnel (Fall 2015)

Teaching Faculty and Adjuncts	2,256
Executive/Administrative/Managerial	637
Other Professionals	1,717
Support Personnel	1,000

Fall 2015 Enrollment: **63,002**



UCF at a Glance

The University of Central Florida, the nation's second-largest university with an enrollment of more than 63,000 students, is a dynamic and entrepreneurial institution. Offering 212 degree programs, UCF is an academic and research leader in optics, modeling and simulation, engineering and computer science, education, hospitality management, digital media and other fields. It is ranked among the nation's top 15 "most innovative" institutions by *U.S. News & World Report* and among the nation's best values by Kiplinger and *The Princeton Review*.

UCF is one of only 25 institutions in the nation to earn the Carnegie Foundation's highest distinction in the categories of "very high research activity" and "community engagement." The community engagement designation is based on the extent and depth of engagements with local, national and global communities.

Students attend classes on UCF's 1,415-acre main campus in East Orlando and at 15 satellite facilities throughout Central Florida. The campus has 600 acres set aside for lakes, woods and an arboretum.

UCF attracts many of the nation's best and brightest students. The fall freshman class for the 2015-16 academic year posted an average SAT score of 1261 with an average high school weighted GPA of 4.0. A total of 277 National Merit Scholars enrolled in fall 2015. UCF continues to become more diverse each year, with a school-record 43 percent of students in fall 2015 classified as minorities.

UCF is one of Central Florida's largest employers, with nearly 12,000 staff and faculty members. The College of Medicine and Medical City partners at Lake Nona are projected to create 30,000 jobs and more than \$7.6 billion in annual economic impact in years ahead. The university impacts more than 112,000 additional jobs and adds \$7.7 billion of value to the economy.

UCF researchers have earned more than \$1 billion in external grants during the past decade. Last year, university researchers secured \$133.4 million in grants. UCF's internationally recognized Institute for Simulation and Training is an anchor of the state's \$5 billion modeling and simulation industry.

UCF awarded 15,484 degrees in 2014-15, which led all other state universities in Florida. ■

Simulating Skin to Save Lives

Imagine suturing the wound of a soldier, but there is no blood. Or treating a patient with a dangerously high fever, but their skin is room temperature. These unrealistic scenarios are commonly found in medical training, yet they fail to prepare students in an essential skill – the ability to perform under psychological stress of a real-life situation.

Leading simulation companies, such as SIMETRI, are striving for more life-like technologies as students train to heal, mend and treat patients. With funding from the Florida High Tech Corridor's Matching Grants Research Program, Orlando-based SIMETRI is collaborating with University of Central Florida (UCF) researchers to develop advanced materials that more closely simulate human skin.

Dr. Jiyu Fang, UCF associate professor for mechanical, materials and aerospace engineering, is leading the research team at UCF's Advanced Materials Processing and Analysis Center. Mirroring the construction of human biopolymers, the simulated tissue invented by Fang's team not only responds to external stimuli, such as a change in temperature, but can also bruise and bleed.

"When we warm up, our face turns red, or if it's cold, we turn blue," Fang explained. "At UCF, we're working with SIMETRI to develop simulated tissue that can show this kind of response in terms of the temperature and color. We are trying to integrate functional material into the simulated tissue to mimic how the human skin responds to the environment." The team is also researching how to simulate sweat.

SIMETRI is using the simulated tissue in its construction of replicated body parts and patient manikins.

"It makes training more realistic and immersive, so people are convinced of a simulated event, versus a manikin that looks like a doll and doesn't worry the trainee about the outcome," said



Angela Alban, SIMETRI president and CEO.

"But if the skin is bruising or you can see or feel change in temperature and color in the skin, those types of things trigger responses that make the trainee more nervous."

The project has potential to advance medical training outcomes and redefine industry standards – an achievement augmented by The Corridor's matching funds. The matching grant enticed Alban to partner with UCF rather than searching for an expert out of state. It also allowed Fang to enlist the help of two graduate researchers, who have been instrumental in the project's advancement.

"We try to find experts within The Corridor because we know we have the potential for additional funds that will help offset some of the cost while having access to top talent and researchers at UCF," said Alban. "It's easy and beneficial for a small business like ours to work with the universities and the Florida High Tech Corridor." ■

Efficiently Guiding a Missile

When launched, missiles know where to go due to sophisticated guidance systems. With new research from the University of Central Florida (UCF), a traditional guidance system may soon be replaced by a different approach allowing for a more efficient flight pattern.

Most current guidance and control systems use a linear design, meaning a missile can go from one point to another, but it cannot account for changes during flight without redesigning the flight algorithm.

Another more modern option for controlling a missile is to use a nonlinear design. Systems that use nonlinear design allow the vehicle to be self-directed and less susceptible to external factors, such as wind. While this technology can be used to control almost any airborne device, including drones and satellites, one of the main applications has been the guidance of missiles.

Coleman Aerospace, an Orlando-based company that supplies systems engineering to government agencies and contractors, is working to develop a nonlinear control model that will reduce the reaction time and cost of launching missiles. Ricardo Elias, Coleman Aerospace VP of engineering, enlisted the help of a research team at UCF to assist with the project through The Corridor's Matching Grants Research Program. The UCF team, led by Dr. Zhihua Qu, professor and chair of UCF's Electrical and Computer Engineering department, hopes their research will

allow companies to increase efficiency and develop programs at a much faster rate.

Four Ph.D. students working alongside Qu created a model of the missile motion according to specifications provided by Coleman Aerospace, then devised an algorithm that allows the navigation and control of the missile to be completely self-directed. Understanding second chances don't exist for a missile launch, the new system helps ensure a more successful completed mission.

According to Dr. Qu, nonlinear systems have been researched for 20-30 years, but are still not widely used in the industry.

"It's a generation thing," said Qu. "When the aerospace control engineers graduated back in the '60s, '70s and even '80s, they learned mostly about linear systems and classic methods, and now they are the ones in managerial positions. For them to incorporate a new technology may be a bit challenging at times if they don't understand the technology themselves."

Innovation in the industry is simply a matter of time. Meanwhile, Qu sees this project as an opportunity to demonstrate how useful and cost effective nonlinear systems can be.



"Without The Corridor funding, we wouldn't have money to investigate new methodology," he said.

And furthering development on new technology to be introduced to the market is what the Matching Grants Research Program is all about. ■

Generating New Views from Above

Many people have had the luxury of watching a movie or enjoying a theme park ride in 3-D. However, 3-D technology is capable of producing far more than an enjoyable entertainment experience. Current research at the University of Central Florida (UCF) seeks to unlock the true potential of this technology.

Through a partnership with Robert Jackson of Jackson Technologies LLC, a small software development and consulting services firm, UCF researchers funded through The Corridor's Matching Grants Research Program (MGRP) are working to develop new techniques for using multiple sensors to generate 2-D/3-D panoramic views of the environment surrounding an aircraft. The resulting aerial images can be used for a variety of different applications, including simulation and training.

Formerly employed by Lockheed Martin for 25 years, Jackson has a strong background in aviation and computer vision. With the help of many engineering colleagues, he was able to add various sensors, including cameras and scanners to an experimental aircraft, which he personally flew across the country to gather data from the environment. The challenge for UCF was how to make sense of all the information he gathered.

"Many may think aerial vision is an old technology, but it is only an old technology in a laboratory environment where everything is controlled," explains UCF computer science professor Dr. Hassan Foroosh, lead researcher on the project. "This data is taken from a moving and agile platform, so there are additional challenges."

Foroosh, leading a team of two Ph.D. students, aims to take the data collected by Jackson Technologies and develop stereo rhythm algorithms to create actual models that can be displayed in 3-D.

What makes this project unique is the use of multiple camera views to passively locate and measure objects, as opposed to actively measuring them using a radar or laser sensor. The newly developed algorithms will make Jackson's product useful to a variety of industries, including defense and homeland security, but also entertainment and extreme 3-D movies. It also has potential military use for battlefield awareness and commercial



uses such as remote measurement and surveying of power lines.

As a small company, Jackson Technologies is extremely thankful for the resources provided by UCF and The Corridor.

"Working with the university has benefited Jackson Technologies enormously as a research partner with outstanding expertise and awareness of the latest research and emerging trends in computer vision technology," said Jackson.

He enjoys working with, and learning from, the Ph.D. students who, according to Foroosh, were the benefactors of funding from The Corridor. "Without Ph.D. students this type of research is just not going to happen. And I think that's where The Corridor's support helped us – to have that additional manpower." Jackson Technologies has already secured one contract with a major corporation, and expects to see interest from many more organizations once the project is completed. ■



UCF



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ucf.edu/research/coastal

From the President



This year, the University of South Florida (USF) achieved impressive growth in its research spending and joined the Top 25 of American public universities as ranked by the National Science Foundation. This achievement is possible through the hard work and dedication of our faculty, students, staff, partners and support organizations committed to building a strong and vibrant research university. The USF System's focus on innovation and invention has positioned us as a global leader in generating new U.S. patents, ranking 13th among higher education institutions worldwide and 10th in the nation.

Our commitment to fully integrating scholarship, research, community service and economic development now propels our effort to build the new USF Morsani College of Medicine and USF Health Heart Institute in Downtown Tampa. USF's presence as an anchor in the redevelopment led by Strategic Property Partners places our university at the center of Tampa's exciting transformation. By working in partnership across both public and private sectors, the new Morsani College of Medicine and Heart Institute will create thousands of jobs and elevate the quality of life across the Tampa Bay region.

Each year, the USF System sets its sights higher. We are proud to serve as an intellectual and innovation catalyst for the Tampa Bay region and create an environment where world-class education and research leads to healthier, more prosperous and more secure communities in the future. Thank you for your continued support.

Cordially yours,

Dr. Judy Genshaft
President, University of South Florida System

Colleges and Schools

Arts and Sciences (USF, USFSP, USFSM)
Behavioral & Community Sciences (USF)
Business (USF, USFSP, USFSM)
Education (USF, USFSP, USFSM)
Engineering (USF)
Global Sustainability (USF)
Graduate Studies (USF)
Honors College (USF)
Hospitality & Tourism Leadership (USFSM)
Marine Science (USF)
Medicine (USF)
Nursing (USF)
Pharmacy (USF)
Public Health (USF)
The Arts (USF)
Undergraduate Studies (USF, USFSP)

Academic Degree Programs

Bachelors	86
Master's	105
Ed Specialist (EdS)	2
Research Doctoral	43
Professional Doctoral	4

Number of Degrees Awarded (2015/16)

Bachelors	9,493
Master's	3,167
Ed Specialist (EdS)	7
Research Doctoral	321
Professional Doctoral	280

Personnel (2015/16)

Full-Time Faculty	1,877
Part-Time Faculty	119
Adjuncts	1,438
Graduate Teaching Assistants	2,129
Administrative	2,427
University Support Personnel	2,056

Fall 2015 Enrollment: 48,918



USF at a Glance

The University of South Florida System includes three institutions serving more than 48,000 students: USF; USF St. Petersburg; and, USF Sarasota-Manatee. Each institution is separately accredited by the Commission on Colleges of the Southern Association of Colleges and Schools, and has a distinct mission and detailed strategic plan.

Serving the Tampa Bay region and beyond, the USF System is a strong presence that provides a competitive differentiation. In addition to being a unified voice for higher education, the USF System seeks to capitalize on the synergies and interdisciplinary strengths among its institutions for the benefit of students, faculty, staff, alumni and communities.

The USF System offers 240 degree programs at the undergraduate, graduate, specialist and doctoral levels, including the doctor of medicine. Awarded \$440,577,680 in new research grants and contracts in FY 2015, the National Science Foundation ranks USF 41st in the nation for research expenditures among both public and private institutions. The university has an annual budget of nearly \$2 billion and an annual economic impact of \$4.4 billion. USF is a member of the American Athletic Conference. ■

A Giant Step for Stroke Patients

Every 40 seconds, someone in the United States suffers a stroke. It's a devastating condition that can have a lasting impact, causing serious, long-term disability that requires months—or even years—of rehabilitation.

According to the Centers for Disease Control and Prevention, more than half of stroke survivors age 65 and older have difficulty walking following the stroke, and face an arduous rehabilitation process with mixed results. However, one Corridor-based research team is working to change that with a revolutionary device—a shoe.

Although the concept may sound simplistic, it's anything but. The shoe, which was developed by Tampa-based Moterum and a team of researchers at the University of South Florida, is designed to teach stroke patients to walk symmetrically again, but in a shorter period of time and at a more affordable cost.

Current rehabilitation methods often include walking on a split-belt treadmill, among other forms of treatment. While this method of rehab can be successful, many patients can revert back to an asymmetrical gait once they step off the treadmill and leave the controlled rehabilitation environment.

That's where Moterum's shoe comes in.

Designed to simulate the sensation of the split-belt treadmill, the shoe could be worn anywhere, allowing patients to undergo rehabilitation in a natural setting on a more consistent basis. Ultimately, this process could help permanently retrain the brain and teach patients how to walk symmetrically.

"This technology has the potential to positively impact 100,000 to 200,000 stroke patients a year," said Dr. David Huizenga, CEO of Tao Life Sciences, the company that oversees Moterum. "If you're able to help stroke patients walk better and become independent faster, it would have a major impact on their health and our economy."

Dr. Kyle Reed, the lead researcher on the project and assistant



professor in USF's Mechanical Engineering Department, is taking the next step toward commercialization of the product by conducting a clinical trial—thanks to funding from the Florida High Tech Corridor's Matching Grants Research Program.

"This money is allowing the shoe to go from a working prototype to a device that we can actually test on stroke patients," said Reed.

Pending the results of the first clinical trial, Reed and his former Ph.D. student, Dr. Ismet Handzic, hope to conduct a large-scale clinical trial to optimize the effectiveness of the shoe. As Moterum's first full-time hire, Handzic will play a key role in bringing the technology to market.

"Seeing this idea come to the point where it might help people is a realization of a dream we had a long time ago," said Reed. "It's very exciting to see the project moving forward and impacting society."

Fixing the Phony Fish Problem

That \$5 grouper sandwich is too good to be true, and a spinoff company from the University of South Florida (USF) is trying to prove it.

PureMolecular in St. Petersburg has developed a simple and quick method to test seafood for authenticity making it harder for imposter fish to find its way between your buttered buns.

According to a report by an organization protecting the world's oceans, Oceana, as much as 33 percent of the seafood sold in the U.S. is mislabeled. Fish in consistent demand, such as tuna, salmon and grouper, lead the cases of phony seafood. Increased regulations, expense, wildlife protection measures and other factors have driven part of the market toward shortcuts resulting in deceitful practices.

In an effort to thwart the shortcuts, PureMolecular teamed up with USF and The Corridor in a Matching Grants Research Program project to further develop its technology.

CEO Dr. John Paul is also a USF professor in the College of Marine Science. He led the project in his lab with a graduate student, both researching improvements to the kits, hardware and chemistry.

"Our goal is to build a better mouse trap for when a buyer is standing on a boat getting ready to purchase 49 tons of grouper and he needs to know what it is," said Paul.

The technology works like this: someone purchasing food for a restaurant can visit



a vendor and obtain a very small sample of the seafood for sale (a mere prick of the fish), then place the sample in a proprietary mixture to receive a reading of authenticity within seconds.

The kit analyzes genetics of the fish to determine the result. Imposter seafood tends to come in the form of lower-quality species, including farm-raised fish which differ greatly in heavy metals and pollutants. The genetic make-up predicts flavor quality. There are some fish that are outright frauds, as was the case when Paul found Asian Catfish being marketed as grouper.

"Grouper is a delicious fish," said Paul. "It's expensive because it is iconic in Florida and restaurants serving it at price differences of \$15 have to make the consumer wonder what they are buying for their money."

Without The Corridor funding, PureMolecular would not be able to afford the student researcher furthering her graduate work on the project and supplies necessary to upgrade the kits.

Paul's business partner, CTO Bob Ulrich, was a former graduate student of his.

"The spark for this company came from realizing technology developed by research dollars in academia can often stagnate," said Ulrich. "We saw a practical application for this technology and we are seeing more of its potential every day." ■

An Accidental Discovery

In the world of research and development, some of the greatest inventions can happen entirely by accident. That was the case for one Tampa-based team of researchers, who discovered a safe and effective means of permanent hair removal. But that discovery was far from what the researchers had originally intended to find.

The research project was initiated several years ago by a team at the University of South Florida (USF) led by Dr. Mark Jaroszeski. In 2014, STEM Genesis, a company in the Tampa Bay Technology Incubator, joined the team at USF, recognizing the project's potential commercial value. The collaboration continues today with support from The Corridor's Matching Grants Research Program.

Initially, the team developed a device to enhance delivery of DNA and other gene-based therapies for the treatment of skin cancer. By emitting a harmless plasma, the technology applies a charged stream of electrons to the surface of the skin, allowing cells to become more permeable and likely to accept a particular drug or therapeutic agent.

However, as the researchers were testing this process, they came across an unexpected outcome—under certain treatment conditions, hair in the treatment area didn't grow back.

"It was really interesting," said Dr. Michael Muthig, president and CEO of STEM Genesis. "The team realized the potential value of a device that could provide permanent hair removal, so we filed a patent application to commercialize it."

Similar to the drug delivery application, the device would deliver a non-thermal electric current to permanently remove the hair. The technology could one day be widely used and sold by medical device companies, med-spas and dermatologists. Once testing is complete, Muthig and Jaroszeski anticipate that the process will be safe, painless and permanent.

While the technology has vast potential as a cosmetic device, its initial application still holds promise as well. The plasma, which is what generates the device's electrical charge, helps to better



control the drug delivery process, ultimately making treatments for cancer and infectious diseases more effective.

"This is really cool science," said Jaroszeski, associate professor of chemical and biomedical engineering at USF. "It's a fascinating way of manipulating cells at the molecular level for disease treatment or hair removal—and we believe we'll be able to achieve this with negligible sensation or side effects."

As STEM Genesis continues to validate and commercialize both of the technology's applications, funding from The Corridor has played a key role in moving the project to the next phase.

"With any high tech medical device coming out of a university, it's usually very hard to get funding to do the necessary testing and validation," said Muthig. "These funds have been absolutely critical in doing that early-stage work to transition the device from the lab to market-ready technology." ■



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From the President



Looking back on my first year as president of the University of Florida (UF), I am happy to note that 2015 was a year of great success and achievement for our university. Our students, faculty and valued partners throughout the Florida High Tech Corridor have made significant contributions in the areas of research and development, encouraging a lasting impact on our economy.

In 2015, UF received more than \$700 million in research awards, surpassing the previous record set in fiscal year 2014 by more than \$5 million. This included a record \$102 million in funding from industry, an increase of more than 40 percent over the previous year. UF is consistently ranked as a leading public university, and these research dollars are a major contributing factor.

One such research project is the Multi-functional Integrated System Technology (MIST) Center which will play a pivotal role in researching the next generation of "smart" electronics. With a partner site at the University of Central Florida, the MIST Center will help power the "Internet of Things" as our society continues to push toward connectivity. Another example of innovation is HiPerGator 2.0, the third-fastest university supercomputer in the country and a piece of machinery capable of storing more information than all the books in the Library of Congress and the nation's top 25 public libraries (including the New York Public Library) combined.

As UF continues to innovate and create groundbreaking technologies in tandem with our Corridor partners, our region stands poised to grow as a leading high tech hub. I look forward to being a part of the promising future that lies ahead.

Cordially yours,

Dr. W. Kent Fuchs
President, University of Florida

Academic Degree Programs

(As of December 2015 BOG Degree Program Inventory)

Baccalaureate	98
Engineer	1
Master's	126
Professional Doctorate	5
Research Doctorate	81
Specialist	7
Professionals (Dentistry, Law, Medicine, Pharmacy, Veterinary Medicine)	5

Number of Degrees Awarded

(1905 – Summer 2015)

Baccalaureate	343,674
Master's	103,736
Specialist	3,241
Engineer	88
Ph.D.	22,862
MD	5,494
DVM	2,841
EDD	1,382
DMD	2,781
JD	18,680
DPH	6,855
DNP	156
SJD	4
AUD	275
DPM	21
DPT	271
Professional (Undesignated – Before 1959)	75

Personnel (as of Fall 2015)

Full-Time Regular Faculty	2,776
Part-Time Regular Faculty	147
Full-Time Clinical Faculty	993
Part-Time Clinical Faculty	148
Full-Time Staff	8,307
Part-Time Staff	186

Fall 2015 Enrollment: **49,555**



UF at a Glance

Progress continued at the University of Florida in 2015 on a variety of fronts.

Long an engineering powerhouse, UF made a huge leap forward this year when South Florida inventor and philanthropist Dr. Herbert Wertheim and the Dr. Herbert and Nicole Wertheim Family Foundation committed \$50 million to launch a \$300 million public and private investment in UF's College of Engineering.

At least two high tech facilities are planned for the college at UF, including the 80,000-square-foot Engineering Innovation building. Scheduled for groundbreaking in spring 2016, it will be designed to encourage interdisciplinary collaboration as UF moves forward in creating the new engineer.

UF's Innovation Square also continues to move forward. In September, the U.S. Economic Development Administration announced UF will receive \$8 million in federal funding toward construction of Phase II of the

Florida Innovation Hub, a 50,000-square-foot building adjoining the original business super incubator at Innovation Square.

According to the latest numbers available, UF ranked eighth for U.S. patents issued (107) and seventh for licenses and options completed with companies commercializing researchers' discoveries (140). That statistic includes agreements completed by UF's Office of Technology Licensing and the Institute of Food and Agricultural Sciences. The university also helped launch 17 startups in the fiscal year that ended in June 2014.

On the faculty-hiring front, when the legislature designated the University of Florida a preeminent university in 2013, UF leadership set out to recruit more than 120 faculty who would help grow the university's national and international stature and give the state of Florida the world-class university it deserves. UF also launched a campaign to leverage that support by raising \$8 in private donations for every dollar of preeminence funding. UF to-date has hired more than 90 researchers from some of the world's most prestigious institutions in more than two dozen areas identified as some of the most challenging global issues. ■

Paper or (Biodegradable) Plastic?

It can take a plastic bottle between 500 and 1,000 years to biodegrade. A professor at the University of Florida (UF) is trying to bring that number down to 10 with research that could have a tremendous impact on our fragile environment.

Dr. Stephen Miller, UF associate professor of chemistry, is developing technology that would use the byproduct of processed sugar cane in creating a new plastic that degrades in 10 years in the presence of water.

The technology has become the focus of his newly formed company, U.S. Bioplastics, where he serves as CTO, alongside CEO Lee Strait. To further develop the plastic for commercialization, they teamed up with The Corridor on a Matching Grants Research Program (MGRP) project.

"Today's plastic was not designed for one-time use when it was created more than 100 years ago," Strait said. "The height of the industrial revolution called for cheap items that will last. And they do. Plastics last for generations."

The need for water being present in order for a rapid breakdown using the new technology is important as many used plastics find a home in the world's oceans, forming giant trash regions (some the size of Texas or bigger) that get stuck in ocean currents. These floating landfills endanger marine life as fish, turtles, seals, birds and others ingest the plastic or are trapped by plastic pieces.

Several patents have been issued and some are pending for the new plastic coined Gatoresin. Miller worked with a post-doctoral student at UF to collect the sugar cane waste and extract data for the project. Corridor funding helped buy a new reactor and scaled up the operation.

Gatoresin is not only environmentally friendly, but also a product that breaks a dependency on oil for the production of plastic. It can be created from corn leaves and stalks, plus sugar beet pulp, utilizing the byproducts of food that mostly go to waste.

An alternative plastic currently exists; however, it is derived from



corn starch, sugar cane and other potential food sources, not their byproducts. The continued use of this alternative could deplete food supplies and has limitations on the temperature of contents it can carry. Coffee cups of this material are out of the question. Gatoresin is a solution to both issues.

"Historically, the plastics industry has been seen as dirty," said Miller. "I want to reverse that. I think someone will pull this off and I hope we are the ones."

The challenge is creating Gatoresin at a low cost, but Miller is excited for the opportunity to create a positive impact on the environment that could last generations. ■

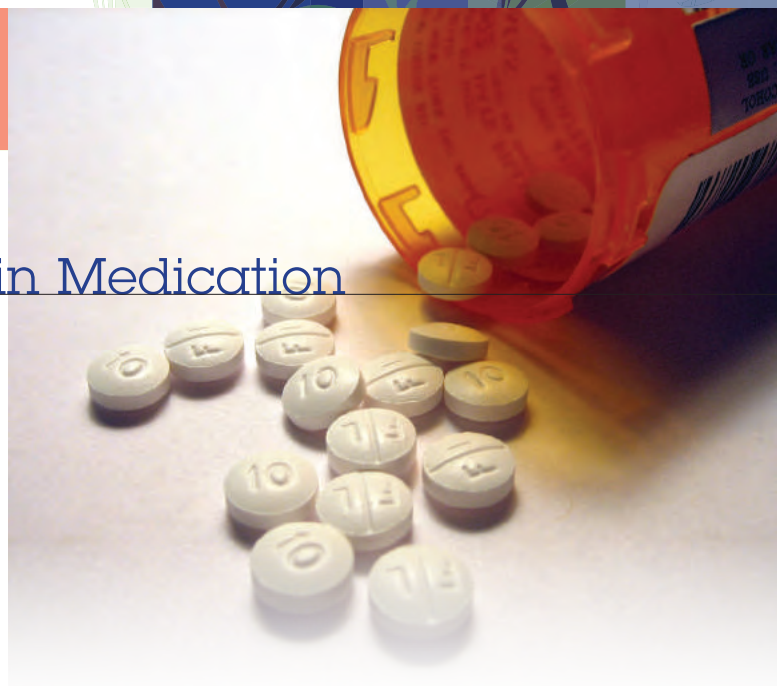
Prescribing the Proper Pain Medication

Oxycodone has long been the go-to option when it comes to prescribing pain medication. At any given time, more than 10 million people in the United States have a prescription for the drug, amounting to \$2.5 billion in sales per year. But for some, oxycodone provides minimal pain relief.

This situation may sound improbable, but it's a very real problem for many people dealing with acute or chronic pain. In fact, nearly 25 percent of the population is classified as poor metabolizers, meaning they are unable to process oxycodone into its active form—either due to genetics or interactions with other medications. These patients often find themselves returning to the doctor pleading their case for an alternate prescription. The challenge is that it's extremely difficult for physicians to verify the patient's claim—until now.

Recognizing the impact of this problem, researchers at the University of Florida (UF) teamed up with Ocala-based Pinnacle Laboratory Services to develop a solution to help doctors prescribe proper pain medication.

With support from The Corridor's Matching Grants Research Program, UF and Pinnacle developed a computer model that identifies patients as poor, intermediate or rapid metabolizers of oxycodone. Utilizing a combination of urine- and genetic-testing, the technology could provide doctors valuable information that validates the need for an alternative prescription or adjusted dosage



"Ultimately, we're removing a lot of the uncertainty in managing patients taking oxycodone for pain," said Dr. Larry Lesko, lead researcher on the project and director of UF's Center for Pharmacometrics and Systems Pharmacology. "This technology provides objective data that eliminates a lot of that 'gut-feeling' from the decision-making process."

Once research and development is complete, the team's technology could be used in two key scenarios. First, a physician could preemptively test patients to determine the type of metabolizer they are, allowing them to prescribe the most effective medication from the get-go. Alternatively, doctors could conduct testing retrospectively once the patient shows a poor response to the drug. In both cases, the end result is a notable reduction in medical costs and improved pain management.

"I'm excited that this research will give some validation to patients and important guidance on dosing," said Dr. Andrea Trescot, medical director of Pinnacle Laboratory Services. "This technology will hopefully give us the ability to use pain medicine more effectively and provide pain relief to patients who are suffering."

Thanks to funding from The Corridor, the team has been able to conduct testing on patients and hire post-doctoral fellows, who are responsible for day-to-day research and development.

"What we're doing could be a game-changer in providing physicians greater insight into the use of oxycodone," said Lesko. ■

Taking a Closer Look at Eye Disease

Preventative health care is credited with helping to catch disease early, but it's difficult to do the job when technology is lacking, specifically in preventing eye disease stemming from diabetes. However, Gainesville's Sentinel Diagnostic Imaging is creating the tools necessary for a diagnosis and treatment of eye disease much earlier than current technology allows.

In patients with diabetes, tiny blood vessels that provide nutrients to the retina – the part of the eye that “sees” images and “speaks” to the brain – leak blood and other fluid that can cloud vision to the point of blindness. The condition is known as diabetic retinopathy and, according to the American Optometric Association, it's the leading cause of vision loss for Americans under the age of 74.

Dr. Daniel Gibson, University of Florida (UF) College of Medicine research assistant and professor, has teamed up with Sentinel Diagnostic Imaging's CEO Dr. David Meadows for a Florida High Tech Corridor Matching Grants Research Program project to create a better retinal image scanning and analysis tool to help catch disease before symptoms set in. The goal is to enhance Sentinel Diagnostic Imaging's existing technology, Oqulus, to have the same accuracy as a retinal specialist. According to Meadows, there are only about 1,000 retinal specialists in the nation – meaning the Oqulus technology would increase access to specialist care.

“It's been known for many years that the eye is the most sensitive organ in your body for both neurological decline and vascular decline,” said Meadows. “Oqulus will be able to give a physician an indication of when and what type of treatments a patient needs earlier than any other technology currently in use.”

The Oqulus software analyzes an image of blood vessels in a patient's retina and characterizes biomarkers that indicate disease, such as the number and health of those blood vessels present.



Physicians can compare a series of images over time to identify early warning signs of a disease to monitor its progression or to validate therapy.

It's the ease with which Oqulus gathers information that will make it an enticing tool for health care providers. “You don't have to give the patient a jab or take bodily fluids and run it off to a lab – it's a picture,” said Gibson.

Matching funds from The Corridor have allowed researchers from UF to collaborate with Sentinel Diagnostic Imaging and accelerate the project. Together, they have equipped Oqulus to successfully identify many of the biomarkers that indicate diabetic retinopathy, and with such success, are beginning to shift the focus to glaucoma.

In the future, Meadows hopes that Oqulus will become part of common medical practices and help in identifying biomarkers for a range of vision and life-threatening diseases that manifest in the eye, including Alzheimer's, multiple sclerosis and hypertension. ■

EDUCATION AND
LEARNING

GATORS

WHAT'S THE GOOD THAT

MEDICINE AND
DISEASE

INSPIRES

MENTAL
HEALTH

ECONOMIC
CRISIS

WHAT'S
NEXT

POVERTY AND
HUNGER

POVERTY AND
HUNGER

PHYSICAL
HEALTH

ENVIRONMENT AND
SUSTAINABILITY

HUMAN
RIGHTS

The Gator Good isn't about a single university or even a single cause. It's about people on opposing sidelines coming together to face any obstacle—no matter how big. There's a bigger purpose. It's inspired by coastal fishing villages, eighth-grade algebra classes and Little League baseball teams. And it takes all of us, all of them and especially you.

EDUCATION
LEARNING

NATURAL
DISASTERS

TELL US THE GOOD THAT INSPIRES YOU
AND BE A PART OF SOMETHING GREATER

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UF

Developing Nanomaterials for a Big Impact

Semiconductors represent a multibillion dollar industry in the United States. From computers to cellphones and calculators, they are at the heart of nearly every electronic device, impacting society daily.

Sarasota's US Nano Vice President Louise Sinks and her team are working to revolutionize the industry by developing advanced nanomaterials for electronics. Unlike traditional semiconductors made of silicon, their cutting-edge materials can be produced in any shape or size, and are more rugged.

Consider the semiconductor that powers a cellphone display. The single crystal is very brittle, to the point of breaking if it's bent. The company's nanomaterial is not just a good semiconductor, but also flexible enough to roll up and carry in a pocket.

But the company's nanotechnology impacts far more than digital displays. By massively reducing the size of traditional technologies, US Nano is able to create chemical sensors as small as a blood test strip. The strips are currently being developed for use by scientists at a local fish farm to monitor the health of the animals.

"Because we're developing such a fundamental technology that can be applied in so many different ways, it's really a lot of fun to work on such different applications," said Sinks. "One day I'm thinking about displays and the next day I'm thinking about fish."

The fish farm is one of several local companies US Nano has partnered with since recently relocating to Sarasota. After four years in a business incubator at the University of Notre Dame, US Nano launched a nationwide search for a city to expand operations and commercialize its technology.

So, when the Economic Development Corporation of Sarasota County went above and beyond to help US Nano overcome relocation challenges, the company gladly



Louise E. Sinks

Vice President

US Nano LLC | www.usnanollc.com

Education: B.S., Chemistry, University of Virginia
M.S., Chemistry, Northwestern University
Ph.D., Chemistry, Northwestern University

Company: US Nano is a nanotechnology company specializing in developing nanomaterials for printed electronics, with particular focus on semiconductors. Its expertise is in synthesis of nanomaterials-based inks, as well as in production of fully functional jet printed electronic devices.

moved south. And, in addition to the area's resources, the prospect of moving to a more temperate climate was equally enticing.

"One of our co-founders has another company located in Sarasota," said Sinks. "We'd have conference calls in the winter and he'd be in shorts, talking about how warm it was."

Despite the company's continued growth, Sinks hasn't lost sight of what inspired her to explore science as a child. A lover of learning and solving puzzles, she now has the chance to follow her passion while creating technology with monumental impact.

"I'm a very analytical person, so I've always been drawn toward math and science," said Sinks. "I love coming to work every day and solving new problems and playing with cool equipment. It's so much fun."

Making Waves with Underwater Technology

In the 1980s, Ken Nagengast helped pioneer the development of wet-mate connectors. Designed to connect and disconnect underwater electrical cables without water leaking inside, this product would eventually become a fundamental piece of equipment for the offshore oil and gas industry.

"Before the connectors were developed, it was highly impractical for the oil industry to get its equipment subsea and operate at the depths at which they're operating now," he said. "It has enabled this industry to pursue oil reserves in extreme ocean depths."

Today, as senior vice president for technology, Nagengast manages Daytona Beach's Teledyne Oil & Gas global technology initiatives and oversees all engineers, including those at the Technology Development Center. There, a diverse team is working on the company's next-generation products – including modern wet-mate connectors – for the oil and gas industry, and applications in ocean science and defense. Nagengast regularly challenges the team with a battle cry of "Show me the Data!"

The advanced Technology Development Center simulates the deep-sea environment. It's one of the harshest environments on earth, where equipment must endure extreme temperatures of up to 400 degrees Fahrenheit and pressures of tens of thousands of pounds per square inch while dealing with the corrosive nature of seawater.

According to Nagengast, these aggressive deep sea conditions challenge the efficiencies of oil production. The amount of oil retrieved from a subsea well is typically less than 40 percent and as low as just 20 percent of the total available oil, but engineers at the Center are developing equipment to assist in making the process more efficient. Using the same material science applied to the heat-resistant space shuttle tiles, the team is developing products, such as interconnection equipment, pressure and temperature sensors, that can withstand similar extreme conditions.

"For the U.S., that means less reliance on outside sources for oil because we're increasing the



Ken Nagengast

Senior Vice President, Technology

Teledyne Oil & Gas | www.teledyneoilandgas.com

Education: B.S., Mechanical Engineering, New Jersey Institute of Technology

Company: Teledyne Oil & Gas is an alliance of Teledyne Technologies companies that delivers high-reliability engineered interconnect solutions for power transmission, data transmission and monitoring applications to the Oil and Gas, Ocean Science and Defense industries.

amount of oil we get out of domestic wells while improving system reliability," he said.

Part of the Center's capability for innovation stems from local university partnerships, including the University of Central Florida, the University of Florida and the University of South Florida, as well as a longstanding relationship with Embry-Riddle Aeronautical University, located just 10 minutes down the road. Each summer, Teledyne Oil & Gas challenges teams of student interns in a competition to solve a problem facing the industry. The competition has resulted in full-time jobs for numerous interns and participation in the development of products the company sells today.

"I like facilitating how we can be better, how we can improve the industry and the way our business operates," said Nagengast. "That's really my passion – finding out what makes things work and also finding out what makes things NOT work. With that understanding, we are leading the industry in developing better products for our customers."



Three Unique Unive



ersities **ONE REGION**



Regions are often defined by features such as climate, topography and demographics. Few regions are defined by a trio of universities, much less three of the nation's largest research institutions.

Increasingly, when people think of Florida's High Tech Corridor, they think of three unique universities with distinct personalities and academic and research specialties ... all ranked in the top 20 in the country by enrollment.

But they are also seen as unique for the fact they collaborate where others might see each other as fierce competitors. "Don't get them wrong," said Jack Sullivan, president of the Florida Research Consortium, a statewide innovation alliance to which each of the universities belong. "The University of Central Florida (UCF), the University of South Florida (USF) and the University of Florida (UF) are fierce competitors in that they each seek to grow their research role and the academic strengths that come with research."

"But they have also worked together to build a culture of support for economic development, job growth and regional cooperation," said Sullivan. "It is unique in American higher education and over the past 20 years it has led to a global recognition of the growing high tech hub in the region. They are a role model."

Economic developers throughout the region say these three institutions – each known for numerous diverse specialties – have become a critical tool in their ability to attract and grow what has become one of the country's well-recognized technology hubs. "The Corridor has been and continues to be a key element of our reputation as a technology hub," said Rick Weddle, president of the Metro Orlando Economic Development Commission. "We often have prospects contact us about opportunities in Orlando because they know UCF's reputation. It used to be that they knew us for our attractions and were curious about higher education here. Today they not only know about UCF, but they know The Corridor story as well."

"Great communities are almost always anchored by great universities and we are no exception," said Weddle. "UCF has helped put Orlando on the map as a top choice for business development. From helping create our dominant position as the 'epicenter of modeling, simulation and training,' to laying the research foundation for the rapidly growing sensor industry in partnership with Osceola County to establish the Florida Advanced Manufacturing Research Center, UCF is critical to Orlando's future growth and development."

You hear the same tone in the Tampa Bay area. "The High Tech Corridor is more accurately a massive pipeline. One that contributes a steady flow of research,



talent, grants and intellectual property into our super region," said Rick Homans, president/CEO of the Tampa Bay Partnership. "The academic excellence of these three top-tier universities provides the most compelling advantage when it comes to our efforts to attract high-wage jobs and transformative investment to the region."

And the state's elder statesman among universities, the University of Florida, not only continues its land grant mission of statewide service, but has in recent years propelled the Gainesville area forward with new jobs producing a hotbed of tech activity.

"The University of Florida and its \$700 million a year research engine gives Gainesville the capacity it needs to forge high-impact public-private partnerships and research capabilities such as those in Boston, New York, Austin and numerous other tech hubs across the country," said Gainesville Area Chamber of Commerce President/CEO Susan Davenport. "Alone, UF's Herbert Wertheim College of Engineering produces 28 percent of all STEM graduates of Florida's public universities."

"On a larger scale, the University of Florida, the University of Central Florida and the University of South Florida have developed a highly symbiotic relationship over the last two decades," she said. "The competition and collaboration among the three universities and their respective business ecosystems make the High Tech Corridor a powerhouse of tech talent, innovation and opportunity for Florida and the entire U.S."



With an estimated 70 percent of Florida's high tech industry located in The Corridor, the region helps Enterprise Florida – the state's official economic development agency – in its ongoing efforts at economic diversification. "People have known the political impact of The Corridor region for a long time because the outcomes of many national elections have been decided here," said EFI President Bill Johnson. "Now, however, Florida's High Tech Corridor stands out as a robust technology-savvy region good for establishing and growing your business. It is a magnet."

In 2014, Florida surpassed New York as the nation's third-largest state. According to U.S.

Census Bureau statistics, more than half of Florida's growth in 2014 came from three areas ... South Florida, Tampa and Orlando. The High Tech Corridor was born of a partnership between UCF and USF whose leaders saw the natural growth occurring between Orlando and Tampa and their ability to partner with high tech industry to help meet research and training needs. Later they invited the University of Florida to join and complete what has become known nationally as The Corridor.

At its annual conference in 2015, the Florida Economic Development Council hosted the presidents of the three universities for a panel discussion and celebration of The Corridor's 20th Anniversary. They seemed to be anything but willing to rest on their accomplishments:

UCF President **John Hitt** emphasized the workforce development role of the universities: "I think in the future we're going to see an exaggeration of a trend that's already started ... and that is that rather than a workforce following jobs, companies now are following workforce. You see it really strongly in a lot of high tech economies." UCF conferred 15,485 degrees during the 2014-2015 school year.

USF President **Judy Genshaft** added that university incubators are playing a key role: "That is so important because so many of the discoveries are made when you are willing to take lots of risk and you're willing to really dream big. That's a very exciting part of what we do to help develop the whole enterprise of discovery and commercialization."



UF President **Kent Fuchs** said The Corridor aspires to be seen as a tech leader: "We're number three in population as a state (having just surpassed 200 million residents) and we deserve to be number three in the tech sector. When other states think of us, I want them to think that Florida and our universities need to be the model for the nation."

These three Florida High Tech Corridor universities have been on the cutting edge of a new era in higher education-economic development partnerships. For instance:

- They have invested more than \$65 million dollars in a Matching Grants Research Program that has produced a downstream impact of more than \$1 billion over those 20 years helping companies tackle applied research problems in partnership with student and faculty researchers.
- They have become central to what Corridor President Randy Berridge calls "early workforce development" by taking a leading role in STEM education projects that have reached hundreds of teachers and thousands of students, over the years bringing experts into the classroom physically, and now virtually via stemCONNECT, a Web-enabled, two-way experience exploring why STEM studies matter.
- They are the driving force behind the Florida Advanced Manufacturing Center and the International Consortium for Advanced Manufacturing Research, an Osceola County facility under construction to open in 2017 and predicted to position the region for five to seven thousand direct jobs and up to 20,000 indirect jobs in the burgeoning sensor field by 2025.

"Florida is on a path to greatness in innovation," said the Research Consortium's Sullivan. "Twenty years ago the concept of three universities partnering to better a regional economy was a fairy tale. Today they are being copied both in Florida – where other universities are partnering to capitalize on shared academic and research strengths – and across the nation where educational leaders are recognizing the essential role of modern universities is not just in preparing the workforce, but in working alongside business through the innovation process that results in opportunity and prosperity." ■

Temperatures can regularly reach the high 90s during the summer in Florida. Add two-a-day football practices and a sports drink industry is just begging to be formed.

The now famous orange-capped Gatorade bottle got its start in 1965 when the late Dr. Robert Cade, former University of Florida (UF) nephrology professor, and his team of research fellows consisting of Dr. Dana Shires, Dr. Jim Free and Dr. Alejandro de Quesada began studying why water hindered player performance on the football field.

Although water is key in hydration, it causes bloating and cramps when athletes drink during intense exercise. It was common to deprive the body of water as to not only avoid these unwanted side effects, but to also follow the mindset of a stronger, leaner, more powerful athlete overcoming the rigor of a workout without water.

Avoiding water led to dehydration and other related complications. It was not uncommon for football players to lose 10-20 pounds in one afternoon following practice in the harsh heat. Many were hospitalized.

In search of a solution, the research team studied the Gator freshman football players and concocted a drink of salt, sugar, potassium and other minerals to help the water included in the drink to be absorbed by the body faster and replenish electrolytes that are lost through sweat. Electrolytes aid in muscle and nerve performance.

With a winning mixture, the Gator football team was highlighted in the media as a team that consistently won games after trailing behind and chugging the mysterious Gatorade. The wins were sensationalized and fingers were pointed at the magical drink for incredible performance.

After that football season, Cade and his team had revolutionized the sports industry and didn't know it. They also forever changed Gainesville.

As a little girl, Phoebe Cade Miles would hear sweet sounds of the violin in her childhood home and know her father was playing music as he tried to figure out a problem. He was a musician, wrote poetry, grew roses, collected Studebaker cars and studied kidney function for a living. Cade was a true Renaissance man. At a young age, she understood science and art go hand-in-hand. **Creativity is innovation.**

Cade Miles was taught science through daily activities that sparked her interest and she often did not know she was learning complex matters while in the midst of a project with her father. One of her favorite memories was helping to make jam.

The adventure began after seeing wild plums growing on a tree leading the pair to pick the fruit while discussing fertilization of the flower and pollination by bees emphasizing biology and botany. Then at home, microbiology came into play as her dad shed light on the germs that live on skin and other items making

Dr. Robert Cade's Lasting Legacy:





& Innovation





it necessary to boil the jar and fruit. The final product was a thick, delicious spread made possible by chemistry.

Adhering to the same approach to teach science, Cade Miles leads Gainesville's Cade Museum as founder and CEO with a mission to inspire creative thinking, future inventors and early entrepreneurs so that communities flourish.

While numerous industries and educators focus on the importance of science, technology, engineering and math (STEM), she sees added value in an art component (STEAM) incorporating visual and hands-on learners.

"My father was interested in how to promote innovation and inventors before he passed away," said Cade Miles. "The Cade Museum is our answer to inspiring creative thinking and entrepreneurs. By including art to teach science we introduce a different thought pattern in problem solving. It brings together the ways people learn."

The museum will open its doors in summer 2017, but it is already pushing forward with

programs that introduce kids to science through innovative classes in their creativity lab, fabrication lab, early entrepreneur program for middle and high school students, and the living inventor series. One class in particular is titled 'Bubblegum + Ice Cream' teaching thermal science, polymer food science, pH scales and more while creating delicious treats.

Its signature program is the Cade Museum Prize. Open to inventors in Florida, the Prize provides \$50,000 in cash to the winner for seed capital and publicity of their innovative idea or product.

"Completing the Cade Prize was a very pleasant and helpful experience," said Hooman Banaei, Everix Optical Filters founder/CEO and winner of the 2015 Cade Prize. "I would say the same even if we hadn't won because the entire process is so thoughtfully designed to teach the applicants how to prepare a pitch around an innovative product."

Innovation and creati

Orlando's Everix manufactures flexible optical filters that are thinner than a human hair comprised of hundreds of layers. The innovative approach in creating the new material makes the product that can be used for screen protectors and filters, glasses and other items less expensive. An optical filter that cost \$2,000 may now cost less than \$100, making it accessible to the general public.

Richard Miles, Cade Museum co-founder and vice president, was instrumental in creating the Cade Prize in 2010 with a goal to provide a platform for new ideas with the potential to follow in the footsteps of Gatorade.



And Everix's optical filter is just one example. Past winners have made breakthroughs in sustainable energy, biotechnology, optics, photonics and more.

"When [Phoebe and I] grew up in Gainesville in the early-mid '80s, there weren't a tremendous amount of opportunities for people outside of the university," Miles said. "We have seen in the last 15 years an explosion of small startup companies, mid-size firms. Now you have these real opportunities for people."

Opportunities have led the husband and wife team to focus on Gainesville to invest their time, energy, talent and money. The Cade Museum will be more than a museum in the sense that it will not only tell Cade's story and that of Gatorade, but also serve as a beacon for new, exciting and different ideas. It will continue to write scripts for a ballet troupe to demonstrate the forces of

creativity is key in winning.

flight (lift, thrust, drag and weight) through dance. It will continue to spotlight human genetic variation by having people place their tongues on tablets to discover differences in taste. And it will continue to strive to inspire creative thinking in science.

"I think the Cade project is one of the most innovative things to happen in Gainesville," said Patti Breedlove, Cade Museum board of directors member, head of the Cade Museum Prize Committee and former prize judge. "It took a while for a lot of us to understand what the vision was because the word museum doesn't convey it at all, but Gainesville is a natural place for something like this to happen given the legacy of Gatorade."

With the Cade Museum, Cade's legacy has reached far beyond billion dollar sales of Gatorade and the transformation of athletic performance, as well as nourishing anyone that is dehydrated. The drink may have put Gainesville and UF on the map, but solving problems – perhaps in a more unique way – is how Cade's memory will live on. ■



MS&T: What Health Care, Video Gaming & Defense

Among growing tech industries in Orlando, one in particular has had a transformative impact on the state's economy.

Modeling, simulation and training (MS&T) is responsible for a \$5 billion annual economic impact and supports more than 60,000 high-wage jobs statewide. Those jobs span industries including health care, video gaming, defense and other specialized fields. With great collaboration and expertise located in one area, Orlando continues to move into the spotlight as the nation's epicenter for MS&T.

Taking root in Central Florida in the 1940s, the region's MS&T cluster provides training for a number of jobs, including flight simulators to train pilots and hyper-realistic dummies to train nurses. The new technology is changing how doctors, teachers and engineers learn necessary skills. With such a broad definition of training, varied industries are making it their own.

One local company producing cutting-edge simulation technology is Electronic Arts (EA) – Tiburon. Based in Orlando, EA – Tiburon is one of the largest video game studios in the world and

creates top video games, including Madden NFL, NBA LIVE and Rory McIlroy PGA TOUR. The company has led the industry in developing immersive and realistic experiences not just for entertainment, but for educational purposes too.

In December 2015, EA launched Madden NFL: Football by the Numbers, an educational video game designed to get students excited about science, technology, engineering and math through football. Available at no cost to educators, the game teaches students how and why certain plays work using the principles of math and science. (The game is offered free to teachers everywhere.)

Beyond developing educational games, the global gaming company has also significantly impacted the growth of MS&T in Orlando.

"Many former EA employees have gone on to form new companies that grow the overall technology sector in Central Florida," said Daryl Holt, vice president and group chief operating officer of EA – Tiburon. "Beyond that, EA has played a role in forming and supporting higher education programs, like the Florida Interactive Entertainment Academy at the University of Central Florida, helping spur the industry forward."

While gaming is a key component of The Corridor's MS&T cluster, medical simulation takes a different approach.

Florida Hospital has a state-of-the-art medical learning facility in Celebration dedicated to training physicians. Having trained more than 50,000 surgeons over the last decade, the Florida Hospital Nicholson Center offers settings





Industries Have in Common

ranging from a robotics training lab to mock operating rooms. The team is also working to develop a curriculum on the fundamentals of robotic surgery.

As part of the curriculum, researchers at the Nicholson Center built a first-of-its-kind device that simulates robotic surgery, as well as a virtual reality game, which uses avatars and a 3-D environment to teach surgeons how to efficiently manage their team during surgery.

"More health care-based applications of modeling and simulation are starting to emerge, and it's not clear where those are going to converge," said Roger Smith, Nicholson Center chief technology officer. "Ultimately, they're going to create a nexus somewhere in the country, and as part of Florida Hospital and the Nicholson Center, we would like to help make Orlando that place."

While medical simulation continues to grow, the defense industry has had a foothold in Orlando's MS&T sector since the beginning.

Thanks to years of collaboration and collocation in Orlando, procurement activities of the Navy, Army, Marines and Air Force work together to secure training solutions for soldiers, pilots and seamen, resulting in the development of breakthrough technologies that have benefited our nation's military.

With such an active military presence, Orlando is also home to MS&T's largest trade show, the Interservice/Industry Training, Simulation and Education Conference (I/ITSEC). I/ITSEC brings together the world's leading MS&T companies and features groundbreaking technologies. As such, for the next four years, I/ITSEC will showcase the future of defense simulation by demonstrating live, virtual and constructive (LVC) training.

LVC training is typically conducted as three separate entities; however, I/ITSEC will showcase the three forms of training combined into one environment. For example, a pilot can fly an F-35 and in his visor see his wing man who is on a base in a simulator, but both experience the same situation and complete a further simulated mission. This approach allows warfighters to train in a complex setting while reducing the costs of expensive live training.

"What's important about the LVC event is that we're bringing all these capabilities together with more than 30 companies, and we're integrating everything into a single operational environment," said Kent Gritton, director of Operation Blended Warrior, the name of the LVC event at I/ITSEC. "The key takeaway is determining how industry, government and academia can come together to increase training efficiency so that this technology can be used more frequently."

And that has proven to be key in MS&T: collaboration for better solutions. ■





In It for the Long Haul:

As Florida increasingly focuses on cleaner, more efficient energy sources, high tech industry has evolved to provide sustainable solutions, and nowhere is that more true than along Florida's High Tech Corridor.

One byproduct of the growth of high tech industry is an ever-increasing demand for energy to fuel advanced technological equipment. As such, Corridor universities, research partners and industry leaders are focused on developing sustainable energy approaches that ease the burden on Florida's environment.

Given Florida's well-deserved nickname as the "Sunshine State," it stands to reason that much of the sustainable energy development underway is in the field of solar electricity generation and distribution.

On The Corridor's western end, Duke Energy is mounting a 10-year plan to build up to 500 megawatts of solar energy generation by 2024.

As well, Duke is moving forward with a five-megawatt solar power plant near Walt Disney World Resort.

"We are committed to working with customers to expand their use of renewable energy," said Alex Glenn, Duke Energy Florida president and a member of the Florida High Tech Corridor Council, who called the project "another example of how we are meeting our customers' interests in renewable energy, while bringing more solar choices to Florida."

In Volusia County, more than a hundred thousand race fans are experiencing solar power generation in a unique environment. As part of Daytona Rising, a \$400 million "reimagining" of the Daytona International Speedway, Florida Power & Light (FPL) partnered with the Speedway to develop the FPL Solar Circuit, featuring more than 7,000 solar panels generating 2.1 megawatts of electricity across three solar installations. The project is the fifth-largest solar facility at an American sports stadium, and brings tremendous visibility to sustainable energy efforts in Florida.

Amazingly, that project represents less than 1 percent of the solar generating capacity FPL is building in 2016 alone. By the end of the year, the company will have added more than 225 megawatts of solar capacity, equal to more than 45,000 typical rooftop solar panel installations, at no net cost to customers.

A highlight of that expansion is the FPL Citrus Solar Energy Center in DeSoto County, a grid-connected 74-megawatt solar power plant. "We're now building three large-scale solar power plants, which are by far the most economical way to advance solar energy in Florida for the benefit of all customers," said Eric Silagy, FPL president and CEO. "This will allow us to cost-effectively triple the amount of solar energy we use to serve our customers by the end of 2016."



Moving clean energy forward in Florida



SOLAR
CIRCUIT

Sustainable Energy Sector Continues to Grow Along The Corridor

In addition to large-scale solar installations like these along The Corridor, the region has long been home to one of the world's leading resources for solar energy research and development, as well. The University of Central Florida's Florida Solar Energy Center (FSEC) was created in 1975 to serve as the state's energy research institute, and today has more than 40 patents licensed to industry. Recently, FSEC has also branched into sustainable energy areas that go far beyond solar.

For instance, FSEC is the only university-led team in the nation to receive part of a \$4 million investment by the U.S. Department of Energy to increase home heating and cooling efficiency as a way to cut energy use. The Building America Partnership for Improved Residential Construction project will research not only optimal comfort systems for heating and cooling, but also high-performance ventilation systems and indoor air quality strategies.

Home heating and cooling represent the single highest energy use for U.S. homeowners and 40 percent of a home's energy consumption, so it's no stretch to say that FSEC's research could have a tremendous impact well beyond Florida. If so, it wouldn't be the first example of energy savings stemming from an FSEC project. The Gossamer Wind® series of ceiling fans was conceived at FSEC, and today the more than 2 million Gossamer Wind fans in operation save users an estimated \$40 million annually.

Similar examples abound along The Corridor of sustainable energy technology and training programs that have a broad national and even international impact.

For instance, Siemens Energy operates a wind service training center in Orlando that provides highly advanced technical and safety training for wind energy

technicians throughout the Americas. The center is one of only four Siemens wind service training facilities globally, joining locations in Denmark, Germany and the United Kingdom.

"As renewable energy continues to grow as part of the world's energy mix, our customers depend on us for highly skilled technicians who are committed to helping ensure the long-term reliability of their assets," said Randy Zwirn, president and CEO of Siemens Energy Inc.

From discovering the next advancement in sustainable energy to training technicians in the care of that equipment, companies and researchers in The Corridor are making strides in alternative energy solutions. The growing activity centered in one region can serve as a catalyst for even greater collaboration and puts a spotlight on The Corridor as a thriving hub for sustainable energy. ■

Fighting Cancer with Genomics

For 13 years, scientists worked tirelessly on the Human Genome Project to discover the billions of DNA sequence combinations possible in one genome. When the findings were released in 2003, Tampa's CvergenX Chief Scientific Officer Javier Torres-Roca, M.D., was among millions around the world who knew science would never be the same.

Torres-Roca was new to the H. Lee Moffitt Cancer Center team when the findings were released. He wanted to find a way to apply the revolutionary genome research to his work.

"It appeared to me that it was going to be critically important to incorporate genomics into radiation oncology," he said.

According to the American Cancer Society, the majority of all cancer patients receive the same standard radiation therapy. However, the range of cancer tumors that exist and their reactions to radiation can be dramatically different. Each tumor contains unique DNA and, just like a fingerprint, no two are alike.

"Today, radiation is a one-size-fits-all therapy," said Torres-Roca, now an associate member and director of research in the Department of Radiation Oncology at Moffitt Cancer Center, and associate professor of oncologic sciences in the University of South Florida's College of Medicine. "But treating two different tumors with the same radiation dose is wrong. We need more variation and personalization based on each patient."

Torres-Roca partnered with Steven A. Eschrich, Ph.D., CvergenX co-founder and scientific director of biomedical informatics at Moffitt Cancer Center, to research genomic applications in radiation therapy. The result of their research is the patented Radiosensitivity Index (RSI), owned by Moffitt Cancer Center and licensed to CvergenX.

RSI technology is the first of its kind. Using a special algorithm, it helps doctors predict the success of radiation therapy based on



Javier F. Torres-Roca, M.D.

Chief Scientific Officer (CSO)

CvergenX Inc. | www.cvergenx.com

Education: M.D., University of Puerto Rico School of Medicine
Residency, University of California, Irvine Medical Center
Research Fellowships, Institute Pasteur (Paris) & Stanford University

Company: CvergenX uses a unique molecular signature to identify specific differences in tumor radiosensitivity. This novel discovery, central to the company's patented Radiosensitivity Index (RSI), provides radiation oncologists the first opportunity to adapt treatment and dose to genetic characteristics of specific tumors, and to personalize and optimize radiation treatment planning and therapy.

a patient's unique genetic characteristics. With this personalized approach, Torres-Roca is confident they can increase the likelihood of more positive patient outcomes.

CvergenX is already making radiation a viable option for patients who would have otherwise not been considered good candidates. It also helps oncologists determine why radiation may be effective or ineffective for different patients, with the potential to solve cases of extreme resistance in the future.

Torres-Roca's passion for scientific discovery and innovation motivated him to overcome all obstacles with the technology and hopes it will one day open the door to new cancer treatments. To him, not knowing the outcome and trying anyway for the chance to change the world is powerful.

Degrading Oxalate for Digestive Health

Born and raised in Sweden, Captozyme Chief Operating Officer Helena Cowley always knew she wanted to pursue a career in science. But it wasn't until an internship with a research company in Alachua, Florida, that Cowley discovered her specific interest in oxalate research. It was also in Alachua where she discovered the love of her life.

"I have the luxury to have found my soul mate, who also shares my drive and passion," said Cowley, referring to her husband and Captozyme co-founder, Aaron Cowley, Ph.D.

Together, the Cowleys and an inspiring team of Captozyme scientists in Gainesville are developing therapeutic enzymes to remove oxalate from the body.

A naturally occurring substance, oxalate is prevalent in plant foods such as spinach, but it serves very little purpose. In fact, oxalate is an anti-nutrient that blocks the absorption of calcium. It's also the culprit of kidney stones and primary hyperoxaluria (PH), a rare disease that causes excessive accumulation of oxalate in the body. No satisfactory preventative treatments for these conditions currently exist – a fact Cowley and her team are determined to change.

With 12 employees Cowley describes as "hard workers who burn the midnight oil" and a product ready for the commercialization process, Captozyme is fit for success. Its proprietary enzymes can break down oxalate in the stomach into safe byproducts. Cowley describes the product like a sugar packet, which contains the oxalate-degrading enzyme in a powder form that can be sprinkled on food or mixed in a drink. Eventually, Captozyme will develop different forms of the enzyme, such as a mint or a liquid, to meet the needs of a wide variety of consumers.

Part of Captozyme's work moving forward will also focus on developing therapies for oxalate conditions and educating the public about



Helena Cowley

Chief Operating Officer (COO)

Captozyme | www.captozyme.com

Education: M.S., Bioengineering, Chalmers University (Gothenburg, Sweden)

Company: Captozyme is a biotechnology startup that develops oxalate-degrading enzymes for food. The company started out with two founders in 2009 and currently employs 12 employees in its labs at the Innovation Hub in Gainesville and Alachua.

the benefits of a healthy, oxalate-reduced diet. In general, according to Cowley, there's no reason to consume oxalate, as it has the potential to do more harm than good.

Considering nearly one in every 10 people will experience a kidney stone in their lifetime, Cowley is excited about the prospect of making a difference for such a large population. While she's still involved in the research and development of Captozyme's products, she looks forward to taking a more consumer-focused role in the company as COO.

"As an engineer, you want to create the perfect product," said Cowley. "But that is not always a match with the consumer's needs and wants. If I could do it all over again, I would focus more on the consumer perspective. The reason why you get up in the morning is the consumer."

YEAR IN REVIEW

President's letter

Dear Fellow Floridians:

When the Florida High Tech Corridor was created by the Florida Legislature in 1996, our supporters were visionaries who saw the potential of such collaboration, but perhaps none of us could foresee the extent to which The Corridor would help transform the state's economic landscape. Over 20 years, a high tech region coalesced and has been recognized internationally, driving innovation in Florida and contributing millions of dollars in research and development expenditures annually.

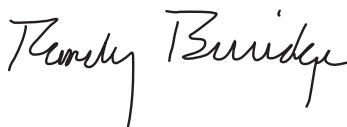
The Corridor has grown to such success because of partners who devote countless hours to growing high tech industry and innovation in the 23-county Corridor. Their work has resulted in these accolades over the past year:

- The Corridor's Matching Grants Research Program was honored by the State Science and Technology Institute with a 2015 Excellence in Tech Based Economic Development award for strides in "Expanding Research Capacity." The Corridor's program won the award among entries from across the nation demonstrating a unique approach to university and private industry research in our region.

- Florida Trend highlighted The Corridor in a feature section putting a spotlight on university and private industry research, high tech business developments and educational programs across the region, plus provided our partners another tool to help share The Corridor story with others.
- The research of our region's inventors was brought into the spotlight when seven professors from Corridor universities were inducted into the National Academy of Inventors in March 2015.
- Our three Corridor research universities – the University of Central Florida, the University of South Florida and the University of Florida – individually ranked in the top 30 of worldwide universities granted U.S. patents in 2014, according to a report by the National Academy of Inventors and the Intellectual Property Owners Association. Collectively, the three Corridor universities beat out the patent portfolios of university groups in the other established and well-recognized high tech hubs of North Carolina's Research Triangle and Austin's Silicon Hills region.

These are just a few recent critical steps that mark our two unique decades of achievement in strengthening Florida's innovation economy. Further details lie ahead in The Corridor's annual report. Thank you for your part in growing The Corridor – big or small.

Best regards,



Randy Berridge, President



Annual Report

Growing High Tech Industry

Through a unique partnership with dozens of economic development, workforce, academic and industry partners, the Florida High Tech Corridor Council has supported the growth of high tech industry throughout the 23-county region for 20 years.

A regional economic development initiative of three research universities – the University of Central Florida, the University of South Florida and the University of Florida – The Corridor has continued to receive national recognition for its efforts to build a region where technology and innovation thrive.

The following overview provides details about the initiatives and programs that helped The Corridor grow high tech industry and the workforce to support it in 2014/2015.

Matching Grants Research Program

The key focus of The Corridor has been to foster applied research partnerships between high tech industry leaders and our three Corridor universities. Every year, technology companies bring their commercial challenges to our expert faculty to take advantage of The Corridor's Matching Grants Research Program (MGRP), which helps leverage R&D budgets of industry partners.

MGRP projects continue to develop innovative technologies, including, simulated skin for better medical training, a sustainable plastic made from sugar cane waste and a shoe that helps to rehabilitate stroke patients.

During 2014/2015, the program generated 87 projects in partnership with 65 Corridor companies, including 28 companies participating in the MGRP for the first time. The Corridor invested \$5.3 million in the projects, while the participating companies matched that investment with \$12.6 million in cash, in-kind services and equipment. The total value of research conducted through the Matching Grants Research Program therefore neared \$17.9 million this year.

Since the inception of the program in 1996, The Corridor has partnered with more than 360 companies on more than 1,400 research projects in sectors ranging from Agritechology to Sustainable Energy. The more than \$65 million in funds that have been invested by The Corridor have been matched by corporate cash and in-kind investments of \$181 million, generating an additional \$900 million in quantifiable downstream impacts, resulting in a total project value of more than \$1 billion.

MGRP counts among its successes the opportunity to engage talented student researchers who learn from faculty mentors as they solve real-world challenges. During 2014/2015, approximately 124 student researchers and 64 faculty members from our research universities were engaged in conducting applied research on Corridor projects. That brings the total number of students (2,816) and faculty (368) who have conducted research on a matching grants project since inception to nearly 3,200.



Workforce Development

The Corridor focuses efforts on workforce development that span the breadth of the talent pipeline, from techPATH's focus on STEM education in middle and high school to other workforce programs that focus on post-secondary education and beyond. techPATH continued this year to bring educators and students into technology industry environments, giving students up-close and personal insights into the careers they might find across the Corridor and providing teachers new ways to share exciting subjects that will lead their students down the right path.



This year, the world's largest modeling, simulation and training (MS&T) conference, the Interservice/Industry Training, Simulation and Education Conference (I/ITSEC), was again held in Orlando. Not only did I/ITSEC continue to place a spotlight on The Corridor's leading MS&T cluster, which has a \$5 billion impact on our state and supports 60,000 jobs, but it also provided an opportunity to introduce students to high tech careers. During the conference, The Corridor's techPATH team hosted two programs – one for students, and one for teachers and school administrators – to highlight high tech careers available to students, with a focus on MS&T. Students received a hands-on introduction to the field of robotics, while teachers and school administrators were provided tools for teaching new technology applications in the classroom.

The Corridor also sponsors a program called stemCONNECT which engages students by bringing expert speakers into the classroom virtually through Web conferencing tools.

This year, stemCONNECT partnered with a physics professor at the University of Central Florida to demonstrate aerospace jobs and research to students at Madison Middle School in Tampa, among other experts in academia and private industry who continued to introduce middle and high school students to high tech industries.

Additional workforce development programs supported by The Corridor during 2014/2015 include: STEM Day, a one-day conference introducing students to high tech careers, hosted by the Zora Festival and Valencia College; the 60th State Science and Engineering Fair of Florida, which recognizes and rewards talented high school students for research in math and science; a NAO humanoid robot purchase for STEM outreach in Hillsborough County schools; the STEM Alliance of Central Florida, a campaign spanning 10 Central Florida K-12 school districts to strengthen achievement in STEM fields; and, the region's FIRST robotics competitions.

Entrepreneurial Support

The Corridor recognizes the importance of supporting the region's entrepreneurs and growth companies, which is why it has invested in two important programs over the last several years: The Corridor's Florida Virtual Entrepreneur Center (FLVEC) and GrowFL, the Florida Economic Gardening Institute at the University of Central Florida.

FLVEC (www.flvec.com) is a one-stop shop for entrepreneurial and business resources available regionally, statewide and nationally. Over the past year, FLVEC received nearly 210,000 new and returning visitors to the site with out-of-state visitors commanding more than 32,000 visits all viewing more than 300,000 pages on varying entrepreneurial topics and resources.

FLVEC has become not only a resource for those seeking to start, grow or relocate a business, but also for our statewide economic development organization partners that refer entrepreneurs and business owners to the site through entrepreneurial classes, prep courses and more, expanding its reach and accelerating growth.

GrowFL continues to grow second-stage companies in Florida through its Economic Gardening® approach. It provides resources, mentoring, support and more to help business owners overcome obstacles to growth and achieve further success. Since inception in 2009, GrowFL has assisted more than 800 companies that have supported nearly 14,000 direct jobs across the state and contributed more than \$2 billion to the Florida economy.

During 2014/2015, The Corridor also continued its ongoing support of the region's university-based incubators, which have seen enormous growth and client success, as well as international recognition.

A 2014 Corridor-sponsored study for the University of Central Florida (UCF) showed UCF incubators have supported more than 250 early-stage companies and more than 3,600 total jobs with an impact of nearly \$2.5 billion in Central Florida. It received a boost to expand entrepreneurship capabilities when it was awarded some \$750,000 from the U.S. Department of Commerce in March



2015. On the other side of The Corridor, the University of South Florida's USF CONNECT in partnership with TampaBayWaVe also received a \$500,000 grant from the Department to increase entrepreneurship in the region. UCF and USF were among 26 recipients nationwide. In the north end of The Corridor, the University of Florida received \$8 million in federal funding for construction of Phase II of the Florida Innovation Hub, which will include an Entrepreneurial Woman's Center. In its first three years, Phase I of the Innovation Hub assisted 60 companies, resulting in 760 jobs and \$50 million in private investment.

To further assist local entrepreneurs, the International Business Innovation Association (InBIA), the world's leading organization advancing business and entrepreneurship, announced in 2014 it would relocate its headquarters to Orlando, from Athens, Ohio, to leverage The Corridor's nationally recognized incubation and entrepreneurship resources. The InBIA's relocation also included plans to establish its new Global Training Center for Business Incubation & Innovation. The InBIA considered more than 30 cities for its new headquarters before narrowing down the final list to Orlando, Atlanta, Denver and Phoenix.

Volunteer Support

The Florida High Tech Corridor Council is sustained by the tireless support of volunteers who are committed to advancing high tech industry throughout the region. During the past year, about 700 volunteers – from numerous partners and participants including economic development organizations, school districts, universities, workforce organizations and others – contributed nearly 4,000 hours in support of The Corridor.

Total Investment in High Tech Economic Development In order to further the missions of partner organizations and ensure funds have the maximum possible impact, The Corridor regularly matches its partners' contributions. During fiscal year 2014/2015, The Corridor committed nearly \$493,000 in funds to 60 programs and initiatives across the region. As a result of The Corridor's investments, those

projects generated an additional value of more than \$1.4 million in funding and support that without The Corridor's initial investment otherwise may not have been realized.

During 2014/2015, The Corridor invested nearly \$8 million in economic development, research, workforce development, education and support for the region's evolving technology communities. Add to that the \$12.6 million in external research matches from our Matching Grants Research Program and \$1.9 million in additional value realized through initiatives funded by The Corridor and this year's direct impact totals more than \$22 million.

Marketing The Corridor

The many projects of the Florida High Tech Corridor all work to improve national awareness of the 23-county region as a thriving high tech hub. By sharing these programs through targeted marketing programs, The Corridor has seen an increase in regional and national publicity and recognition including a 30-page spread in the August 2015 issue of *Florida Trend* that highlights research, innovation and partner advancements in the region.

The Corridor's presence on social networks such as Facebook, Twitter, YouTube and LinkedIn allows for direct interaction with business leaders, technologists and economic developers to link to partner websites and in-depth news coverage. Through the www.floridahightech.com website and social media channels, The Corridor has placed an emphasis on recognizing and promoting the region's "Faces of Technology," a program that highlights the researchers, technicians and engineers who have helped grow innovation across the region. The past eight years have more than 100 technology pioneers featured in the annual magazine, *florida.HIGH.TECH*, with corresponding videos posted to the Corridor's YouTube channel.



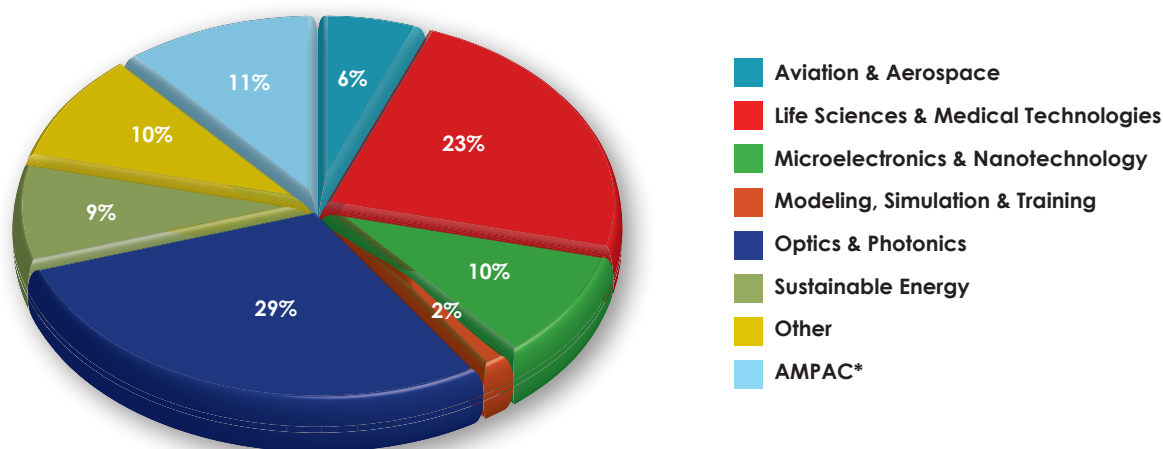
The Corridor continued to be an active participant in many prominent technology trade shows. University, business and economic development leaders represented the region at I/ITSEC, Photonics West and SEMICON West, to name a few.

In addition to this award-winning annual magazine, *florida.HIGH.TECH*, The Corridor informs readers of technological advancements across the 23 counties in its monthly eNewsletter, *Inside Florida's High Tech Corridor*. The eNewsletter is distributed to more than 3,500 readers each month. It offers a quick digest of regional high tech news and highlights of partner achievements, maintaining regular updates on research from Corridor universities, a calendar of upcoming dates from the tech community and spotlights on the current class of Faces of Technology. If you would like to be added to the distribution list for Inside Florida's High Tech Corridor, please send an email to pressroom@floridahightech.com. ■

Numbers

Funded Research Projects By Sector

Sector	Corridor Funds Invested	Cash Match	In-kind Match	Total Allocated	% of Total
Aviation & Aerospace	\$266,331	\$367,157	\$510,345	\$1,143,833	6%
Life Sciences & Medical Technologies	\$1,331,766	\$1,422,982	\$1,346,888	\$4,101,636	23%
Microelectronics & Nanotechnology	\$484,023	\$828,037	\$399,556	\$1,711,616	10%
Modeling, Simulation & Training	\$154,270	\$182,000	\$60,000	\$396,270	2%
Optics & Photonics	\$1,512,179	\$2,475,546	\$1,135,000	\$5,122,725	29%
Sustainable Energy	\$388,962	\$627,144	\$511,000	\$1,527,106	9%
Other	\$598,624	\$652,088	\$615,199	\$1,865,911	10%
AMPAC*	\$539,658	\$1,384,374	\$-----	\$1,924,032	11%
Totals	\$5,275,813	\$7,939,328	\$4,577,988	\$17,793,129	100%



*AMPAC: Funded by an early Corridor industry grant, the Advanced Materials Processing and Analysis Center at the University of Central Florida conducts research in a variety of sectors.

Stacking up Against the Competition

StackFrame CEO Gene McCulley grew up fishing for mackerel to help his father's commercial fishing business. He never planned to be an entrepreneur.

"I often describe myself as not having a very entrepreneurial bent," he said. "My goal was simply to build the organization I wanted to work in."

Although his parents were unfamiliar with the high tech industry, they encouraged McCulley's interest in science and technology at an early age. As a high school student, he won three coding tournaments hosted by Indian River State College, earning a scholarship to attend the school. When McCulley later transferred to the University of Central Florida (UCF) to pursue a computer engineering degree, his hard work continued to pay off. McCulley entered a programming contest for the chance to join UCF's prestigious programming team – and won.

"When I got to UCF, I had a plan that I was going to get a degree in computer engineering and hadn't really thought further than that," he said.

But the programming team introduced McCulley to the UCF Institute for Simulation and Training, where his path took an unexpected turn. There, he had the opportunity to work alongside world-class modeling and simulation researchers, gaining the knowledge and professional network that would open the door for his career.

"I was the dumbest guy in the room for the first six months," he said. "I got to learn a lot there, which got me into modeling, simulation and training, which led to other jobs. Every lucky opportunity I had, I grabbed onto."

After gaining valuable skills at UCF, McCulley made the tough decision to leave before completing his degree. He pursued a great opportunity for full-time work with a top



Gene McCulley

CEO

StackFrame | www.stackframe.com

Education: Associates Degree, Indian River State College
Studied computer engineering at the University of Central Florida

Company: StackFrame develops software and manages IT services for organizations with challenging needs.

defense technology company – a decision that undoubtedly paid off in the long run. Eventually, when McCulley was faced with the decision to pursue a new job or create his own, he decided to launch StackFrame.

Although McCulley might not describe himself as an entrepreneur, he's successfully run the business for 11 years, creating customized information technology and software solutions for the defense and commercial industries. With 25 employees and growing, Sanford-based StackFrame serves a diverse array of clientele, from a mystery shopping company to several branches of the U.S. military.

"At StackFrame, we get to really understand how information flows through an organization and how people do their jobs, so we can help them do their jobs better or eliminate a pain point," said McCulley. "To know that we are helping them improve matters and making them happy is gratifying."

Trade associations

General Technology

Florida Business Incubation Association

12201 Research Pkwy., Ste. 501
Orlando, FL 32826
Dr. Thomas O'Neal, President
407.882.1120 • thomas.oneal@ucf.edu
www.fbionline.org

Florida Manufacturing Extension Partnership

1420 Celebration Blvd., Ste. 200
Celebration, FL 34747
407.376.1915
www.floridamep.org

IEEE

(Institute of Electrical & Electronics Engineers)

Orlando Chapter

Orlando, FL
Stanley Buchanan
407.256.3329 • stanbuchanan@ieee.org
www.ieee.org/orlando

Gainesville Technology Council

300 E. University Ave., Ste. 100
Gainesville, FL 32601
352.334.7100
www.gainesvillechamber.com

Suncoast Technology Forum

7282 55th Ave. E., #242
Bradenton, FL 34203
Jeffrey Hart, Executive Committee President
941.870.0078
info@suncoasttechnologyforum.com
www.suncoasttechnologyforum.com

Tampa Bay Technology Forum

5100 W. Kennedy Blvd., #465
Tampa, FL 33609
813.400.1164
www.tbtf.org

Orlando Tech Association

101 S. Garland Ave.
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Space Coast Tech Council

Jerry Olguin, Director
jerry@sctcbrevard.com
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Agritechnology

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Mike Sparks, Executive Vice President/CEO
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www.flcitrusmutual.com

Florida Citrus Processors Association

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Ansley Watson Jr., Executive Director
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www.fcplanet.org

Florida Farm Bureau

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Gainesville, FL 32614-7030
John Hoblick, President
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www.floridafarmbureau.org

Florida Fertilizer & Agrichemical Association

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Lakeland, FL 33801
Mary Hartney, President
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www.ffaa.org

Florida Fruit & Vegetable Association

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Maitland, FL 32751
Mike Stuart, President
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www.ffva.com

Highlands County Citrus Growers Association

6419 U.S. 27 South
Sebring, FL 33876
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Florida Aviation Business Association

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Exploration Park, FL 32953
Frank DiBello, President & CEO
321.730.5301
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Digital Media/ Interactive Entertainment

Film Florida

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Orlando ACM SIGGRAPH

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Financial Services

National Association of Insurance

and Financial Advisors – Florida

1836 Hermitage Blvd., Ste. 200
Tallahassee, FL 32308
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Florida Bankers Association

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Florida Venture Forum

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Florida Venture Sourcing

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Information Technology

Armed Forces Communications and Electronics Association (AFCEA)

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Association of Information Technology Professionals, Polk Chapter
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Healthcare Information and Management Systems Society (HIMSS)
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Life Sciences/ Medical Technologies

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Microelectronics/ Nanotechnology

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Modeling, Simulation & Training

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Optics & Photonics

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International Society for Optical Engineering (SPIE)
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Laser Institute of America (LIA)
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www.lia.org

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Advancing Optical Filters

The entrepreneurial lifestyle comes naturally to Hooman Banaei, who grew up in a successful entrepreneurial family.

"I saw all the challenges and I saw all the fruits of labor," he said.

So, when Banaei experienced a breakthrough in optics after his doctoral studies at the University of Central Florida, there was no question he would commercialize the technology on his own. Banaei followed in his father's footsteps when he launched Everix Optical Filters in 2013.

Everix grew from humble beginnings, starting out in Banaei's storage shed. A one-man show, he was responsible for everything from high tech research to janitorial work.

"I loved all of it, with no exception," said Banaei.

Today, however, the company is located in a small facility in Orlando and even has its own clean room. There, Banaei oversees a team that creates Everix's flexible, ultra-thin optical filters.

Traditional optical filters are constructed by adding hundreds of nanolayers one at a time to a rigid, glass base, designed to block or transmit specified wavelengths. Developed in multimillion dollar vacuum chambers, the process to create just two or three square feet of the material can cost thousands of dollars and takes up to a full day.

In the same amount of time, Everix can create hundreds of square feet of advanced materials at a fraction of the cost. With flexible protective layers and hundreds of nanolayers, Everix's product is less than 100 microns thick – thinner than a human hair.

Everix's major focus is on vision-related applications. Everix launched the first of its series of products for vision industry in December 2015. The product called PureLight is a screen cover that completely blocks the most harmful range of screen blue light that is responsible for disrupting the sleep cycle and its many health consequences.



Esmaeil (Hooman) Banaei

Founder/CEO

Everix Optical Filters | www.everix.com

Education: B.S., Physics, University of Tabriz
M.S., Optics and Photonics, University of Central Florida
Ph.D., Electrical Engineering, University of Central Florida

Company: Through its proprietary manufacturing process, Everix is the sole manufacturer of ultra-thin, plastic-based, high-performance optical filters that bring true economies of scale to a historically expensive 40-year-old industry, thereby expanding existing markets and enabling new ones.

"This is something completely unprecedented and it could cost over \$2,000 for a regular phone screen cover made with traditional coating technologies," explained Banaei. "We're most excited about enabling new markets and finding new ways we can serve the community by bringing such advanced materials to the mainstream of consumer markets."

According to Banaei, Everix's filters could someday enable the creation of disposable medical devices for detecting cancer and infectious diseases in their earliest stages.

For Banaei, a passion to influence the industry and bring new technology into the hands of users keeps him moving forward.

Combining Technology with Education

Priya Rudradas' passion for educational technology is what keeps her coming to work every day – a passion that took her nearly 15 years to discover.

After 10 years as a software engineer for the telecommunication and transportation industries, she was ready for a career change.

"I hit the ceiling in terms of what can be done in computer programming," she said. "I stepped back to think how can I take my ability to code and solve problems to help my kids and other kids of the world."

As a result, Rudradas started working with a nonprofit that focused on youth empowerment, where she saw immense potential for combining technology and education to change lives. There, she integrated technology into their educational programs, teaching students the basics of designing, developing and iteratively improving solutions for real-life problems.

Following her newly discovered passion for educational technology, Rudradas enrolled in the College of Education at the University of Florida (UF). She met David Massias, Shadow Health CEO, and the rest is history. Massias asked Rudradas to run day-to-day operations at Shadow Health in Gainesville with her background in computer science and educational technology.

Today, as Shadow Health COO, she leads product development, plus customer support and training for the company's educational software for undergraduate and graduate digital clinical experiences.

Shadow Health's signature product, Digital Clinical Experience, improves health care quality by teaching students the essentials of patient interaction and high-level clinical reasoning skills. Interactive assignments on the cloud allow students to engage in conversation with a virtual patient, examine



Priya Rudradas

Chief Operations Officer

Shadow Health Inc. | www.shadowhealth.com

Education: M. S., Computer Science, Illinois Institute of Technology

Company: Shadow Health® is an educational software developer of Web-based Digital Clinical Experiences™ designed to augment courses for nursing students and allied health education programs. Students engage with Digital Standardized Patients™ (using a state-of-the-art conversation engine and interactive 3-D imagery) to perform assessments, practice documentation and demonstrate critical thinking.

the patient and document their findings while their performance is being assessed. Each assignment provides automatic feedback, offering professors an opportunity to review the interaction and provide students with further direction. Lessons can even be designed around a program's specific education objectives and have already been adopted into nursing and pharmacology programs at UF, the University of South Florida and the University of Central Florida, among others.

The Digital Clinical Experience is often a student's first interaction with a patient of any kind. "Students give you feedback saying 'Wow, I never thought it was so hard to talk to a patient,' or 'This was my first-ever time talking to a patient, and now I know more about communicating and patient assessment,'" said Rudradas. "The most important part of this job is the fact that we're making an impact on how we teach health care to nursing students, or any allied program. Eventually, that means health care quality is improved."

Electrifying Muscle Movement

The spinal cord is the epicenter of the human body, connecting the brain to nearly everything else through the central nervous system. It's responsible for controlling all motor skills, from running and jumping to opening doors and brushing teeth. Damage to the spinal cord by way of neurological disorders or injury can be devastating and even result in paralysis.

But now there's hope for a healthier, more independent life for those impacted by spinal cord damage thanks largely to developments by Gainesville-based Myolyn.

"Myolyn is a combination of my two favorite things: robotics and helping people," said co-founder and CEO, Alan Hamlet, Ph.D.

Hamlet launched the company with co-founder and CTO Matthew Bellman in 2013 during their doctoral engineering program at the University of Florida. With expertise in mechanical and electrical engineering, the pair researched the application of functional electrical stimulation (FES) to certain muscle groups for bringing back functional ability in people with paralysis.

The result of their research is the MyoCycle, Myolyn's recumbent tricycle, which relies on FES to engage the legs and lower body. Unlike passive technologies used more often today, Myolyn gives the user active control. In other words, users are not having their legs moved for them – they're exerting physical energy to control the motion.

"The special sauce is our algorithm," Hamlet explained. Myolyn's algorithm allows therapists to control the parameters of FES stimulation, so the intensity and timing of the electrical current can be personalized for each patient.

Not only are MyoCycle users regaining control of their movement, but they are exercising one of the body's largest muscle groups. This helps muscle mass and bone density, and improves long-term cardiovascular health. Even better is the fact that MyoCycle users can regain a sense of independence. Perhaps for the first



Alan J. Hamlet

Chief Executive Officer

Myolyn | www.myolyn.com

Education: B.S., Mechanical Engineering, University of Florida
M.S., Mechanical Engineering, University of Florida
Ph.D., Mechanical Engineering, University of Florida

Company: Myolyn is a medical technology company that is taking the recent advances in robotics and automation and applying them to rehabilitation and therapy. Myolyn's products improve the health, mobility and quality of life of individuals with neurological disorders.

time, someone completely paralyzed from the waist down would be able to enjoy a family bike ride around their neighborhood.

"It's rewarding to take a concept and turn it into something physical that can have a positive impact on the world," said Hamlet.

Myolyn's technology is currently in final development stages and will soon undergo approvals by the U.S. Food and Drug Administration. Hamlet is excited about its implications for the medical field and is confident they will be able to start selling MyoCycles in the coming months.

"I foresee Myolyn's FES cycle becoming a standard of care."



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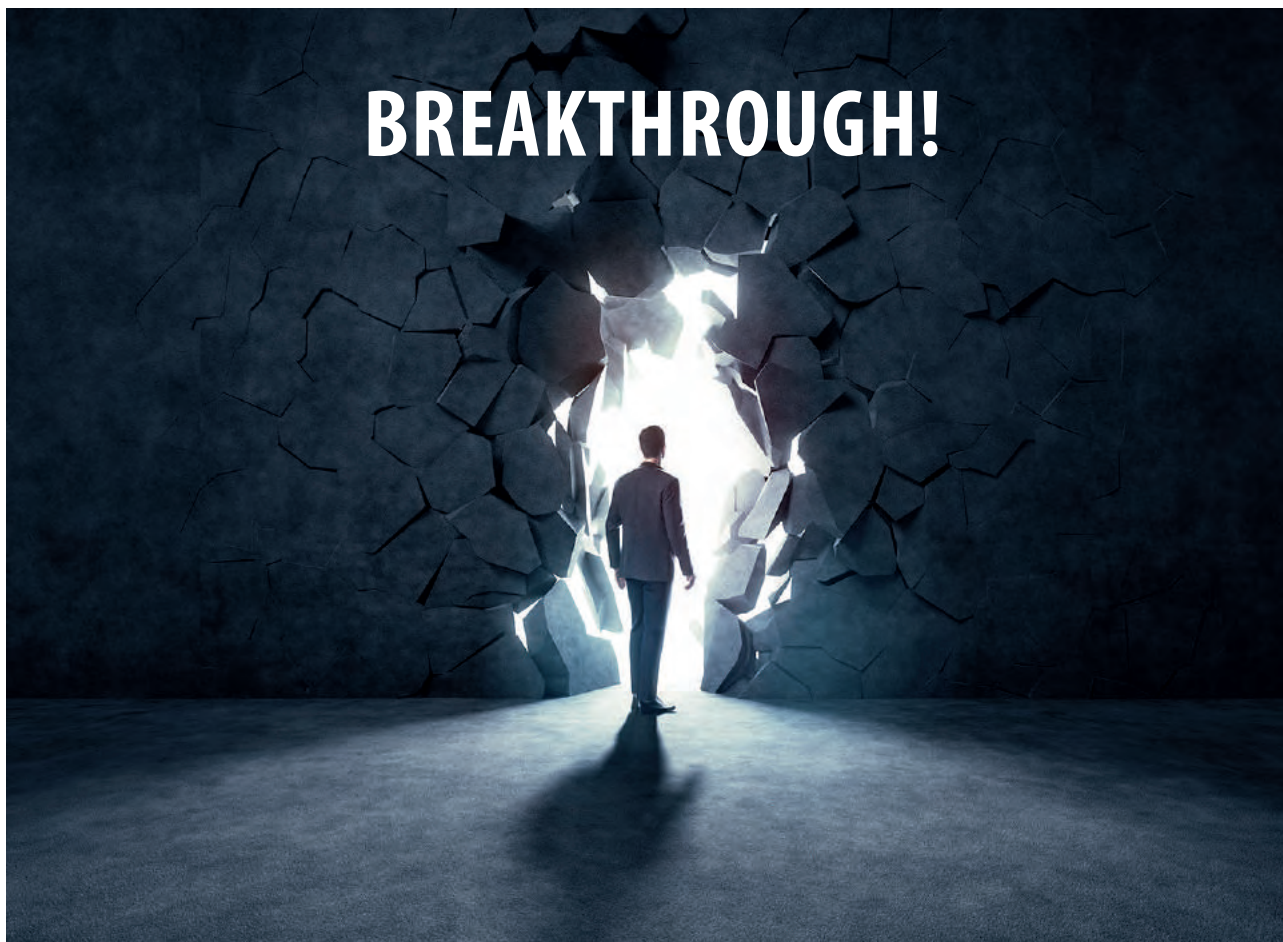
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