

# Fiscal Year 2016 Annual Report

Office of Technology Transfer

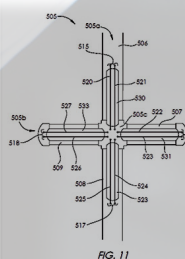
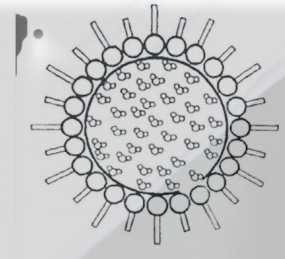
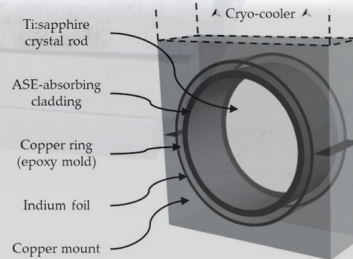
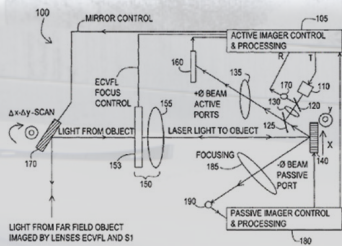
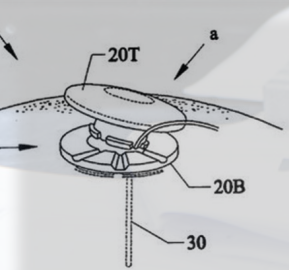


FIG. 11





## **Most Innovative School**

UCF ranked 13th “Most Innovative School” along with Georgia Institute of Technology and the University of Southern California by U.S. News & World Report in 2016.

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# Welcome

## From the Director

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Dear Colleagues,

As I reflect on the accomplishments made by our Knights in FY 2016, I am reminded that innovation and partnership are two key pillars of UCF's success. I am honored to work with our community of researchers, entrepreneurs and innovators who push through the boundaries of what is known to discover and explore the unknown. I am encouraged by their collaboration with each other and other universities, labs, foundations and companies to advance science, innovation and technology.

### **Innovation**

UCF researchers create innovative solutions for the most pressing problems of today and tomorrow. One such solution, an integrated source that both stores and transmits energy for applications as diverse as aerospace and smart phones was developed by associate professor Jayan Thomas. This game changing technology was awarded an Oscar of Innovation (page 22) and is now on its way to commercialization through a student-led startup, Capacitech Energy.

Through their intellectual curiosity, our faculty, students and staff continue to advance the pursuit of knowledge and innovation in classrooms, labs and in the field. Thank you to the 161 UCF innovators recognized for submitting disclosures of new discoveries to our office in FY 2016 (page 9). As these disclosed innovations often result in patents, UCF continues to lead in the number of U.S. issued patents (page 5).

I would also like to congratulate the two UCF professors whose "prolific spirit of innovation" was recognized nationally as they were named Fellows by the National Academy of Inventors (NAI) - Issa Batarseh and Quifang Li (page 6).

### **Partnership**

Our partnerships with entrepreneurs, industry and other institutions amplify the impact of our innovation. In FY 16, the Technology Transfer team worked with 31 industry partners, nine of which were startup companies, to finalize 34 license and option agreements to bring UCF discoveries to the marketplace.

The assistance our faculty and students receive from other entrepreneurial support organizations at UCF (page 23) has enabled them to start and grow companies around the innovations they are creating.

We recognize the tremendous effort and dedication of our scientists and are committed to harnessing the benefits of their research results for the betterment of our community and our world.

Svetlana Shtrom, Ph.D., M.B.A.  
Director, Office of Technology Transfer

# \$145M

## Research Funding

UCF researchers and staff received an institutional record of \$145.75 million in research funding. Of the \$145.75 million, \$84.04 million was received from the federal government, \$14.46 million from state and local government and \$47.25 million from industry.

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# At A Glance

Fiscal Year 2016

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**99**

Disclosures

**98**

U.S. Patent Applications

**68**

U.S. Patents Issued

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**9**

Startups

**34**

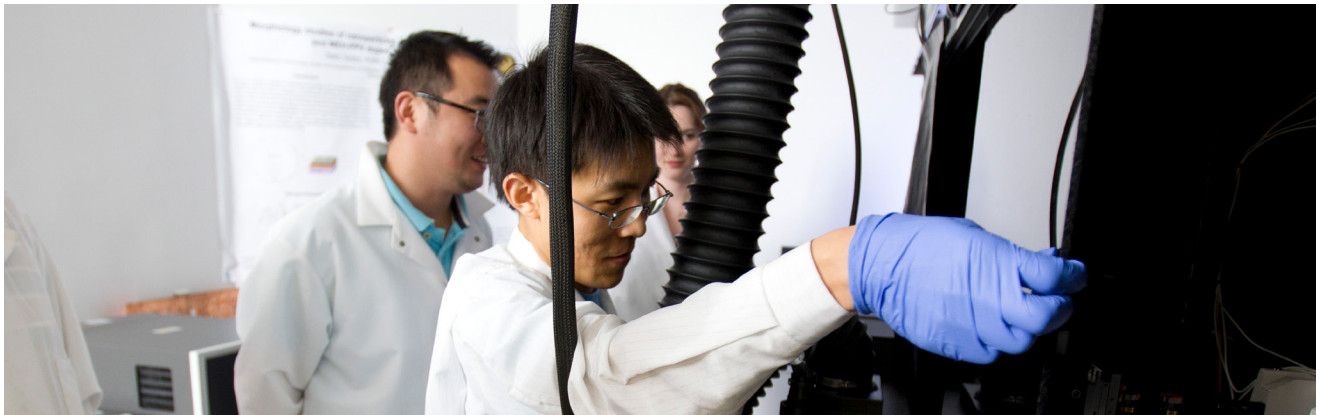
Licenses & Options

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**\$1,802,304**

LICENSING INCOME

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# At A Glance

## Five Year History

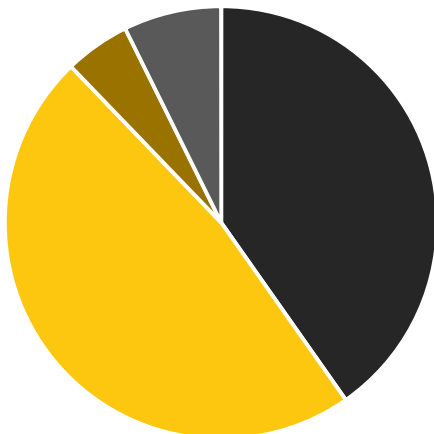
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	FY 12	FY 13	FY 14	FY 15	FY 16
Invention Disclosures	126	124	98	96	99
Licenses & Options	10	17	23	38	34
Licensing Income	\$1M	\$800K	\$1M	\$1.5M	\$1.8M
U.S. Patent Applications Filed	132	197	132	118	98
U.S. Patents Issued	74	71	57	62	68
No. of Startups	5	3	8	14	9

# Funding Sources

## for Disclosed Innovations

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We appreciate the support from federal, state, local and industry research sponsors. Many discoveries that impact the way we live, work and play are realized because of their investment. This chart represents the funding support (as a percentage of the total number of funding sources) behind the invention disclosures received by Technology Transfer.

■ Industry ■ Federal ■ State and Local ■ Other



# #41

## Patent Ranking

Worldwide, the University of Central Florida was #41 on the list of the top 100 universities granted U.S. utility patents in 2015, as published by the National Academy of Inventors and the Intellectual Property Owners Association.

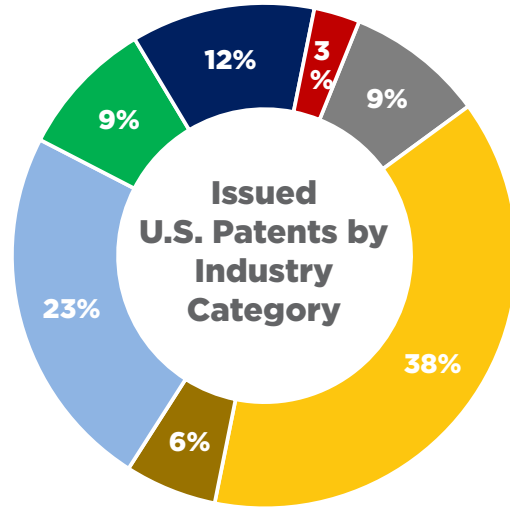
Fifty U.S. patents were issued to UCF in the calendar year 2015.



# Issued US Patents

By Industry Category

- Energy
- Healthcare
- Materials
- Optics
- Sensors
- Software
- Other



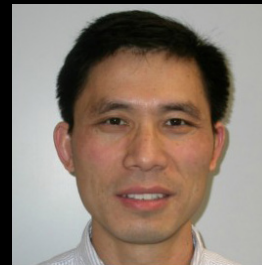
# Faculty Fellows

National Academy of Inventors Fellows

**Issa Batarseh, Ph.D.**  
College of Engineering  
and Computer Science



**Guifang Li, Ph.D.**  
College of Optics  
and Photonics



Election to NAI Fellow status is a high professional distinction given to academic inventors who have demonstrated a prolific spirit of innovation in creating or facilitating inventions that have made a tangible impact on quality of life, economic development and the welfare of society.

# Summary

By Academic Unit Fiscal Year 2016

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College / Research Center / Department †	Disclosures **	U.S. Patent Applications Filed	U.S. Utility Patents Issued	Licenses & Options
<b>Totals without duplicates</b>	<b>99</b>	<b>98</b>	<b>68</b>	<b>34</b>
<b>Advanced Materials Processing &amp; Analysis Center</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>-</b>
Advanced Materials Processing & Analysis Center	2	4	1	-
<b>Center for Research in Computer Vision</b>	<b>2</b>	<b>1</b>	<b>-</b>	<b>-</b>
Center for Research in Computer Vision	2	1	-	-
<b>College of Arts &amp; Humanities</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1</b>
School of Visual Arts & Design	-	-	-	1
<b>College of Education and Human Performance</b>	<b>2</b>	<b>1</b>	<b>-</b>	<b>-</b>
Educational & Human Sciences	2	1	-	-
<b>College of Engineering and Computer Science</b>	<b>18</b>	<b>16</b>	<b>14</b>	<b>5</b>
Center for Advanced Turbomachinery & Energy Research	1	-	-	-
Civil, Environmental, and Construction Engineering	3	4	1	1
Coastal Dynamics of Sea Level Rise	-	1	-	-
Computer Science	7	4	4	1
Dean's Office	-	-	1	-
Electrical & Computer Engineering	3	6	5	3
Industrial Engineering & Management Systems	2	1	-	-
Materials Science & Engineering	2	1	1	-
Mechanical and Aerospace Engineering	2	1	2	-
<b>College of Health &amp; Public Affairs</b>	<b>3</b>	<b>1</b>	<b>-</b>	<b>1</b>
Dean's Office	1	-	-	-
Health Management and Informatics	2	1	-	1
<b>College of Medicine</b>	<b>12</b>	<b>15</b>	<b>14</b>	<b>3</b>
Faculty & Academic Affairs	1	1	-	-
Internal Medicine	-	1	-	-
Medical Education	2	3	3	-
Medicine Administration & Finance	2	-	2	-
Medicine Dean's Office	-	1	-	-
Burnett School of Biomedical Science - Director Office	8	9	9	3

College / Research Center / Department	Disclosures **	U.S. Patent Applications Filed	U.S. Utility Patents Issued	Licenses & Options
<b>College of Nursing</b>	<b>1</b>	<b>1</b>	-	-
Nursing	1	1	-	-
<b>College of Optics and Photonics (CREOL)</b>	<b>22</b>	<b>23</b>	<b>14</b>	<b>3</b>
CREOL	22	23	14	3
<b>College of Sciences</b>	<b>11</b>	<b>16</b>	<b>13</b>	<b>2</b>
Biology	-	1	-	-
National Center for Forensic Science	1	-	-	-
Chemistry	8	12	5	1
Mathematics	1	1	1	-
National Center for Forensic Science	-	-	1	-
Physics	5	4	5	1
Psychology	-	-	1	-
<b>College of Undergraduate Studies</b>	<b>1</b>	-	-	<b>2</b>
Undergraduate Research	1	-	-	2
<b>Florida Solar Energy Center</b>	<b>3</b>	<b>2</b>	<b>4</b>	<b>5</b>
Advance Energy Research	-	1	-	-
Buildings Research	1	-	-	-
FSEC	2	1	4	5
Solar	1	-	-	-
<b>Florida Space Institute</b>	<b>1</b>	-	-	-
Florida Space Institute	1	-	-	-
Information Technologies and Resources	1	-	-	2
Computer Services	1	-	-	1
Information Technologies and Web Services	-	-	-	1
<b>Institute for Simulation &amp; Training</b>	<b>5</b>	<b>2</b>	-	<b>3</b>
IST	5	2	-	3
Mixed Emerging Technology Integration Lab	4	-	-	-
SREAL	-	-	-	-
<b>NanoScience Technology Center</b>	<b>15</b>	<b>17</b>	<b>8</b>	<b>7</b>
NanoScience Technology Center	16	22	9	7
<b>Office of Research &amp; Commercialization</b>	-	-	-	-
Office of Research & Commercialization	1	1	-	-

† Due to interdisciplinary research on campus, inventions can be associated with more than one college, department or unit. As a result, the numbers reported in the table above may be attributed to multiple colleges, departments or units and may exceed the total number of unique inventions.

\*\* this list includes copyright and trademark disclosures



# Innovators

## All Lead and Co-Lead

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Reza Abdolvand, Ph.D.

Ayman Abouraddy, Ph.D.

Haitham Al-Deek, Ph.D.

Parinaz Aleahmad

Deborah Altomare, Ph.D.

Ahmad Alzahrani

Rodrigo Amezcua Correa, Ph.D.

Jose Antonio-Lopez

Ulas Bagci, Ph.D.

Hooman Banaei, Ph.D.

Swetha Barkam

Michael Bass, Ph.D.

Richard Blair, Ph.D.

Joshua Bradford

Andrea Caetano Das Neves  
Lavado

Jean Calderon Flores

David Canova

Eduardo Castillo Orozco

Christopher Cazabon

Juan Cendan, Ph.D.

Debopam Chakrabarti, Ph.D.

Debashis Chanda, Ph.D.

Haiwei Chen

Hao Chen

Jiangshan Chen

Shi Chen

Jeffrey Chiles, Ph.D.

Hyoung Cho, Ph.D.

Demetrios Christodoulides,  
Ph.D.

Karin Chumbimuni Torres, Ph.D.

Alicja Copik, Ph.D.

Evan Cornett

Eric Cunningham

Smruti Das, Ph.D.

Soumen Das, Ph.D.

Ronald DeMara, Ph.D.

Yajie Dong, Ph.D.

Dale Driggs

Michael Eakins

Ramy El-Ganainy, Ph.D.

Amy Ellis

Anthony Fannin

Sasan Fathpour, Ph.D.

James Fenn

Cristina Fernandez-Valle, Ph.D.

Hassan Foroosh, Ph.D.

Romain Gaume, Ph.D.

Clarissa Graffeo

Xiufang "Nadine" Guo, Ph.D.

Varadraj "Raj" Gurupur, Ph.D.

Hal Halvorson

Angela Hamilton

James Harper, Ph.D.

Juan He

Caridad Hernandez, M.D.

James Hickman, Ph.D.

Atsusi Hirumi, Ph.D.

Kien Hua, Ph.D.

Jun Huang

Christopher Hughes

Sarfraz Hussein

Robert Igarashi, Ph.D.

Madeleine Johnson

Aravinda Kar, Ph.D.

Waldemar Karwowski, Ph.D.

Alexander Katsevich, Ph.D.

Annette Khaled, Ph.D.

Pieter Kik, Ph.D.

Matthew Kleinberg

Richard Klemm, Ph.D.

Dmitry Kolpashchikov, Ph.D.

Stephen Kuebler, Ph.D.

Lee Kumanchik

Ranganathan Kumar, Ph.D.

Roy Laurens

Joseph LaViola II, Ph.D.

Carlos Ledezma

Yun Han Lee

Chao Li

Kun Liang, Ph.D.

Patrick LiKamWa, Ph.D.

**We would like to thank and congratulate all UCF  
faculty, students and staff who began the  
commercialization process by submitting invention  
disclosures of their discoveries to our office.**

.....

Xinliang Liu, Ph.D.	Clifford Rice	Eugene Taranta
Weili Luo, Ph.D.	Kathleen Richardson, Ph.D.	Ronald Tarr
Arkadiy Lyakh, Ph.D.	John Rogers	Jayan Thomas, Ph.D.
Mehran Maghoumi	Christopher Rose	Tina Tian
Kyle Marcus	Bradley Rosenkrantz	Fernando Uribe Romo, Ph.D.
David Metcalf, Ph.D.	Alireza Safaei	Demetrius Vazquez
Philip Metzger, Ph.D.	Tamil Sakthivel	Abraham Vazquez-Guardado
Sina Moradian	Navaneetha Santhanam	Devon Veller
Shawn Morrison	Santimukul Santra, Ph.D.	Joseph Walters
Eduardo Mucciolo, Ph.D.	Swadeshmukul Santra, Ph.D.	Yanan Wang
Ardalan Naseri	Benjamin Sawyer, Ph.D.	Greg Welch, Ph.D.
Ayan Nasir	Kimberly Schneider, Ph.D.	Yishi Weng
Janardan Nath	Sudipta Seal, Ph.D.	Mary Williams
Alexis Neigel	Hubert Seigneur, Ph.D.	Roger Wright
Tim Nguyen	Lawrence Shah, Ph.D.	Annie Wu, Ph.D.
Barbara O'Hara	Mubarak Shah, Ph.D.	Shin-Tson Wu, Ph.D.
Jeremiah Oyer	Sarah Shahraini	Daming Xu
Shuo "Sean" Pang, Ph.D.	Michael Sigman, Ph.D.	Yang Yang, Ph.D.
Danny Parker	Dinender Singla, Ph.D.	Yu Yuan, Ph.D.
Robert Peale, Ph.D.	Evan Smith	Hae-Bum "Andrew" Yun, Ph.D.
J. Manuel Perez Figueroa, Ph.D.	Sang-Eun "Sam" Song, Ph.D.	Lei Zhai, Ph.D.
Otto Phanstiel, Ph.D.	Jeffrey Sonne	Dong Zhang
Gerard Pianta	Robert Spinelli	Shaojie Zhang, Ph.D.
Corey Pittman	Kiminobu Sugaya, Ph.D.	Jianxiong Zhu
Parthiban Rajasekaran, Ph.D.	Qiyu Sun, Ph.D.	Ruidong Zhu
Luke Read	Alam Syed	Changchun Zou, Ph.D.
Chait Renduchintala	Guanjun Tan, Ph.D.	

# News

## Research and Researchers in the News

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### **Facial Recognition Technology Developed at UCF used to Improve Human Analytics**

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November 24, 2015

Miami-based, human analytics startup company Kairos, is using facial recognition technology developed in UCF's Center for Research in Computer Vision to improve the ability to accurately complete facial identification of individuals in photos and video.

The technology is based on a novel algorithm developed by Professor Mubarak Shah and his team that focuses on specific facial features and then converts a photo into a checkerboard of patches which is then compared against a database of photos, feature by feature, to identify the match.

"Working with Kairos provides the perfect illustration of how UCF research and UCF-developed technologies are not only brought to fruition but are also applied to the commercial marketplace," said Narasimha "Raju" Nagaiah, licensing associate with UCF's Office of Technology Transfer, who facilitated the license agreement.

"In our efforts to identify a leading-edge facial recognition technology, we were quickly able to come across UCF's computer vision program and identify Dr. Shah's research as groundbreaking," said Brackeen. "The response by the Office of Technology Transfer was exceptional and thorough in its support of our effort to take this technology to the commercial market."

In addition to working with the Office of Technology Transfer, Kairos received investment support through the Florida Angel Nexus and the Florida Institute for the Commercialization of Public Research.



Professor Mubarak Shah



Thomas O'Neal, associate vice president for the Office of Research & Commercialization (left) with Brian Brackeen, Kairos CEO

## Personalized Learning Experiences Built for Classrooms Finds a New Use in Matching Investors with Entrepreneurs .....

April 1, 2016

Custom learning software originally designed to deliver personalized and optimal learning experiences for K-12 classrooms is now delivering insights for improved matchmaking between investors and entrepreneurs. UCF researcher David Metcalf and his research team in the Mixed Emerging Technology Integration Lab (METIL) created the intelligent software, known as a Multimodal Communications Framework. This cloud-based, software-as-a-service (SaaS) solution is a result of collaborating on R&D projects with other institutions and Fortune 500 companies.



An Orlando-based technology investment firm founded by a group of serial entrepreneurs, Merging Traffic, has licensed the software from UCF to streamline the process of investing in startups for both sides of the table - entrepreneurs and accredited investors.

## Mobile Learning Converges with Competency-Based Education in an Adaptive Environment, for all Students .....

April 18, 2016

Today's student expects their learning experience to be as mobile-centric as they are. DreamDegree™ is a dynamic educational experience that serves up course content to students in their individual learning style, when they are ready and where they spend the most time - on their mobile devices. California-based SignificantTechnology, LLC licensed technology from UCF to support its existing cloud-based learning tool. The technology was developed by David Metcalf, Ph.D. and his research team in the Mixed Emerging Technology Integration Lab (METIL) at Institute for Simulation and Training.



“Students don’t learn the same way, know the same concepts or become proficient at the same time. DreamDegree™ identifies a personalized learning path for each student to aid in mastery of concepts. Faculty can spend more time on collaboration, creativity, critical thinking and problem solving skills,” says SignificantTechnology founder Michael Clifford.

DreamDegree™ is available in the App Store, Google Play and Amazon - anywhere internet access is available.

# Spotlight

## Faculty Features

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Below are highlights of the stories we shared in fiscal year 2016.  
To read the full articles visit: <http://tt.research.ucf.edu/archives>.

### **Connecting Solar Energy to the Grid**

**Issa Batarseh** .....

August 3, 2015

UCF professor Issa Batarseh, Ph.D.—who, as an engineer, calls himself a technologist—believes the real key is using science to our advantage by creating the right technology. Science, he says, is ever-present, but only becomes impactful when forces of nature are discovered, controlled, mastered, and put to good use. This only happens when new technologies are created.

Batarseh notes that the sun is a gigantic nuclear reactor in space which rains more energy down on the earth in an hour than is used in the entire world in one year. He has developed technology to convert and connect this solar energy to the grid. Without the power electronics he invented, the shifts in energy supply to the grid caused by changes in the available sunlight from an event such as a thunderstorm require a supplement of conventionally produced, non-renewable energy. Utility providers, intent on preserving grid security, want solar that is predictable and firm to avoid shifting power sources.

The misconception that solar energy is too expensive and out of reach for everyone to harness and use on a daily basis is being dispelled by Batarseh’s work in smart grid technology which promises to harness the sun’s infinite, clean energy for universal use in our everyday lives.



**The sun is a gigantic nuclear reactor in space which rains more energy down on the earth in an hour than is used in the entire world in one year.**



## **Boron Nitride, A New Catalyst**

**Richard Blair** .....

September 7, 2015

Richard Blair, Ph.D., Research Professor in Physics and the Center for Advanced Turbomachinery and Energy Research (CATER), was working on a project upgrading bio-based oils for use as jet fuels. Without processing, these fuels contained too much oxygen to be useful, but through hydrodeoxygenation, where a catalyst adds hydrogen to remove oxygen, they can be used. As he drew the components of unprocessed biofuel, he wondered if boron nitride could work similarly in hydrogenation.

After years of research, Blair's hunch was finally confirmed. He explained: "The killer application is that this same catalyst can do something that no other catalyst can do, which is convert carbon dioxide into usable molecules like fuels and precursor chemicals, chemicals to make plastics and to make everyday items. What I've identified is a simple approach that uses a relatively inexpensive catalyst to do what all these more complicated catalysts do."



**“This catalyst can do something that no other catalyst can do...”**

## **Treating the Worst Types of Cancer**

**Annette Khaled** .....

October 5, 2015

Annette Khaled, Ph.D., and her team at the Burnett School of Biomedical Sciences study triple negative breast cancer, most commonly found in African-American and Hispanic women. Khaled chose this type of cancer because it's difficult to treat, it recurs, and it can become metastatic, "If you can cure triple negative breast cancer, you're curing the worst types of cancer."

Although Khaled sees cancer treatment moving towards a more personalized approach, her research is exploring more common denominators across varying types of cancer. Recently, she found that in breast cancer, the more advanced the stage, the higher the peptide target was expressed. Khaled later discovered that the same was true in prostate, lung, ovarian, and pancreatic cancers. She is currently investigating if this pattern will be found in head and neck cancers as well. The hope is that this discovery will lead to a more generic type metastatic cancer treatment.



**The hope is that this discovery will lead to a more generic type metastatic cancer treatment.**

## Faculty Features Continued

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### **A Targeted Approach to Prostate Cancer**

**Ratna Chakrabarti** .....

November 2, 2015

Ratna Chakrabarti, Ph.D., is a cancer researcher and Associate Professor in the Burnett School of Biomedical Sciences at the College of Medicine, where her research impacts a condition that affects 14 percent of American men during their lifetime: prostate cancer.

Chakrabarti realized that there was a need for better biomarkers and therapeutics for prostate cancer. “Without knowing which patients will develop aggressive tumors, there is a general treatment for prostate cancer,” she noted. Because this blanket treatment may be unnecessary for some patients, she sought to find more tailored therapies and treatments. This pursuit led to her pioneering discovery of target proteins for aggressive prostate cancer.



**Tailored therapies and treatments for prostate cancer.**

### **The Tiny World of MEMS Technology**

**Reza Abdolvand** .....

December 7, 2015

Reza Abdolvand, Ph.D., Associate Professor and Director of the Dynamic Microsystems Lab in the College of Electrical Engineering and Computer Science, engineers and constructs complex devices that are about the size of a grain of salt – micro-electrical-mechanical systems, or MEMS.

Because of their small size, these systems can be used for wireless sensors in a variety of ways, including monitoring the health of a patient. Abdolvand is currently working on making these devices even smaller by reducing the size of the antenna as well as optimizing the sensing element.

“Everyone is trying to make wireless sensors now because of the ease of implementation, the simplicity and the flexibility that comes with a wireless system. With passive wireless sensors, the sensor itself does not have a source of energy on-board, like a battery. What we are developing is a special type of passive wireless sensor in which the device is not really converting the incoming energy into a source of energy to run any processing or to power any electronics. Rather, it just reflects the energy back.”



**MEMS, micro-electrical-mechanical systems, are complex devices about the size of a grain of salt.**

## **A Researcher's Road to Entrepreneurship** **Sudipta Seal**

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January 4, 2016

UCF researcher Sudipta Seal, Ph.D., the Director of Advanced Materials Processing and Analysis Center and NanoScience Technology Center, specializes in nanomaterials and transforming waste products into green products. “Technology evolves. You have to ensure that you catch the wave of innovation on time, or you might miss it,” he remarked. By catching the wave in time, Seal was able to find the resources he needed to fund his research, and help others by commercializing his technology.



**“Technology evolves. You have to ensure that you catch the wave of innovation on time.”**

nSolgel was started to commercialize Zerocrete, a “green” cement substitute made from fly ash, the waste product from coal-fired power plants.

“Startups are very challenging and there’s always the ‘valley of death’ [the challenge of negative cash flow in the early stages of a startup]. Many times, we get stuck there. That’s where we need a lot of help. It’s not that the technology is bad or not worthwhile.”

## **A Simple Solution for Exterminating Fire Ants** **Joshua King**

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February 1, 2016

Entomologist and associate professor in the Department of Biology, Joshua King, Ph.D., began his exploration in the life sciences as many children do: outdoors. He developed a hobby of observing and collecting insects.



**“It’s a simple idea, using hot water to kill fire ant colonies.”**

As part of his postdoctoral work, King focused on the development of non-toxic methods to control fire ant colonies. King explained one such non-toxic method: “It’s a simple idea, using hot water to kill fire ant colonies.”

When King came to UCF, he collaborated with an agricultural fabricator to create a high-temperature, high-volume, fuel-powered, mechanized system that can be hauled on a trailer. Over the summer, King used his machine at Fort De Soto Park in St. Petersburg, Florida, where endangered and protected sea turtles lay their eggs on the beach. Sadly, the park was losing a large number of hatchlings due to fire ants. “We eliminated greater than 90 percent of the fire ant colonies from around the nests. So it was very effective,” recalls King.

## Faculty Features Continued

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### Science + Engineering

#### Larry Shah

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March 7, 2016

Larry Shah, Ph.D., research assistant professor in the College of Optics and Photonics (CREOL), is now working in the lab where he started out as a doctoral student almost 20 years ago at UCF – the Laser & Plasma Laboratory, which is headed by his former advisor Martin Richardson, Ph.D. Here he studies fiber lasers—specifically, lasers based on optical fibers doped with rare-earth metals thulium and ytterbium which can be used in telecommunications, materials processing, healthcare applications, and more.

Shah is a self-described “Ph.D. tech.” He explains, “First you need engineering sense to say, ‘That is not where that goes. That shouldn’t be there.’ And you also need to be a critical scientist and ask ‘Does the data make sense? What trend do I expect to observe?’ In the lab, you need science and engineering, but it’s almost like driving. You’re no longer really thinking about it, you’re just doing it.”



**“First you need engineering sense to say, ‘That is not where that goes.’”**

### Tracking Disease-Carrying Mosquitoes

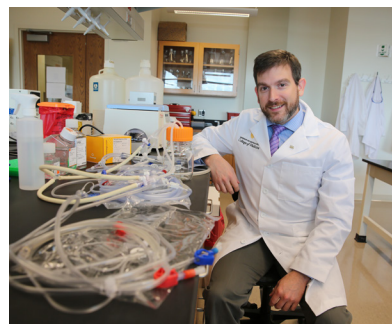
#### Bradley Willenberg

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April 4, 2016

College of Medicine researcher, Bradley Willenberg, Ph.D., joined the lab of Edward Ross, M.D. in September 2014. This lab group’s research interests include biomaterials projects which focus on developing injectables and gels used in tissue engineering and wound healing. This particular area of research is based on patented capillary-alginate hydrogel materials Willenberg invented during his doctoral and postdoctoral studies.

Willenberg has also been working on disease-carrying mosquito surveillance. This observational work began during his time as a scientist at the University of Florida and has evolved into a device that attracts mosquitoes and then changes their color if they are carrying a specific disease. Because this invention operates passively (i.e., uses no electricity) and does not require sending specimens to a lab, monitoring mosquitoes is made easier within the developing world, where these insects carry diseases such as dengue fever, malaria and yellow fever.



**The device attracts mosquitoes and then changes their color if they are carrying the disease.**

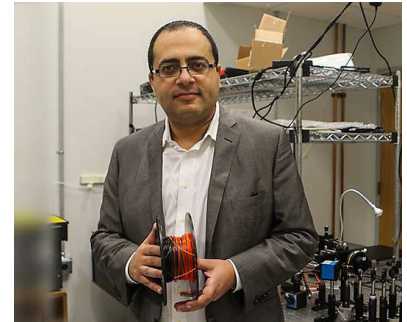
## **Fantastic Failures Can Actually be Fantastic Breakthroughs**

**Ayman Abouraddy** .....

May 2, 2016

Ayman Abouraddy, Ph.D., an associate professor at CREOL, helped to create a new nanoparticle fabrication technique which sprung from an unlikely event. His student was performing an unrelated experiment that continued to go awry. Yet this unexpected result was the very thing that had eluded Abouraddy and his fellow researchers for years.

Abouraddy and his colleagues had attempted to observe a phenomenon that Harvard theoreticians previously predicted: under a high temperature, an extended fiber with an embedded, continuous core can spontaneously form a chain of spherical micro- and nanoparticles. After much effort and expense, this research question went unanswered until Abouraddy's student stumbled upon the answer. Abouraddy calls the "mistake" the student had observed a "fantastic failure," infused with serendipity.



**The student had observed a "fantastic failure"**

## **The Intersection of Information Systems, Healthcare Delivery and Big Data**

**Varadraj "Raj" Gurupur** .....

June 6, 2016

Varadraj "Raj" Gurupur, Ph.D., assistant professor in Health Management and Informatics in the College of Health and Public Affairs, joined UCF in the fall of 2014, realizing his childhood dream of becoming an innovator. His main research involves software engineering decision support systems for healthcare delivery. He calls this burgeoning field "a strange intersection of information systems, healthcare delivery and big data."

He has come up with a systemized way to monitor the data completeness of patient medical records - Data Completeness Analysis Package (DCAP). Through concept maps and statistical analytical methods, DCAP can holistically look at a patient's record and can work across databases. Unlike currently available methods—which involve various forms or software that is proprietary and limited—DCAP is open-source and can be used with any existing databases. Gurupur hopes that this open-source software will continue to be improved by others.



**"A strange intersection of information systems, healthcare delivery and big data."**

# Partnerships

## Commercialization Partners

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Our industry partners are integral to the process of transforming the discoveries made at UCF into commercial products that impact the way we live, work and play. These 31 companies and institutions have partnered with us to both evaluate and license innovative materials, drugs and methods in order to improve existing products or to create something new.

Startups are shown in **gold**.

Aviana Molecular Technologies, LLC

BEAM Photonic Technologies, Inc.

Brandt Consolidated, Inc.

**Capacitech Energy, LLC**

Cedars-Sinai Medical Center

**Cogent Solar, Inc.**

Data Transfer Solutions (DTS)

DisinfectX, LLC

**Feynman Nano, Inc.**

Florida Atlantic University

Florida State College

**Frigidus Ltd.**

H2Litmus, LLC

Hesperos, Inc.

Intecrowd, LLC

Integsense, Inc.

IPX Foundation

Kairos AR, Inc.

Mend VIP, Inc.

Merging Traffic, LLC

**Multicore Photonics, Inc.**

**e-skin Displays, Inc.**

Nanovation Partners

SchoolFlow, Inc.

**SensaTek Propulsion Technologies, Inc.**

**SEVA Therapeutics, Inc.**

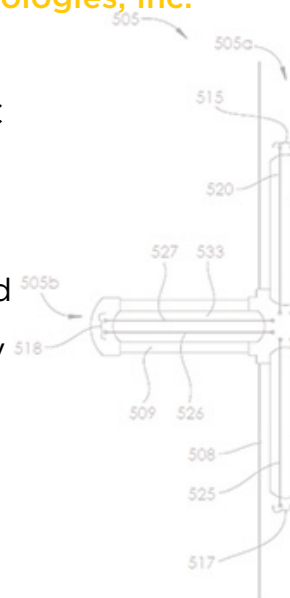
Significant Technology, LLC

**Suncoast Nanotech, LLC**

University of West Florida

Versa Drives Private Limited

Western Carolina University



# Events

## Supporting University Intellectual Property

Events our team attended to promote university-developed technology, support faculty and industry partnerships and to stay current on industry trends and best practices.

2016

- JAN** — ● — Florida Citrus Show
- FEB** — ● — Photonics West
  - — AUTM Annual Meeting
- MAR** — ● — CREOL Industry Affiliates Day
  - — Business of Biotech
  - — Biennial Organic Reactions Catalysis Society Conference
- MAY** — ● — Tech Connect
- JUN** — ● — Bio International
  - — Florida Citrus Mutual Annual Meeting
- OCT** — ● — TechXpo
  - — BioFlorida
  - — KSC Innovation Expo
- NOV** — ● — R&D 100
  - — I/ITSEC

- Promote University Technology
- Resource to Faculty
- Continuing Education

# Startup Companies

Formed to Commercialize UCF Innovations

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## **Capacitech Energy LLC**

This UCF student-led startup is commercializing a self-sustainable energy source that both stores and transmits electricity using an affordable and lightweight copper cable-based-super-capacitor, developed by UCF professor and co-founder Jayan Thomas in the NanoScience Technology Center (NSTC).

## **Cogent Solar, Inc.**

Using technology developed by Florida Solar Energy Center (FSEC) researcher Jeffrey Sonne, Cogent Solar provides affordable solar panel solutions that complement the distinctive architectures of today's homes, small businesses and recreational activities.

## **e-skin Displays**

<http://www.eskindisplays.com/>

These ultra-thin, full-color and tunable electronic displays developed by UCF Assistant Professor Debashis Chanda in NSTC, are inspired by nature. Chanda is also leading this startup that is taking the technology to market.

## **Feynman Nano, Inc.**

The UCF student-led startup manufactures customized nanotextured "smart" structures for a wide range of applications such as anti-bacterial materials and autoimmune deficiency treatments. The technology was developed by co-founder Brandon Carpenter and UCF Assistant Professor Jayan Thomas in NSTC.

## **Frigidus Ltd.**

UK-based startup Frigidus is developing high efficiency air conditioner condenser fans. The core technology was developed by Danny Parker in FSEC.

## **Multicore Photonics, Inc.**

<http://www.multicore-photonics.com/>

A UCF grad is bringing fiber optic technology developed by CREOL Assistant Professor Rodrigo Amezcua to market. The company specializes in the design and packaging of commercially scalable direct OEM replacement sensors and instrumentation using multicore fiber technology.

## **SensaTek Propulsion Technologies, Inc.**

<http://www.sensatek.com/>

SensaTek develops high-intensity sensory equipment for the aerospace and power production industries. College of Engineering and Computer Science associate professors who developed the technology, Xun Gong and Linan An, are both part of the company.

## **SEVA Therapeutics, Inc.**

Pre-clinical biotechnology company SEVA Therapeutics will use nano-particle peptides (CT20) developed by College of Medicine Associate Professor Annette Khaled in further research that could ultimately lead to new therapies to fight metastatic cancer.

## **Suncoast Nanotech LLC**

Suncoast Nanotech is using technology developed in NSTC to manufacture Quantum dots faster and cheaper and that are more bio-compatible than what is currently available. The company was started by one of the technology's inventors, Associate Professor Swadesh Santra, and several UCF students.

Entrepreneurial Resources (see page 23 for program descriptions)

 UCF I-Corps Program

 UCF Business Incubation Program



# Oscar of Invention

## Awarded to UCF Technology

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R&D Magazine recognized UCF and Jayan Thomas, at its annual R&D 100 Awards. Widely known as the “Oscars of Invention,” the prestigious R&D 100 Awards have a 50+ year history of honoring excellence in technology innovations. The award, which identifies and celebrates the top technology products of the year, highlighted the work of UCF associate professor Thomas, NanoScience Technology Center, CREOL and the College of Engineering and Computer Science, for his development of energy transmitting and storing copper wire.

The motivation for the technology came to Thomas more than a year ago when he discovered some stray cables lying about while on a walk one evening. He had taken a stroll to ponder the subject of energy storage and in a burst of inspiration, a novel thought occurred to him: Cables transmit energy, but why can't they also store it?

“We’re developing a self-sustainable energy source that can be portable and used at anytime, anywhere,” said Thomas. “It’s a compelling proposition that has significant ramifications for a variety of industries including aerospace, heavy machinery and electric automobiles.” This new electrical cable can replace conventional supercapacitors when it is used in place of standard, non-energy-storing wires.

“We envision the wire also being weaved into fabric so that your jacket can charge your electronic devices,” said Thomas. “In this scenario, you would just place your mobile smart device into your pocket to charge it—that’s a game-changer.”



Rob Bernath, business development manager at the UCF Office of Technology Transfer, and UCF professor and innovator Jayan Thomas.

**“We’re developing a self-sustainable energy source that can be portable and used at anytime, anywhere.”**

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# Supporting Programs

For Innovators and Entrepreneurs

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The Office of Technology Transfer works with other entrepreneurial support units to assist startups in advancing university research.

## I-Corps

Faculty and students selected to participate in the I-Corps program learn first-hand about entrepreneurship while they explore and validate the commercial landscape surrounding their innovation.

## Venture Accelerator Lab

A place for technology entrepreneurs to transform innovative ideas and intellectual property into businesses with high growth potential. Entrepreneurs can get assistance with strategic research, market and competitive analysis, industry trends, financial modeling, and more.

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## Business Incubation Program

Since 1999, the UCF Business Incubation Program has helped hundreds of early-stage businesses develop into financially stable companies by providing the tools, training and infrastructure that help facilitate smarter, faster startup growth.

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## GrowFL

Created in 2009 by the Florida legislature, GrowFL is an economic development program focused on assisting second-stage growth companies prosper in the state of Florida by providing strategic research, peer learning, and leadership development.

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## Florida Angel Nexus

The Florida Angel Nexus powers angel investment groups statewide to provide investors the efficiencies of a large entity and the flexibility of niche interests. Selected entrepreneurs have access to a large base of investors with expertise in their respective industry.

**FOR MORE  
INFORMATION VISIT  
[CIE.UCF.EDU](http://CIE.UCF.EDU).**



Interdisciplinary collaborators Bradley Willenberg, Ph.D. and Sudiptal Seal, Ph.D. work to detect Zika and other viruses carried by mosquitoes.

# Technology Transfer

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