2012-2013 Annual Report

During the 2012/2013 fiscal year, the USF Matching Grants Research Program awarded 21 new projects with 21 companies. The awards totaled $974,080 from the Florida High Tech Corridor Council with industry partners providing cash of $1,196,937. Additionally, industry sponsors provided $1,928,033 worth of in-kind support for a total investment of $4,099,050 in the program. The match ratio was more than $3:$1. The average total project value was $195,193 with an average award of $46,385. These projects supported 59 students and 34 faculty members.

Projects were awarded to the College of Engineering (15), College of Arts & Sciences (2), USF Health (2), USFSP College of Business (1) and Mote Marine Laboratory (1).

Alcantar, Norma, “Selectivity Studies for Ammonia and Chlorine Removing Agents for Preserving Bait and Fresh Caught Fish”
Department: Chemical and Biomedical Engineering
Sector: Life Sciences
Partner: Marine Metal Products Co.
Location: Tampa, Hillsborough
FHTCC Award: $5,000  Cash Match: $5,000  In-Kind Match: $5,500
Total Project Value: $15,500
Students: 1
Faculty: 3
Abstract: USF has been contacted to offer recommendations on what chemicals or materials can be used to remove chlorine and ammonia without compromising the integrity of the bait and caught fish while affordability and ease-of-use is maintained. USF has proposed 4 tasks to accomplish this project.

Crane, Nathan, “Model-Driven Solutions for Screwless Panel Assembly”
Department: Mechanical Engineering
Sector: Modeling, Simulation, & Training
Partner: ALUMI-GUARD, INC
Location: Brooksville/Hernando
FHTCC Award: $14,970  Cash Match: $15,000  In-Kind Match: $15,000
Total Project Value: $44,970
Students: 3
Faculty: 2
Abstract: This project will create multiple assembly models to represent the fence with its motion. These models will be used to guide idea generation and to evaluate the function of the ideas.

Gitlin, Richard, “Improving the Communications Performance and Reliability of In Vivo Wireless Medical Devices”
Department: Electrical Engineering
Sector: Life Sciences
Partner: Innovatia Medical Systems, Inc.
Location: Tampa/Hillsborough County
FHTCC Award: $77,126  Cash Match: $77,126  In-Kind Match: $81,000
Total Project Value: $235,252
Students: 4
Faculty: 1
Abstract: The overarching objective of this research is to realize a highly reliable, distributed, and wirelessly networked system of in vivo communicating devices that will create a new paradigm for Minimally Invasive Surgery. Specific objectives in this project are (1) the design of a high-definition video device (the Camera Module) that is wirelessly controlled and wirelessly communicates to an external receiver and (2) the demonstration of novel means to overcome the challenges of reliably communicating over the in vivo wireless channel with a high bit rate, high reliability, low latency, and limited complexity.

Gitlin, Richard, “The Body-Area Communication R&D”
Department: Electrical Engineering
Sector: Information Technology
Partner: Jabil Circuits, Inc.
Location: St. Petersburg/Pinellas
FHTCC Award: $61,944  Cash Match: $123,591  In-Kind Match: $123,591
Total Project Value: $309,126
Students: 1
Faculty: 1
Abstract: The Body-Area Communication R&D Project is a joint research project between Jabil and USF directed towards investigating technologies associated with Body-Area communication and the potential applications.

Department: Chemical Engineering
Sector: Sustainable Energy
Partner: Florida Power & Light Co.
Location: Tampa/Hillsborough
FHTCC Award: $62,000  Cash Match: $113,516  In-Kind Match: $11,000
Total Project Value: $186,516
Students: 4
Faculty: 1
Abstract: The objective of this proposal is to test the performance of an air-conditioning unit manufactured by VaporGenics Inc. for residential applications. Tampa FL. This system is based on an Organic Rankine Cycle refrigeration system and can use waste heat to generate refrigeration for air conditioning.

Guldiken, Rasim, “Acoustic Emission Technology on a Chip- ACHIP”
Department: Electrical Engineering
Sector: Microelectronics/Nanotechnology
Partner: WavesinSolids LLC
Location: Tampa, Hillsborough
FHTCC Award: $49,946 Cash Match: $49,946 In-Kind Match: $60,000
Total Project Value: $159,892
Students: 2
Faculty: 2
Abstract: We aim to investigate MEMS acoustic emission sensors.

Ligatti, Jay, “Development of Network-security Tools”
Department: Computer Science Engineering
Sector: Information Technology
Partner: Impulse Point, LLC
Location: Lakeland/Polk
FHTCC Award: $61,356 Cash Match: $61,356 In-Kind Match: $61,356
Total Project Value: $184,068
Students: 3
Faculty: 1
Abstract: The USF team will team work with Impulse Point to support development of the Impulse Safe-Connect product.

Luer, Carl, “Anti-tumor Cell Activity of Compounds Isolated from Culture Medium of Shark Immune Cells”
Sector: Life Sciences
Partner: MOTE Marine
Location: Sarasota/Sarasota
FHTCC Award: $50,000 Cash Match: $50,000 In-Kind Match: $50,000
Total Project Value: $150,000
Students: 1
Faculty: 2
Abstract: Funds are being requested to utilize advanced resources (i.e., technology and instrumentation) available through USF and Moffitt Cancer Center to separate shark immune cell-derived compounds using different separation techniques in collaboration with the ongoing shark immunology research at Mote Marine Laboratory. Fractions and isolated compounds
generated through these advanced separation techniques will be assayed at Mote Marine Laboratory for anti-cancer activity, and compound(s) with bioactivity will be returned to Moffitt for characterization and identification of specific structures.

Miao, Zhixin, “Community Power System Simulation”
Department: Electrical Engineering
Sector: Sustainable Energy
Location: Tampa/Hillsborough
FHTCC Award: $33,325  Cash Match: $66,650  In-Kind Match: $33,325
Total Project Value: $133,300
Students: 4
Faculty: 1
Abstract: To build a virtual power system in the state-of-the-art real time digital simulators to investigate the impact of energy storage system such as battery on a community power system.

Muller, Andreas, “Laser Standoff Detection of Shielded Fissile Material”
Department: Physics
Sector: Optics & Photonics
Partner: Alakai Defense Systems
Location: Largo/Pinellas
FHTCC Award: $75,480  Cash Match: $75,481  In-Kind Match: $76,000
Total Project Value: $226,961
Students: 2
Faculty: 2
Abstract: A method for detecting ionized nitrogen in air, found in the vicinity of fissile materials, will be investigated. It uses ultra-violet laser light to induce fluorescence in nitrogen ions which can potentially be detected at long ranges.

Mumcu, Gokhan, “Miniaturized Low Frequency Resonant Antennas”
Department: Electrical Engineering
Sector: Microelectronics/Nanotechnology
Partner: Lockheed Martin Missiles & Fire Control
Location: Orlando/Orange
FHTCC Award: $10,000  Cash Match: $20,000  In-Kind Match: $10,000
Total Project Value: $40,000
Students: 1
Faculty: 2
Abstract: In this effort funded by Lockheed Martin, Center for Wireless and Microwave Information Systems (WAMI) of USF (PIs: Dr. Gokhan Mumcu and Dr. Thomas Weller) is aiming to develop miniature low frequency (~10MHz) antennas that will operate within the vicinity of a metamaterial lens. These antennas will potentially operate with magneto-dielectric substrates and provide high packing density and enhance imaging resolution when utilized with the metamaterial lens.
Otero, Carlos E., “Performance Evaluation, Optimization, and Integration of On-Demand Intelligence Software”
Department: Information Technology
Sector: Information Technology
Partner: Northrop Grumman Corporation
Location: Melbourne/Brevard
FHTCC Award: $36,993  Cash Match: $79,386  In-Kind Match: $182,000
Total Project Value: $298,379
Students: 2
Faculty: 3
Abstract: The research provides a detailed investigation of the state-of-the-art in advanced analytics’ open-source and COTS software for addressing “Big Data” problems in the defense industry. The investigation focuses on evaluation of significant software quality attributes, such as performance, usability, and interoperability, which are essential in determining the software’s suitability for national defense problems that deal with massive amounts of data. The performance evaluation study will focus on key analytics algorithms for automated alerting and processing of both data-at-rest and data-in-motion. A general evaluation of usability and interoperability will be carried out to determine the complexity and cost required for integrating disparate analytics (both open-source and COTS) solutions into a framework that supports massive and collaborative analytics of streaming, unstructured data. These capabilities are integral to help solve today’s most important national defense problems.

Philippidis, George, “Production of High-Value Algae Biomass in a Novel Cultivation System”
Department: Chemical & Biomedical Engineering
Sector: Sustainable Energy
Partner: Culture Fuels, Inc.
Location: Lakeland/Polk
FHTCC Award: $27,000  Cash Match: $27,000  In-Kind Match: $28,700
Total Project Value: $82,700
Students: 2
Faculty: 1
Abstract: The objective of this research project is to develop and test methods for growing algae strains with a strong potential for aquaculture in the novel floating cultivation system that USF and Culture Fuels have jointly designed. Using strains of interest to the company, USF will demonstrate the production of the algae species in the floating bioreactor and determine the system’s long-term productivity as a function of nutrient use and energy consumption.

Tan, Jun, “HUCBC modulation of Alzheimer's-like pathology and behavioral changes”
Department: Psychiatry & Behavioral Medicine
Sector: Life Sciences
Partner: Saneron CCEL Therapeutics, Inc.
Location: Tampa/Hillsborough
Tejada-Martinez, Andres, “Meshfree Modeling In Laminated Composites”
Department: Civil and Environmental Engineering
Sector: Aviation & Aerospace/Modeling, Simulation & Training
Partner: Applied Composites Modeling, LLC
Location: Winter Gardens/Orange
FHTCC Award: $21,309 Cash Match: $21,309 In-Kind Match: $21,000
Total Project Value: $63,618
Students: 3
Faculty: 1
Abstract: Research and development of computer modeling techniques applicable to laminated composite materials in aerospace applications.

Tipparaju, Srinivas, “Novel drug delivery systems by tablet technology: Repositioning the FDA (Food and Drug Administration) approved drug pipeline”
Department: Pharmaceutical Sciences
Sector: Life Sciences
Partner: CoreRX
Location: Clearwater/Pinellas
FHTCC Award: $65,000 Cash Match: $65,000 In-Kind Match: $65,000
Total Project Value: $195,000
Students: 4
Faculty: 2
Abstract: The project will utilize the technology based expertise for developing the drug delivery systems. USF Students will be trained to perform the design and development and get experience under the mentorship of faculty and Industry.
Turos, Edward, “KeriCure Nanoparticles for Drug Delivery”
Department: Chemistry
Sector: Life Sciences
Partner: KeriCure, Inc.
Location: Wesley Chapel/Pasco
FHTCC Award: $32,500  Cash Match: $32,500  In-Kind Match: $82,000
Total Project Value: $147,000
Students: 11
Faculty: 1
Abstract: This project involves two very important aspects to further the research and product development for KeriCure products, as well as promote diverse interdisciplinary education for those involved academically. The first portion involves the product characterization of existing KeriCure products, including validation of product designs via chemical, mechanical, and analytical procedures. The second portion of this project deals with the synthetic design and implementation of drugs or bioactive molecules into the KeriCure technology.

Wang, Jing, “Research and Training Internship for Enhanced Microwave and Millimeter-Wave Circuit Design, Characterization and Modeling”
Department: Electrical Engineering
Sector: Microelectronics/Nanotechnology
Partner: Modelithics, Inc.
Location: Tampa/Hillsborough County
FHTCC Award: $28,088  Cash Match: $28,088  In-Kind Match: $29,000
Total Project Value: $85,176
Students: 3
Faculty: 1
Abstract: The goal of this project will be to characterize example microwave devices and construct and verify improved models for high frequency transistors that are going to be tailored for use in circuit simulation software. Another goal will be transfer of developed techniques and complete modeling examples to Modelithics through collaborative research interaction between Modelithics’ engineers and USF students/faculty.

Watkins, Allison, “USFSP Banking Program”
Department: Information Systems & Decision Sciences
Sector: Information Technology
Partner: C1 Bank
Location: St. Petersburg/Pinellas
FHTCC Award: $79,815  Cash Match: $103,760  In-Kind Match: $88,755
Total Project Value: $272,330
Students: 1
Faculty: 1
Abstract: The USFSP College of Business will develop a cutting edge course delivery system to teach C1 Bank executives key banking principles. While providing training for employees at
this growing community bank, the program also will provide USFSP undergraduate students with skills in mobile design, systems administration, instructional design and technology

Weller, Thomas, “Smart Grid Functionality of PV-Battery Systems”  
Department: Electrical Engineering  
Sector: Microelectronics/Nanotechnology  
Partner: CompData Systems, Inc./DBA Silent Partner Technologies  
Location: Lutz/Hillsborough  
FHTCC Award: $23,258  
Cash Match: $23,258  
In-Kind Match: $45,000  
Total Project Value: $91,516  
Students: 2  
Faculty: 1  
Abstract: The objective of this project is to design and demonstrate novel antennas for radio frequency identification (RFID) applications. The reader antennas will be for both hand-held and platform mounted designs. The specific goal for the new tag antenna designs is to improve the achievable performance when the tags are mounted on either metallic objects or objects with high water content, since each condition tends to cause significant degradation in the performance of the tags.

Weller, Thomas, “Metamaterial-based MEM Non-Dispersive Phase Shifter”  
Department: Electrical Engineering  
Sector: Microelectronics/Nanotechnology  
Partner: TECOMSYS, Inc  
Location: Oldsmar/Pinellas  
FHTCC Award: $40,000  
Cash Match: $40,000  
In-Kind Match: $40,000  
Total Project Value: $120,000  
Students: 2  
Faculty: 3  
Abstract: The Phase I research will address the design and demonstration of a Ka band (26-40 GHz) micro electromechanical (MEM) based phase shifter. The primary objective is to develop phase shifters with a very small footprint that exhibit constant phase shift over frequency.