

## Florida High Tech Corridor

### 2000-2001 USF "External Matching Grant" Project Awards

#### Investigator, Proposal Title and Description

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##### College of Arts and Sciences

**"Curable Coatings w/ Controlled Rheology"**; P.I.: Harmon, Julie; Award-\$50,000; Match-\$100,000. Private Sector Partner: Honeywell

Summary: "This proposal addresses the problem of identifying ruggedized coatings that exhibit controlled flow properties during cure. The coatings must exhibit optimum adhesion to substrate and must endure temperature swings and corrosive environments."

**"LaserCom for Last Air Mile"**; P.I.: Killinger, Dennis; Award-\$50,000; Match-\$100,000. Private Sector Partner: Schwartz Electro-Optics

Summary: "High reliability laser beam open-air communication systems will be developed to connect downtown Metro buildings for high-speed video and computer data."

**"Bicomposite Materials by Design"**; P.I.: Zaworotko, Mike; Award-\$20,000; Match-\$40,000. Private Sector Partner: Constellation Technology Corporation

Summary: "We propose to use the principles of crystal engineering to design new porous sensor materials that are based upon synthetic compounds and biomolecules."

##### College of Engineering

**"Development of an Intelligent Robotic Haptic Interface to Perform Complex Tasks by Individuals with Disabilities"**; P.I.: Dubey, Rajiv; Award-\$70,000; Match-\$140,000. Private Sector Partners: Electronic Mobility Controls, and the Florida Department of Labor and Employment Security-Division of Vocational Rehabilitation.

Summary: "Design and development of an intelligent robotic haptic interface in the virtual reality environment to perform a range of job related tasks likely to be encountered by persons with disabilities."

**"On-Wafer Metrology for 100 GHz Microelectronics";** P.I.: Dunleavy, Lawrence; Award-\$156,500; Match-\$458,520. Private Sector Partners: Raytheon Systems, Alliant Techsystems, Intersil, GGB Industries, Maury Microwave, Anritsu Company.

Summary: "This project represents an innovative teaming of USF faculty and students with several industrial contributors. Begun in 1999, the project will continue to advance an otherwise cost-prohibitive measurement capability and utilize it to research, develop and apply methods and improvements to measurements (primarily on-wafer) in the 100 GHz regime and at selected lower frequencies of interest to our research sponsors."

**"APPSA Radiometer";** P.I.: Henning, Rudolf; Award-\$36,000; Match-\$72,000. Private Sector Partner: Custom Manufacturing and Engineering

Summary: "This project provides research and engineering design support to CME in such areas as EM (electromagnetic) properties of the atmosphere, mm-wave radiometric remote sensing, weather's impact on satellite communications and EM meteorological observations. This information is needed for proper design of the Phase 2 SBIR prototype Automated Passive Propagation Sensor / Analyzer (APPSA). This APPSA, to the best of our knowledge, is a first-of-its-kind portable, rugged, remotely controllable instrument, suitable for future low-cost production. Its light-weight, reliable, real-time operating characteristics result from use of MMICs, MEMs, ICs, and a passive instrument's very low power requirements."

**"Deeply Pipelined and 3D Optimized NCL Multipliers";** P.I.: Jain, Vijay; Award-\$27,500; Match-\$55,000. Private Sector Partner: Theseus Logic

Summary: "Applications of DSP microprocessors range from wireless communication to video processing, and from aircraft control to modern medical imaging. This research will focus on the development of ultra-fast multipliers using the new NCL technology for the next generation DSP chips."

**"Rapid Prototyping of Wireless Functions on the J Platform";** P.I.: Jain, Vijay; Award-\$15,000; Match-\$30,000. Private Sector Partner: Intersil Corporation

Summary: "This research will focus on a rapid prototyping approach to reduce the cost and time for the development of advanced wireless products. These will be products for future broadband internet access, and Local Area Networks."

**"High-Throughput and Low-Power Implementations of Space-Based Radar Algorithms";** P.I.: Katkooari, Srinivas; Award-\$50,000; Match-\$100,000. Private Sector Partner: Honeywell

Summary: "We propose a design methodology for effective (area, power, and throughput) implementation of space-based radar algorithms on a commercial RC board."

**"Evaluation of Mechanical Properties of Hard Coatings for Multifunctional Applications";** P.I.: Kumar, Ashok; Award-\$20,363; Match-\$52,000. Private Sector Partner: BryCoat, Inc.

Summary: "The focus of this joint research program is to develop hard coatings for multifunctional applications. Mechanical properties will be studied using the nanoindentation method. Applications for this technology include precision components used in medical devices, aerospace systems, automotive designs and numerous other industries."

**"Development of Thin-Film HgI<sub>2</sub> for Medical Radiography";** P.I.: Morel, Don; Award-\$65,337; Match-\$136,180. Private Sector Partner: Constellation Technology Corporation

Summary: "The primary objective of this project is to develop thin-film HgI<sub>2</sub> x-ray detectors. Achievement of this objective would enable significant improvements in the resolution of x-ray imaging that would lead to earlier detection and treatment of cancer, particularly breast cancer."

**"Optical Characterization of High-Brightness AlGaInN and AlGaInP Thin Films and LEDs";** P.I.: Ostapenko, Sergei; Award-\$30,000; Match-\$60,000. Private Sector Partner: Uniroyal Optoelectronics

Summary: "The project is targeting process optimization of advanced light-emitting materials based upon III-V compounds for light-emitting diodes. Photoluminescence spectroscopy at wide temperature ranges will be applied to correlate with technological parameters of phosphide and nitride films. Nano-scale film morphology will be assessed using atomic force microscopy."

**"Improving Search Performance in Telecommunication Databases";** P.I.: Perez, Rafael; Award-\$38,894; Match-\$84,390. Private Sector Partner: Computer Systems and Services Inc.

Summary: "Enhancing performance of an intelligent search engine for large telecommunication databases and providing it with graphic capabilities is a main objective of this project."

**"Task Scheduling in Heterogenous Computing Systems";** P.I.: Ranganathan, N; Award-\$28,244; Match-\$65,000. Private Sector Partner: Honeywell

Summary: "Design and development of algorithms for task scheduling in heterogenous computing systems and their implementation and testing in Honeywell's SAGE application environment."

**"Digital Resampling at Intermediate Frequencies";** P.I.: Snider, Arthur David; Award-\$10,000; Match-\$20,000. Private Sector Partner: Intersil Corporation

Summary: "The third generation wireless services are expected to make extensive use of the software radio concept. We propose to extend our ongoing research in this field in the area of sample rate conversion, investigating fundamental limitation on rate conversion, finite word length effects, and special algorithms available for fixed-rate conversion processes."

**"Null Convention Logic Circuitry for Significance-Based Computations";** P.I.: Snider, Arthur David; Award-\$20,000; Match-\$40,000. Private Sector Partner: Theseus Logic

Summary: "Full exploitation of predicted chip transistor densities is confounded by complex timing requirements. In support of Theseus' efforts, we shall formulate the algorithms of 'significance-based computation,' a calculation scheme recently developed at USF, in their Null Convention Logic models."

**"Development and Design of Multi-Purpose Multi-Product Supercritical Fluid...";** P.I.: Sunol, Adin; Award-\$100,000; Match-\$200,000. Private Sector Partner: MEI Corporation

Summary: "The primary objective of the project is to develop and design a multi-purpose multi-product processing facility that utilizes supercritical fluids. The project involves software development, simulation and training, process prototyping, and development of a multi-purpose design to be used in manufacture of portfolios of products. The base technology is environmentally superior supercritical fluids, while product categories are biomedical, microelectronics, pharmaceutical, environmental, food and beverages, aerospace, transportation, software systems, and materials applications."

**"Silicon Micromachined Conformal Package and Components for a K-Band Receiver";** P.I.: Weller, Thomas; Award-\$20,000; Match-\$40,000. Private Sector Partner: Raytheon Systems

Summary: "The goal is to investigate densely integrated multi-layer transmit/receive architectures for 20 GHz microelectronic, micromachined modules."

**"Active Device (BJT) and Varactor Diode Modeling";** P.I.: Weller, Thomas; Award-\$50,000; Match-\$100,000. Private Sector Partner: Motorola

Summary: "In this project, state-of-the-art techniques for the characterization and modeling of bipolar junction transistors and variable reactance diodes will be studied and developed."

## College of Medicine

**"Transplantation of Stem Cells from Umbilical Cord Blood";** P.I.: Sanchez-Ramos, Juan; Award-\$100,000; Match-\$200,000. Private Sector Partner: C-CEL Bio-Therapies

Summary: "This project describes the process by which stem cells may be isolated, expanded and differentiated into neural cells from blood taken after birth from the umbilical cord vein. In collaboration with CCELL, these neural precursors will be developed into a therapeutic product for treatment of many Central Nervous System disorders and injuries."