

**BOARD OF GOVERNORS  
STATE UNIVERSITY SYSTEM OF FLORIDA  
Research and Economic Development Committee  
April 18, 2007 Teleconference**

**SUBJECT:** Centers of Excellence Accountability Measures

---

**PROPOSED BOARD ACTION**

Approve Centers of Excellence Accountability Measures

**AUTHORITY FOR BOARD OF GOVERNORS ACTION**

Section 7(d), Article IX, Florida Constitution

**BACKGROUND INFORMATION**

The 2006 Florida Legislature created the 21<sup>st</sup> Century Technology, Research, and Scholarship Enhancement Act, a portion of which contained the Centers of Excellence Program to provide Florida with a clear position of leadership in key emerging technology areas with the unique potential for economic and societal impact in the future. For the 2006-07 fiscal year, \$30 million was appropriated for this program. At its November 16, 2006 meeting, the Board of Governors recommended the establishment of six Centers of Excellence and the distribution of the appropriation as follows: USF Florida Center of Excellence in Biomolecular Identification and Targeted Therapeutics (\$8M), FAU Center of Excellence in Ocean Energy Technology (\$5M), UF Florida Institute for Sustainable Energy Technology Incubator (\$4.5M), UCF Florida Photonics Center of Excellence Laser Technology Initiative (\$4.5M), UF Center for Nano-Bio Sensors (\$4M), and the FSU Center of Excellence in Advanced Materials (\$4M). This brings to nine the total number of Centers of Excellence, three having been created by similar legislation in 2002.

The 21<sup>st</sup> Century legislation has an expectation that the Centers of Excellence will undergo regular performance monitoring. The attached set of draft universal accountability measures was developed with input from the SUS Councils of Academic Vice Presidents and Vice Presidents for Research. Center-specific Accountability Expectations were developed from the commitments made in the proposals.

---

**Supporting Documentation Included:**

Draft Accountability Measures

**Facilitators/Presenters:**

Vice Chancellor R.E. LeMon

**CENTERS OF EXCELLENCE**  
**Draft Universal Accountability Measures**

**Research Effectiveness**

Number and Value of Competitive Grants Applied For

Number and Value of Competitive Grants Received

Federal Research Expenditures

Other Research Expenditures

Number of Publications in Refereed Journals From Center Research

Number of Invention Disclosures Filed

Number of Invention Disclosures Issued

Number of Technologies Licensed and Revenues Received

**Collaboration Effectiveness**

Number, Monetary Values, and Nature of Research Collaborations with Other Florida Public Institutions

Number, \$ Monetary Values, and Nature of Research Collaborations with Non-Florida Institutions

Number, Monetary Values, and Nature of Research Collaborations with Private Industry

Numbers of Undergraduates, Graduate Students, and Post-doctorates Supported on Center Funds

Number of Undergraduate, Graduate Students, and Post-doctorates Placed in Relevant Positions After Leaving Center

Number of Masters and Ph.D. Students Graduated

Collaboration with K - 20 Education System (# students or teachers served)

**Economic Development Effectiveness**

Number and Monetary Value of Businesses Started-up in Florida

Number and Monetary Value of Jobs Created in Florida

Number of Instructional Contact Hours of Specialized Industry Training

Dollars Acquired from Venture Capitalists

## USF Center of Excellence

### In Biomolecular Identification and Targeted Therapeutics

The process in which this Center would function starts with the need to identify a biomolecule, such as a protein or biomarker, associated with a particular disease or human illness. This may arise from either an on-site investigation or an outside agency or institute. Techniques developed within the Center would identify this biomolecule as a verifiable target for therapeutic intervention. Synthetic chemists in the Center would then work to design and synthesize an effective therapeutic agent for this target, using existing facilities on campus. **What have been the concrete results of this process during this Reporting Period?**

Alternatively, the Center may be called upon by an on-site investigation or outside agency to develop identification or diagnostic device for a particular disease with the capability to monitor a specific biomolecule, such as an infectious microbe or genetic biomarker. **What have been the concrete results of this process during this Reporting Period?**

Patenting and licensing these technologies and therapies through the USF Patents Office to biotech firms in the USF incubator or elsewhere in Florida would lead to revenue, new jobs, and new biotechnologies. **What activities have taken place during this Reporting Period with respect to patenting and licensing technologies and therapies to biotech firms in the USF incubator or elsewhere? What additional revenue has been realized during this reporting period? How many new jobs and new biotechnologies have been created during this reporting period?**

The opportunities for universities to out-license to industry and to facilitate small business development are excellent, and the Tampa Bay region is perfectly poised within the State of Florida to advance on the economic boom in biotechnology development. **What out-licensing to industry has taken place in the context of Center activities during this reporting period? What facilitation with small business development has taken place in the context of Center activities during this reporting period?**

USF's plan to sustain the proposed Center will consist of leveraging current resources and non-recurring resources provided by the Center of Excellence program to attract new revenue in the form of large interdisciplinary program contracts and grants, licensing fees generated by Center intellectual property, and core equipment user fees. **What new revenue has been attracted in the form of contracts and grants, licensing fees, and core equipment user fees during this Reporting Period?**

USF has committed to hiring seven new faculty members with research credentials and interests that align with the FCoE-BITT. These new faculty members will increase the level and breadth of expertise as well as the amount of external funding (federal and

industrial) brought to the Center. These new faculty and existing FCoE-BITT faculty will provide a revenue stream through increased indirect costs from new grant and contracts, and licensing fees generated through Center-based intellectual property. Grants and contracts secured by Center faculty will include graduate student stipends and tuition support, shared salary support for Center technical staff, and core equipment user fees. **What is the status of the institution's hiring of the seven new faculty members with Center-aligned interests? What additional revenue streams have these faculty brought to the institution? What tuition support, graduate student stipends, and salary support for technical staff has been created by these faculty during this Reporting Period?**

USF will aggressively market existing intellectual property to local and national biotechnology firms in order to produce licensing revenue and will dedicate one professional from the Division of Patent and Licensing to the FCoE-BITT. **What licensing revenue has been created during this reporting period? What is the name of the individual from the Division of Patent and Licensing whose functions are now dedicated full-time to the Center?** Small business startups will be facilitated through the USF Incubator and the Center for Entrepreneurship, a campus-wide organization focusing on entrepreneurial education, training, and research. **What small business startups have been facilitated through the USF Incubator as a direct result of Center activities during this Reporting Period?** As FCoE-BITT faculty develop productive collaborations with these startup companies through seed grants awarded by the Center, additional indirect costs from joint SBIR/STTR grants and licensing revenue from intellectual property will be generated to sustain the Center. **How many seed grants and at what dollar figure have been awarded by the Center during this Reporting Period? What has been the outcome of these seed grants in terms of licensing revenue and additional indirect costs to sustain the Center during this Reporting Period?**

This cluster of academic/industry expertise in biomolecular identification and targeted therapeutics on the USF campus will present opportunities for the FCoE-BITT to successfully compete for large interdisciplinary program contracts and grants from federal agencies and foundations which, in turn, will generate additional indirect cost and licensing fee revenue. **How many large interdisciplinary program contracts and grants, and at what dollar figure have been both submitted and awarded during this Reporting Period? How much additional indirect cost and licensing fee revenue has been generated as a result of this activity during this Reporting Period?** The cluster will also serve as a magnet to attract high wage, high tech industries to this region and Florida. **How many, and which, high wage, high tech industries have been added to the Tampa Bay region as a direct result of the Center's activities during this Reporting Period?**

## **FAU Center of Excellence In Ocean Energy Technology**

The Center will be the impetus of a new industry that has the potential to change the economic and social environment of Florida, the U.S., and indeed, the world...with potential [in Florida] for tens of thousands of jobs and billions of dollars of revenue [and] hundreds of thousands of jobs around the world...[and] annual revenue potential...in the hundreds of billions to trillions of dollars. **To what extent, and by what indicators has the Center changed the economic environment of Florida during this Reporting Period? How many jobs have been created in Florida and elsewhere as a result of the Center? How much additional annual revenue has been realized in Florida and elsewhere as a result of the Center?**

The seed industry established through the COEOET will refine ocean energy technologies and develop a technology and industrial base that will initially focus on harnessing ocean energy in Florida and then export energy products to worldwide locations. **What energy products have been exported by the Center during this Reporting Period?**

Harnessing ocean energy in Florida will provide a degree of energy independence for Florida through sustainable and reliable renewable clean energy. **To what extent and by what indicators is Florida more energy independent due to the Center's activities during this Reporting Period?**

The COEOET will establish Florida as the clear leader in key emerging technologies for harnessing ocean energy with a potential to dwarf the world's oil and coal sectors. **To what extent and by what indicators has Florida's reputation as a world leader in key emerging technologies for harnessing ocean energy been enhanced by the Center's activities during this Reporting Period?**

The non-recurring initial seed money provided by the state for the COEOET will be sufficient to establish a self-sustaining base. Multiple efforts are planned to generate funds that will build and sustain the COEOET that leverage off the base capabilities, including the generation of royalty streams through licensed technology, private and government funded technology development, federal earmark requests, education and workforce development, direct funding through U.S. Department of Energy renewable energy program, participation in the Florida Renewable Energy Technologies Grant Program, a Center Sponsorship Program, and through use of the instrumented offshore range. **What royalty streams have been generated during this Reporting Period? What licensed technologies have been developed during this Reporting Period? What private funded technology development has been effected during this Reporting Period? What government funded technology development has been effected during this Reporting Period? What federal earmarks have been sought and received during this Reporting Period? What private funded technology development has been effected during this Reporting Period? What funds have been requested and received for education and workforce development during this Reporting Period? What direct funding through the US. Department of Energy renewable energy program has been sought and received during this Reporting Period? What funding has been sought and received through the Florida Renewable Energy Technologies Grant Program during this Reporting Period?**

The total revenue stream to the COEOET is estimated to be over ten million per year within the first 10 years with unlimited potential as the ocean energy sector grows.

What has been the actual revenue stream for the Center during this Reporting Period?

## UF - Florida Institute

### For Sustainable Energy (FISE) Energy Technology Incubator

Currently Florida is the 3<sup>rd</sup> largest energy importing state in the country. Every aspect of Florida's economy depends on increasingly expensive energy, the majority of which is imported. Development and commercial deployment of advanced energy technologies is crucial to Florida's economy. The proposed incubator is crucial to addressing this need and would provide the following outcomes:

#### 1. Florida Energy Independence

- The facility will enable Florida to use biomass to produce all of the automotive fuel needs of our state. **What is the status of this Institute deliverable for this Reporting Period?**
- Serve as a catalyst to assist the corn-based ethanol industry in identifying other Florida biomass feedstocks, maximizing yields, and developing co-products. **What is the status of this Institute deliverable for this Reporting Period?**
- UF has world leading technology in conversion of biomass to fuels and chemicals as evidenced by the recent visit from British Petroleum (BP), and its consideration of UF as the academic partner for a 5-yr, \$500 million BP R&D program for biomass-derived automotive fuels. **What is the status of this consideration as of this Reporting Period, and what was the extent to which the Institute's status as a Center of Excellence impacted the considerations?**

#### 2. Florida Energy Security

- Local fuel production using available biomass makes Florida less susceptible to fuel shortages and disruption following hurricanes. **To what extent has this situation changed during this Reporting Period as a result of the Institute's creation as a Center of Excellence?**
- Distributed power generation technology being developed at UF (e.g., fuel cells & solar cells) makes Florida's electric grid more efficient and less susceptible to hurricane disruption. **To what extent has this situation changed during this Reporting Period as a result of the Institute's creation as a Center of Excellence?**

#### 3. Commercial Spin-Offs and Local Job Creation

- Two spin-off companies have been formed based on UF microbial biocatalysis for biomass conversion into ethanol (Celunol Corp., Dedham, MA) and biodegradable plastic monomers (BioEnergy LLC, Norwell, MA). Both have licensed UF technologies, established research laboratories in the nearby Sid Martin Biotechnology Incubator to work closely with UF and are actively seeking sites for commercial development in Florida. Both companies are very excited about the proposed facilities and one has offered to provide supplemental funding (\$350,000 total). **To what extent has this situation changed during this Reporting Period as a result of the Institute's creation as a Center of Excellence?**
- A third UF spin-off company Arrow, has expressed an interest in UF biotechnology that uses carbon fibers and nanotubes in biological fuel cells. **To what extent has**

this situation changed during this Reporting Period as a result of the Institute's creation as a Center of Excellence?

- A fourth company, Fuel FX, has licensed UF sensor technology to improve fuel economy and reduce emissions from automobile and diesel engines. This company is seeking a prototype fabrication facility of the kind proposed here to fabricate prototypes of the licensed technology as part of its commercialization strategy. To what extent has this situation changed during this Reporting Period as a result of the Institute's creation as a Center of Excellence?
4. *Enhancing Florida's Leadership in Energy Research and Technology Development*
- This facility will provide a low-cost and leveraged route for industry to test new technologies and their interface to existing systems. To what extent has this situation changed during this Reporting Period as a result of the Institute's creation as a Center of Excellence?
  - The proposed facility is crucial to advance Florida's natural biomass resources (rather than Midwestern corn), thus, establishing Florida as the national biomass energy leader. To what extent has Florida established such leadership during this Reporting Period as a result of the Institute's creation as a Center of Excellence?
  - Considerable federal funding in energy will be available and much of it will be directed at large scale demonstrations. What is the extent of federal funding during this Reporting Period?
  - Faculty researchers can use the facility to advance their research into these larger scale systems, making them more competitive for funding and more attractive to industry. To what extent and by what measures has this enhancement occurred during this Reporting Period?
  - The requested facility will provide flexible services to industry and Universities throughout the state and help establish Florida as a leader in the commercialization of renewable energy. To what extent and by what measures has this enhancement occurred during this Reporting Period?

UF will combine recurring university resources for faculty hiring in *FISE* with the one-time Center of Excellence funds to create the *FISE Energy Technology Incubator* facility. The strategic plan for *FISE* and its *Energy Technology Incubator* includes four key funding resources for self sufficiency:

- Obtain competitive funding (federal, state, industry) for large collaborative research projects. (We estimate that the proposed facility will allow us to double our current federal energy research support.) What is the status of this Institute deliverable for this Reporting Period?
- Return overhead (7.5%) for those large projects associated with *FISE*. How many dollars have accrued in this manner during this Reporting Period?
- Recovery of user fees from faculty research and affiliated industry. How many dollars have accrued in this manner during this Reporting Period?
- License Fees (5% of the license fees collected by UF's OTL will be returned to the Incubator). How many dollars have accrued in this manner during this Reporting Period?

- The BioFuel Pilot Plant will produce transportation fuel using Florida's own resources, transitioning Florida from an energy importer to an energy exporter. **What is the status of this Institute deliverable by this Reporting Period?**
- The Hydrogen Production Membrane Reactors will improve the efficiency of hydrogen production not only from current fossil fuels, but also from Florida's extensive biomass resources. **What is the status of this Institute deliverable by this Reporting Period?**
- Finally, the Solid Oxide Fuel Cells will improve fuel efficiency using our existing fuel infrastructure, continue to do so as we transition to BioFuels, and ultimately operate on hydrogen when the distribution infrastructure is in place. **What is the status of this Institute deliverable by this Reporting Period?**
- The numerous other technologies will also improve energy efficiency and increase our energy generation options. If just one of these many technologies is commercialized it will be larger than Gatorade in terms of market potential. Moreover, it will make a dramatic and lasting beneficial impact on the economy, standard of living, and environment not only in Florida, but around the world. **What is the status of such major commercialization by this Reporting Period?**
- Among these the Emission Control Sensor will be the first to have a commercial impact. We have already licensed the technology to *Fuel FX* International, Inc. *Fuel FX* is raising the capital to establish a facility that has the specific resources of our proposed Prototype Development and Demonstration Lab. If that facility existed now *Fuel FX* would already have the sensor prototypes under evaluation by companies such as Toyota, GM and Ford. If accepted and designed into the emission control automobile feed back loop, the first order from just one of these companies would be on the order of \$100M. The economic impact of this and the potential for job creation in Florida is immense. **What is the status of this portion of the Institute's activity as of this Reporting Period?**

### **UCF Florida Photonics Center of Excellence (FPCE)**

#### **Laser Technology Initiative (LTI)**

The one-time \$5M requested (+ \$1M for buildout costs of the FPCE/CREOL addition) will be matched by ~\$2.4M commitment from UCF and other sponsors and an initial investment in recurring funding support of ~\$600k/yr. **What is the status of the University's investment as of this Reporting Period?** Based on our previous performance we will leverage more recurring support in the future. The involvement of 6 current CREOL faculty, each now generating an average of ~\$1M/yr funding with the 4 new faculty (total of 10), plus, donated equipment of > \$5M, portends an overall budget near \$10M. This would represent a capital ROI of ~ 140% and an ROI on recurring funds of ~100%/yr. **What comparable ROI can be demonstrated for this Reporting Period?** This of course does not include the impact of the ~10-15 Ph.D/MS-qualified personnel injected into the workforce each year, the license and royalties drawn in IP generated and transferred to client industries, nor the direct and indirect economic impact in terms of new companies started, research and investment generated by industrial partners and the added HQM workforce attracted to the region. **What tracking has UCF done to quantify and qualify where its Ph.D/MS-qualified personnel**

are and what they are doing during this Reporting Period? What is the status of licensing and royalties generated and transferred to client industries during this Reporting Period? What new companies have been started and investment generated by industrial partners during this Reporting Period?

The UCF Administration supports this proposal for the LTI with a match of 4 Faculty positions (\$0.6M/yr recurring) and a total in matching funds of \$2.4M. (FHTCC will add another ~\$500k) **What is the status of this intended commitment?** *Significant partnerships* with medical laser companies, laser manufacturers and defense companies are expected to provide LTI access to state-of-the-art equipment worth \$M's. **What is the status of this intended partnership for this Reporting Period?** *LTI will partner closely with UCF's Technology Incubator* in supporting *new start-up companies*. **What start-up companies have been created during this Reporting Period?** We are also proposing the appointment of a *21<sup>st</sup> Century Scholar in Laser Medicine*, with the mandate to transition advanced laser technologies from LTI to major medical centers in Florida, including the new medical and biomedical centers being established in Orlando. **What is the status of this proposed deliverable for this reporting Period?**

### **UF - Center for Nano-Bio Sensors**

CNBS's research plan includes deliverables of new nano-bio sensors, probes and devices. **What is the status of this deliverable by the end of this Reporting Period?**

The healthcare and biotechnology industry base in Florida is expected to grow significantly in the coming years due to the aging of its population. Additionally, Florida comprises a geographic region that is uniquely susceptible to homeland security threats (e.g., agriculture, tourism, ports, cruise lines). The availability of a nano-bio trained workforce at all levels from technician to senior researcher and a commercially promising research environment are two of the most important enabling factors for attracting out-of-state companies to start Florida operations as well as creating homegrown start-up biomedical companies providing high paying jobs. A primary objective of CNBS is to meet both of these challenges in creating the nation's leading nano-bio industry cluster. **What is the status of this deliverable by this Reporting Period?**

Funds obtained through the Center of Excellence initiative will be invested in augmenting the existing intellectual and facilities infrastructure to deliver a focused set of nano-bio industry relevant technologies to the private sector, and to create the foundations for future commercializable technology innovations. **What is the status of this intended commitment? What technologies have been delivered to the private sector during this Reporting Period? What measurable foundations have been created for future commercializable technology innovations during this Reporting Period?**

### **FSU Center of Excellence In Advanced Materials (CEAM)**

Commercial aircraft, such as the structure of Boeing's new 787, or the Dreamliner, will consist of more than 50% composite materials. The new Airbus A350 will have similar airframes, utilizing almost four metric tons of composites in place of much heavier metal components. The same development strategy will soon be applied to automobiles, body armor and space vehicles. **What is the quantifiable status of the change to composite materials in major industries during this Reporting Period?**

Florida's marine industry employs 220,000 people, of which 99,400 work in manufacturing with \$3B in total output. Safer production techniques require systematic technical approaches such as materials characterization, process design, optimization and quality engineering that CEAM can provide to Florida's boat builders. In addition to recreational boating, ship building is using more composite materials than ever before. **What is the quantifiable status of the change to composite materials in these maritime industries during this Reporting Period?**

Within the next three years, our Center will become one of the world's premier advanced materials centers in terms of economic and workforce impact. Specifically, with our research and tech transfer plans, CEAM will meet the following deliverables:

1. Support the recreational marine and shipbuilding industries by reaching out to 236 boat building establishments in the state to help manufacturers implement technology to meet the MACT standards and maintain global competitiveness. In the first year, we will provide training to at least 30 companies. **What is the status of this Center deliverable for this Reporting Period?**
2. Partner with two Florida community colleges each year to promote clean manufacturing technology through CEAM's state-wide advanced materials workforce training network. **What is the status of this Center deliverable for this Reporting Period?**
3. Provide training for future technicians, engineers and scientists for the Florida workforce. **What is the status of this Center deliverable for this Reporting Period?**
4. Work with the aerospace/defense and space industries to transition FSU's nanomaterials into several applications. Specifically, accelerate development effort with our industry partners to establish at least one production facility in Florida to mass produce buckypaper nanomaterials allowing the economics of the technology to expand to industrial applications. **What is the status of this Center deliverable for this Reporting Period?**
5. Collaborate with our current Industry University Cooperative Research Center (IUCRC) members to identify new applications for buckypaper in the industrial market. Consult with these partners to identify at least three new potential businesses that can be established in Florida utilizing our technologies. **What is the status of this Center deliverable for this Reporting Period?**
6. Submit three patent applications and license at least one technology each year. **What is the status of this Center deliverable for this Reporting Period?**
7. Become self-sufficient in three years through leveraging public and private resources, and continue our growth to reach \$10M per year in contracts and grants. **What is the status of this Center deliverable for this Reporting Period?**

Our plans to achieve self-sufficiency in three years are as follows:

1. Contracts and Grants. Our researchers have demonstrated an impressive track record for continued growth of external supports through contracts and grants (C&G), growing at an average rate of 190% annually over the past four years. With the addition of new faculty researchers and the new \$17M Materials Research Building dedicated to advanced materials research and commercialization, C&G is expected to reach \$10M per year in five years. At this level, CEAM will be recognized as one of the top research institutions in the world. **What is the status of this Center deliverable for this Reporting Period?**
  2. Intellectual Properties and Royalties. According to IEEE<sup>1</sup>, nanotechnology is likely to generate products of high commercial value. FSU is in negotiations with organizations on licensing arrangements of composite technologies, such as resin infusion and buckypapers, which are expected to generate sizeable royalty revenues. More patent applications are expected using buckypapers in power, energy, and liquid crystal displays. **What is the status of this Center deliverable for this Reporting Period?**
  3. Commercialization and Spin-Off Companies. The outlook for new business entities resulting from the proposed CEAM is exceptional: FSU has signed two separate non-exclusive teaming agreements with National Composite Center and Georgia Aerospace for the scale-up production of buckypapers. Both agreements call for production plants be installed in Florida. More agreements are expected to license our technologies, attracting to Florida high-tech businesses with high-wage jobs. These spin-off companies would provide career opportunities for faculty, graduate students and scholars. **What is the status of this Center deliverable for this Reporting Period?**
-