

## **Project Work Plan**

### **“A Center for Advanced Materials and Nanotechnology in AMRI at the University of New Orleans”**

**LEQSF(2007-12)-ENH-PKSFI-PRS-04**

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#### **a. Goals and Objectives**

The **goals** of this project are to:

- 1) Enhance the collaborative infrastructure that will allow the participating institutions to successfully compete for major center grants (*e.g.*, NSF MRSEC, NSEC, ERC; DOD MURI; DOE; NIH; *etc.*);
- 2) Build opportunities to translate research success into economic development through patents, licensing, and start-up companies; and
- 3) Strengthen the secondary educational infrastructure to increase the number of undergraduate and graduate students pursuing science and technology careers.

The **objectives** of the project are to:

- 1) Develop nanomaterials for application as biosensors and for clinical imaging;
- 2) Design and fabricate nanoscale mechanical devices for use in fluidics, medicine, communications, data storage, and sensors;
- 3) Create highly efficient materials for energy conversion (thermoelectric and ferroic composites), advanced batteries, and hydrogen storage;
- 4) Provide summer research opportunities in nanoscale science for high school students;
- 5) Develop academic-year programs to expose secondary students and teachers to nanoscale science and technology;
- 6) Provide undergraduate and graduate training in materials science and nanoscale science;
- 7) Create opportunities for international recognition in advanced materials;
- 8) Increase translational research in advanced materials; and
- 9) Create opportunities for patents, licensing, and potential start-up companies.

#### **b. Deliverables**

Deliverables will include annual reports and a final end of project report. Dissemination of results through publications in top scientific journals, and presentations at professional conferences including American Chemical Society, Materials Research Society, and American Physics Society. Grant applications for center grants to Federal agencies (*e.g.* NSF, DOE, *etc.*).

### c. Performance Measures

The fundamental goal of this P-KSFI proposal is to establish a federally-funded center for advanced materials and nanoscience in Louisiana. To reach that goal, the team must build a significant body of collaborative successes in the fields of materials research for bio-sensing and imaging, nanoscale mechanical devices, energy conversion and storage, and outreach. Project milestones for this project are listed below. Accomplishment of these milestones can be evaluated through documentation in annual reports as well as publications resulting from and acknowledging this project. Specific performance indicators will include: number of federal research proposals submitted and awarded, number of publications, number of presentations at professional conferences, number of patent applications and disclosures, number of high school interns participating in summer research, and number of high school students served during academic year outreach programs.

- Assemble and pattern bio-nanosensor prototypes
- Fabricate biosensors for ricin toxin and sPLA<sub>2</sub> detection
- Attach the magnetic nanoparticles and photoluminous nanoparticles on biomolecules and mice for signaling processes and bioimaging in vivo.
- Develop schemes based on specific binding pairs of host-guest molecules to direct the assembly of nanocomponents
- Use gel-nanocomponent systems to create new actuators
- Create devices where the mechanical properties are used to control a switch or a valve can be used in switch and valve to control
- Create nanocomposite demonstrating enhanced thermal and electrical transport properties.
- Create nanocomposite material which allows electrical control of magnetization.
- Develop prototype, microscale energy conversion devices using novel nanocomposites.
- Secondary teachers in this project (funded by this and other programs) will impact at least 600 secondary students per year; grow to at least 3000 per year by project end.
- Obtain NSF funding through the GK-12 mechanism.
- Finalize the business plan for NanoPrism Technologies, Inc. and establish it as a viable company in the UNO Research and Technology Park small business incubator.
- Find customers and secure licensing agreements for patents that arise from this project.

### d. Monitoring Plan

The services to be undertaken by the Contractor (University of New Orleans) under this contract shall commence promptly after the execution of the contract. The Board of Regents (Board) and its representatives shall have the right to inspect the progress of the work, as well as financial records pertaining to the work. Upon expiration of the contract term, the Board reserves the right of future inspection.

These reports will be reviewed, at a minimum, by the Commissioner of Higher Education, acting for the Board. As deemed appropriate, the Board will engage the services of out-of-state consultants to evaluate these reports and other pertinent documentation and to conduct on-site visits. The consultants' assessment will guide the Board in determining the effectiveness of the Contractor in fulfilling objectives of the project.

In addition to written reports, a comprehensive mid-course evaluation will be conducted by external consultants, selected by and acting under the auspices of the Board, during the third project year. Continued funding beyond the third project year will depend upon the external review's evaluation of the quality and success of project activities and the project team's ability to meet benchmarks identified in Appendix B of this contract and/or adapt project activities to unforeseen circumstances.

d. Utility of the Final Product

This project will build a significant body of collaborative successes in the fields of materials research for bio-sensing and imaging, nanoscale mechanical devices, energy conversion and storage, and educational and commercial outreach. The resulting successes will lead to development of a nationally competitive center in materials science. Such a center will increase Louisiana's stature in materials science and nanotechnology and will eventually lead to increased commercialization and increased economic prosperity within the state. The project will build intellectual property, scientific expertise, human resources, and new small businesses.

## **Time Line**

<u>Time Frame</u>	<u>Activity or Milestone</u>
June 2007	Project start; subcontracts initiated
June – July 2007	Design and planning of academic year high school outreach program
June '07 – May '08	The 3 FRG's will initiate research activities.
Aug '07 – May '08	Implement academic year high school outreach program
June '08 – July '08	Summer research internships for high school students
June '08 – May '09	Initial dissemination of research results from FRG's; pursuit of patents when appropriate
Aug '08 – May '09	Academic year high school outreach program
June '09 – July '09	Summer research internships for high school students
June '09 – May '10	Further dissemination of research results from FRG's and pursuit of patents
Aug '09 – May '10	Academic year high school outreach program
June '10 – July '10	Summer research internships for high school students
June '10 – May '11	Develop and execute strategy, including determining focus (foci) and teaming, for federal center grant
Aug '10 – May '11	Academic year high school outreach program
June '11 – July '11	Summer research internships for high school students
June '11 – May '12	Pursue Federal research center grant(s)
Aug '11 – May '12	Academic year high school outreach program
June '12 – July '12	Summer research internships for high school students