A., B., C. The Research Foundation - Center of Excellence in Nanoelectronics and Nanotechnology Working Capital (W875, W877 and W883)

October 21, 2010

Grantee: The Research Foundation of State University of New York (the "Research Foundation")

Beneficiary Organization: University at Albany - Center of Excellence in Nanoelectronics and Nanotechnology ("CENN")

ESD Investments: Three grants totaling up to $3,150,498 ($1,179,166 – W875, $1,155,666 – W877, and $815,666 – W883) to be used for operating costs including faculty salaries, facility user fees, consumable supplies/chemicals, travel/sponsorship at technical conferences, and marketing/business development media.

Project Location: University at Albany - College of Nanoscale Science and Engineering ("CNSE"), Albany, Albany County

NYS Empire Zone (or equivalent): N/A

Project Completion: March 31, 2011

Grantee/Beneficiary Contact:
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Project Team:

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Project Description:

Grantee Background

The Research Foundation of the State University of New York is a private, 501(c)(3) not-for-profit educational corporation that administers externally funded contracts and grants for and on behalf of the State University of New York. The Research Foundation is a separate, not-for-profit corporation, and as such is not supported by state appropriated tax dollars, nor does it receive support services provided to New York State agencies. The Research

Foundation provides the administrative flexibility to respond quickly to the special demands of externally funded contracts and grants in a manner that facilitates their scientific or technical execution.

Beneficiary Background

Situated within the University at Albany's College of Nanoscale Science and Engineering, the New York State Center of Excellence in Nanoelectronics and Nanotechnology, is a fully integrated technology deployment, product prototyping, manufacturing support, and workforce training resource for emerging generations of integrated circuitry, and the only university-based 300-millimeter semiconductor wafer pilot prototyping facility in the world. It provides critical laboratory, clean room and incubation space for nanotechnology and related technology companies. The CENN complex features nearly 750,000 square feet, with over 80,000 square feet of Class 1 clean room space.

The mission of the CENN is to assemble and deploy the critical mass of vertically and horizontally integrated industry-university consortia and public-private partnerships to convert CNSE's prospective nanotechnology innovations into real business opportunities and revenue-generating ventures within a technically aggressive and economically competitive technology development and deployment environment. In addition, the CENN mission includes serving as a platform for CNSE in its implementation of innovative real-time educational programs to train a critical pool of highly qualified scientists, engineers and technicians to support the needs of the nanoelectronics industry in the 21st century.

During its first phase of growth, the focus has been on establishing a leadership role in the next generation computer chip development. To date, CENN has reported partnerships with over 1,500 companies and multiple university partners, including ASML, AMD, IBM, Tokyo Electron Limited, and the International SEMATECH North program. CENN has created over 1,300 jobs at on-site consortia and spin off companies, and 1,700 jobs at off-site partners.

ESD has committed over $800 million of funding in support of CNSE's nanotechnology initiative. All funds are legislative- or executive-sponsored, except for $10 million for the current International SEMATECH Manufacturing Initiative ("ISMI")project. These funds include:

• In 2005, a $20 million grant was approved to NanoTech Resources, Inc. d/b/a Albany NanoTech for the establishment of the $338 million Center for Semiconductor Research ("CSR") with IBM. ESD funds were used for the acquisition and installation of semiconductor processing equipment to be used in nanoelectronics research. The project is complete and the funds have been fully disbursed;

• In December 2006, grants totaling $76 million to Fuller Road Management Corporation ("FRMC") were approved for the expansion of the state-of-the-art 300mm wafer Class 1 capable clean room at CNSE and the purchase of new clean room processing and support equipment. The grants also include the implementation of research and development programs for the Institute of Nanoelectronics Discovery and Exploration ("INDEX"), according to a five-year operational plan, at a minimum of $1 million per year. Over $64 million has been disbursed to date;

• In 2007, $62 million was disbursed for the design and construction of the Albany Center of Excellence in Nanoelectronics;

• In 2007, a total of $160 million was disbursed for the SEMATECH project for machinery, equipment, development, and support;

• In 2008, an additional $300 million was approved for the SEMATECH project for machinery, equipment, development, and support. A total of $150 million has been disbursed for this project;

• In 2009, a total of $100 million was disbursed for the Tokyo Electron Limited ("TEL") project for the development and acquisition of machinery and equipment;

• In July 2009, a $25 million grant was approved to The Research Foundation to be used for a portion of the cost of facility upgrades and fit-out, and the purchase of machinery and equipment, for the CSR. Approximately $8 million has been disbursed to date;

• Also in July 2009, a $50 million grant was approved to FRMC to be used for a portion of the cost of clean room and infrastructure upgrades, fit-out, tool and equipment acquisition, and installation for the CNSE-IBM Computer Chip R&D Packaging Center. Approximately $3.9 million has been disbursed to date; and

• In 2010, $10 million was approved for the ISMI project for machinery, equipment, development, and support. An additional $10 million is dedicated to this project by the Assembly for a total of $20 million of funding. No funds have been disbursed.

<u>The Project</u>

As the CENN embarks on Phase II of its strategic roadmap, it will continue to pursue its proven economic model of establishing state-of-the-art intellectual and physical, university-based, infrastructure and capabilities in nanoelectronics to serve as the engine that fuels the attraction and retention of cutting edge industry clusters targeting the areas of clean energy technologies and nanomedicine. These areas share similar technology drivers as the nanoelectronics industry, represent large market opportunities and allow significant

leveraging of existing infrastructure. Key to unlocking the tremendous innovative discoveries and associated market opportunities in such diverse sectors is the development of common integration platforms and coherent roadmaps for achieving interoperability.

The development of nanofabrication technologies by the nanoelectronics industry such as 300mm silicon wafer nanofabrication infrastructure and 3-Dimensional ("3-D") wafer scale packaging is now enabling the convergence of nanotechnology with electronics, photonics, bioelectronics, microsystems, and wireless technologies in new and exciting formats. Integration of multi-functional (heterogeneous) devices including sensors, power, positioning, logic, and memory represents the largest economic opportunity to emerge in the 21st century.

The CENN seeks to support both public and private technology customers in targeted arenas in defense as well as energy, infrastructure and healthcare industries.

Expansion of Nanofabrication Resources and Capabilities

CENN has focused on establishing state-of-the-art intellectual and physical, university-based, infrastructure and capabilities in nanoelectronics that are emerging as leading drivers toward shared convergence platforms for integrated system-in-package ("SIP") and system-on-a-chip ("SOC") solutions. Expansion has been targeted in technology areas that broaden the nano-processing of heterogeneous materials (e.g. organic, biomaterials), novel architectures (e.g. 3-D wafer packaging) and metrology (e.g. in-line process control) capabilities capable of enabling Quick-Turn-Around-Time ("QTAT") pilot prototyping of emerging solutions in clean energy technologies and nano-medicine applications.

Advanced Packaging

A prime example has been CENN's support for the formation of industry consortia targeting advanced device packaging solutions using 3-D wafer-to-wafer and die-to-wafer packaging technology. 3-D packaging is rapidly approaching broad-based adoption in the nanoelectronics industry driven by market demand for improved: 1) performance of integrated devices, by decreasing power consumption, heat and increasing speed for high performance IT servers; 2) cost, by reducing the expensive and yield-reducing flip-chip or bump bonding of multiple chips together for system-on-package for consumer electronics such as video games; and 3) form factor, allowing for a smaller more compact device with increased functionality for wireless phones and personal computing.

CENN is enabling, integrating, coordinating, and managing an array of public-private pre-competitive research programs (e.g. CNSE Focus Center-New York), industry consortia (e.g. SEMATECH), integrated device manufacturer partnerships (IBM and the alliance partners), centers (e.g. Advanced Packaging Center, OEMs (e.g. EVG Systems, TEL, AMAT, Suss, etc.), material suppliers (e.g. Total, Dupont, 3M, etc.), and computer

modeling companies (e.g. Cadence, etc.) to establish on-site investment in facilities, personnel and capabilities. Over the next several years, CENN seeks to establish programs with these partners to undertake partnership opportunities targeting clean energy and nanomedicine.

Metrology

A second example has been CENN's support for collaborative development of innovative nanoscale metrology and imaging solutions in partnership with industry and government to develop nanoscale characterization and metrology in the area of clean energy related materials and devices and bioelectronics. Examples of energy related materials and devices rapidly approaching scale-up manufacturing include solar cells (photovoltaics), solid state lighting, fuel cells, and energy storage devices where in-line process control provided by nanoscale characterization and metrology play a critical role in establishing a reliable and repeatable manufacturing process.

Expansion of Clean Energy Technologies Resources and Capabilities

CENN's clean energy technologies mission is to support "open innovation" in clean energy-directed research, development and technology deployment through focused research, development, test and measurement laboratories; pilot-prototype and test-bed integration facilities; and, business incubation and commercialization capabilities. In partnership with leading nanoelectronics companies, government research agencies and academic partners, CENN's objective is to create a unique clean energy technology and commercialization resource unmatched in the academic world that is visionary and of national importance.

The development of open innovation in the clean energy industry through shared development of cross-sector, university-based nanofabrication technology platforms represents an enormous opportunity to establish related technology development teams around industry-compliant manufacturing solutions. Integration of "enabling" nanoelectronics fabrication technologies (e.g. patterning, deposition, etch, characterization, etc.) for field-deployable platforms (e.g. nanomaterials, power electronics, sensors, wireless, etc.) is the key to success in open innovation in the adjacent markets of clean energy as well as transportation and security.

Expansion of Nanomedicine Resources and Capabilities

One of the major challenges and biggest opportunities for nanobioscience is to meet the demands of nanomedicine, including early disease diagnostics and effective delivery of therapeutics, offering the possibility of a prevention paradigm rather than to treatment of disease at an advanced stage.

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With the age of the world's population rapidly increasing and the associated chronic health conditions, the emergence of personalized healthcare enabled by expert systems represents an enormous opportunity for nanotechnology to address a vast array of public health priorities. Proactive computing with highly integrated multi-functional devices capable of sensing, communicating and locating with embedded intelligence (logic and memory) requires a model that integrates the vast capabilities and know-how of the nanoelectronics industry with the research expertise of the biohealth fields.

Upon completion of the project, and semi-annually thereafter, the Grantee will furnish a final report, consisting of project impact and performance measurements in a manner prescribed by ESD.

Financing Uses	Amount	Financing Sources	Amount	Percent
Salary and Fringe	$608,169	ESD Grant (W875)	$1,179,166	100%
Direct Costs (inc. research and development, and consumable supplies)	374,478			
Indirect Costs (inc. administrative and facilities)	196,519			
Total Project Costs	$1,179,166	Total Project Financing	$1,179,166	100%

Financing Uses	Amount	Financing Sources	Amount	Percent
Salary and Fringe	$589,527	ESD Grant (W877)	$1,155,666	100%
Direct Costs (inc. research and development, and consumable supplies)	373,528			
Indirect Costs (inc. administrative and facilities)	192,611			
Total Project Costs	$1,155,666	Total Project Financing	$1,155,666	100%

Financing Uses	Amount	Financing Sources	Amount	Percent
Salary and Fringe	$427,213	ESD Grant (W883)	$815,666	100%
Direct Costs (inc. research and development, and consumable supplies)	252,509			
Indirect Costs (inc. administrative and facilities)	135,944			
Total Project Costs	$815,666	Total Project Financing	$815,666	100%

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Financial Terms and Conditions:

1. The Grantee will be obligated to advise ESD of a material adverse change in its financial condition prior to disbursement.

2. The grants will be disbursed as follows:

   W875 – Up to $1,179,166 will be disbursed to Grantee, no more frequently than monthly, upon documentation of eligible working capital costs, assuming that all project approvals have been completed and funds are available. The final 10% of the grant of the grant will be disbursed upon documentation of the full $1,179,166 in eligible working capital project costs. Payment will be made upon presentation to ESDC of an invoice and such other documentation as ESDC may reasonably require. Expenses must be incurred on or after April 1, 2007 to be considered eligible project costs.

   W877 – Up to $1,155,666 will be disbursed to Grantee, no more frequently than monthly, upon documentation of eligible working capital costs, assuming that all project approvals have been completed and funds are available. The final 10% of the grant of the grant will be disbursed upon documentation of the full $1,155,666 in eligible working capital project costs. Payment will be made upon presentation to ESDC of an invoice and such other documentation as ESDC may reasonably require. Expenses must be incurred on or after April 1, 2008 to be considered eligible project costs.

   W883 – Up to $815,666 will be disbursed to Grantee, no more frequently than monthly, upon documentation of eligible working capital costs, assuming that all project approvals have been completed and funds are available. The final 10% of the grant of the grant will be disbursed upon documentation of the full $815,666 in eligible working capital project costs. Payment will be made upon presentation to ESDC of an invoice and such other documentation as ESDC may reasonably require. Expenses must be incurred on or after April 1, 2009 to be considered eligible project costs.

3. ESD may reallocate the project funds to another form of assistance, at an amount no greater than $3,150,498, for this project if ESD determines that the reallocation of the assistance would better serve the needs of the Grantee and the State of New York. In no event shall the total amount of any assistance to be so reallocated exceed the total amount of assistance approved by the Directors.

Statutory Basis – Local Assistance – Centers of Excellence:
The projects were authorized in the 2007-2008, 2008-2009 and 2009-2010 New York State budgets and reappropriated in the 2010-2011 New York State budget. No residential relocation is required as there are no families or individuals residing on the site.

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Disclosure and Accountability Certifications:
The Grantee has provided ESD with the required Disclosure and Accountability Certifications, which disclosed the following information:

- In the summer of 2009, The Research Foundation of State University of New York received federal grand jury subpoenas for documents relating to the Research Foundation's and the New York State Department of Health's ("DOH") joint PERM/MEQC project. The investigation appears to relate to the reporting by the DOH and the Foundation of the results of the project tasks to the federal government. Upon information and belief, the grant dollars involved in this project total less than one percent of the total dollar amount of the Research Foundation's annual grant awards.

- In September 2009, the Research Foundation received a subpoena from the United States Department of Health and Human Services Office of Inspector General seeking certain documentation relating to certain federal National Institutes of Health ("NIH") grants related to the Research Institute on Additions at the University at Buffalo. During the course of this federal inquiry, the former Principal Investigator that made various allegations of fiscal mismanagement and who may have been a government whistleblower was investigated and criminally charged by the New York State Attorney General in relation to his fabrication of false testimony and presentation of false witnesses during an administrative hearing with the State University of New York in relation to his alleged misconduct in science.

- It is important to note that the federal government, including NIH, with obviously full knowledge of these investigations, continues to award grants to the Research Foundation in the millions of dollars. At no point has the Research Foundation been given reason to believe that these investigations will, in any way, have a material adverse effect on the Research Foundation's ability to administer this project.

- Also, as an employer of over 17,000 individuals per year, the Research Foundation receives and responds to several complaints to the New York State Division of Human Rights and charges to U.S Equal Employment Opportunities Commission and may, from time to time, be involved in litigation both as a plaintiff and as a defendant.

The Disclosure and Accountability Certifications, while disclosing the above, do not indicate that the Grantee has any current conflict of interest or good standing violations, and therefore, staff recommends that the Corporation authorize the grant to the Grantee as described in these materials.