

**B. The Research Foundation -
Center for Semiconductor Research Capital (W662)**

July 23, 2009

General Project Plan

- Grantee:** The Research Foundation of State University of New York
(the “Research Foundation”)
- Beneficiary Entity:** The Albany Nanotech Complex of the College of Nanoscale Science and Engineering of the University at Albany, State University of New York (“CNSE”).
- ESD Investment:** A grant of up to \$25,000,000 to be used for a portion of the cost of facility upgrades and fit-out, and the purchase of machinery and equipment, for the Center for Semiconductor Research (“CSR”).
- Project Location:** CNSE, Albany, Albany County
- NYS Empire Zone (or equivalent):** N/A
- Project Completion:** December 31, 2011
- Grantee Contact:** John Loonan, CNSE Vice President for Finance and Fiscal Management
257 Fuller Road
Albany, NY 12203
Phone: (518) 956-7359 Fax: (518) 437-8603
- Beneficiary Contact:** Same as above
- Project Team:**
- | | |
|-----------------------|----------------|
| Project Management | Edwin Lee |
| Legal | Jonathan Beyer |
| Affirmative Action | Laverne Poole |
| Design & Construction | Joseph Burkard |
| Environmental | Soo Kang |

Project Description:

Background

Grantee

The Research Foundation of 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 (“SUNY”). The Research Foundation is a separate, not-for-

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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.

The Research Foundation has established and oversees the operation of sixteen affiliate corporations to facilitate university-industry-government partnerships and accelerate the growth of sponsored programs and applied research opportunities at SUNY. One of these affiliates is the Fuller Road Management Corporation (“FRMC”), a partnership between the Research Foundation and the University at Albany Foundation, Inc. FRMC holds a lease from the state of New York for the land upon which the Center for Environmental Science and Technology Management (“CESTM”) is located.

Beneficiary

Established in May 2005, CNSE is a global resource for research, development, education, and economic outreach in the nanotechnology and nanotechnology-enabled disciplines and applications of the 21st century, including nanoelectronics, bioinformatics, renewable energy, infotonics, environmental technologies, telecommunications, and biotechnology. CNSE serves as a critical enabler in establishing New York as a competitive and attractive location for the high-tech industries of the 21st century, leading to the creation of high- paying jobs for New Yorkers.

CNSE has developed a multi-phase, long-term strategic plan that reshapes the traditional departmental structure into four divisions of scholarly excellence in research and development, education, technology deployment, and economic outreach. Conceived as catalysts that encourage and stimulate cross-disciplinary educational and research initiatives, these divisions represent the fundamental intellectual underpinnings of nanotechnology and can be summarized as follows:

Nanoscience: The observation, identification, description, discovery, experimental investigation, and theoretical interpretation of nanoscale phenomenon;

Nanoengineering: The application of nanoscience principles to practical applications, such as the atomic scale design, manufacture and operation of efficient and functional structures, machines, processes, and systems;

Nanoeconomics: The formulation, study and analysis of the economic and business principles underlying the development and deployment of nanoscale know-how, products and systems; and

Nanobioscience: The application of nanoscale scientific concepts and principles to the study of biological, biomedical and medical procedures, practices, structures, systems, and organisms.

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CNSE has created partnerships and provides the management and coordination of a comprehensive portfolio of vertically integrated R&D centers that provide a smooth and inclusive transition of scientific concepts from theoretical conception into actual product demonstration and introduction to market.

CNSE core partnerships include:

- **IBM’s Center for Semiconductor Research**, established in 2005, is a long-term, multi-phase, joint R&D cooperative program on future computer chip technology nodes beginning with the 32nm computer chip device node. Industry partners within the CSR include IBM, Advanced Microdevices, SONY, Toshiba, Tokyo Electron (“TEL”), and Applied Materials. The CSR provides full vertical integration of the design, modeling, fabrication, testing, and pilot-prototyping capabilities required to produce the nanochips of the future, beginning with a blanket silicon wafer and ending with workable nanochip demonstration vehicles;
- **TEL’s Technology Center America (“TTCA”)** in Albany provides expertise in computer chip equipment manufacturing and wiring technologies. TTCA represents TEL’s only R&D facility located outside of Japan, and involves the installation of a spectrum of alpha- and beta-type TEL tools, placement of TEL researchers and engineers from Japan, Europe and the U.S., and joint R&D activities on a variety of advanced computer chip programs with emphasis on future generations of computer chip wiring technologies;
- **International SEMATECH** is a semiconductor technology development consortium. It conducts and sponsors high-tech research, collaborating with equipment and materials suppliers, as well as government and academic research centers, to refine the manufacturing tools and technology necessary to produce future generations of computer chips. International SEMATECH’s member companies include IBM, Intel, Freescale, Hewlett-Packard, Texas Instruments, GlobalFoundries, Micron, National Semiconductor, Infineon Technologies (Germany), Panasonic (Japan), Renesas (Japan), Samsung (Korea), TSMC (Taiwan), UMC (Taiwan), Toshiba (Japan), and NEC (Japan);
- **The Applied Materials (“AMAT”) R&D Center** in Albany also provides expertise in computer chip device technologies. The AMAT R&D Center is the only applied materials facility outside of its headquarters in San Jose. The AMAT R&D Center is pursuing four principal tasks that are similar in scope and complementary in technology applications with those of the TEL TTCA;
- **The ASML R&D Center** in Albany supplies the overall Center with lithography technologies. Like TEL and Applied Materials, the Albany location is ASML’s only facility located outside its main headquarters. The ASML R&D Center is pursuing tasks similar in scope and complementary in technology applications with those of the TEL TTCA and AMAT R&D Center; and

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- **Vistec Semiconductor Systems**, maker of electronic beam lithography systems, wafer process control and mask metrology systems, moved its headquarters from Cambridge, England to the Watervliet Arsenal and the CNSE complex. At CNSE, Vistec conducts E-Beam research and development, as well as wafer process control and mask metrology.

In July 2008, Governor Paterson, Assembly Speaker Silver and Senate Majority Leader Skelos announced significant new investments by IBM and New York State, accelerating New York's international leadership in nanotechnology research and development, and creating up to 1,000 new high-tech jobs upstate. The state will provide a total of \$140 million in economic development grants, leveraging more than \$1.5 billion from IBM. The investment will go toward three separate and complementary components of a comprehensive project, supporting the nanotechnology computer chip activities of IBM, including: (1) the expansion of the IBM-CNSE partnership under the CSR at the CNSE Albany NanoTech Complex, which is expected to result in the creation of 325 new R&D jobs; (2) the creation of a new, advanced 120,000-square-foot semiconductor packaging research and development center to be established, managed and owned by CNSE, with IBM serving as a key partner; and (3) the upgrade of IBM's East Fishkill facility in Dutchess County.

ESD has awarded the following grants in support of CNSE's nanotechnology initiative:

- **October 2002:** A \$50 million grant (Q314) to FRMC for the design and construction of the Albany Center of Excellence in Nanoelectronics ("NanoFab II"). ESD awarded an additional \$10 million grant to introduce semiconductor industry lithography leader ASML as a new industry funding and development partner to the New York State Center of Excellence in Nanoelectronics and Nanotechnology ("CENN"), which is situated within the CNSE. The project is complete and the funds have been fully disbursed;
- **February 2003:** A \$60 million grant (R084) to the Research Foundation of SUNY for the consortium International SEMATECH North to establish a R&D program at the CENN. With subsequent amendments, the state has granted \$160 million toward a total \$471.5 million SEMATECH program. The project is complete and the funds have been fully disbursed;
- **February 2004:** An initial \$33.88 million grant (R852) to the Research Foundation to establish TEL's \$300 million R&D program at the CENN. Subsequent grants were made to bring ESD's total investment to \$91 million;
- **May 2005:** A \$20 million grant (T408) to NanoTech Resources, Inc. d/b/a Albany NanoTech for the establishment of the \$338 million 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;

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- **December 2006:** Grants totaling \$76 million (U447-\$75 million; V042-\$1 million) to FRMC for the expansion of the state-of-the-art 300mm wafer Class 1 capable clean room at the 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. For U447, \$64,465,179 has been disbursed;
- **February 2007:** A \$1.415 million working capital grant (V174) to the Research Foundation for fostering collaboration between the academic research community and the business sector to develop and commercialize new products and technologies; promote critical private sector investment in emerging high technology fields in New York State; and create and expand technology related businesses and employment. No funds have been disbursed to date; and
- **January 2008:** A \$300 million grant (V895) to the Research Foundation for the relocation and establishment of the International SEMATECH headquarters and its advanced research and development operations at the CNSE. To date, \$120M of the grant has been disbursed.

The Project

The CSR is currently focused on the 28nm computer chip transistor node. It is the only facility within a university setting that provides full vertical integration of the design, modeling, fabrication, testing, and pilot-prototyping capabilities required to produce the nanochips of the future, beginning with a blanket silicon wafer and ending with workable nanochip demonstration vehicles. The CSR’s work is expected to create significant technological advancements in a number of fields. Some of the applications include:

- state-of-the-art “hyper-fast” computers, such as laptops, desktops and high-end performance servers for advanced processing and computing;
- ultra-fast and highly secure telecommunications;
- biological and chemical “laboratory-on-a-chip” systems for very early disease identification, therapy design and evaluation, clinical implementation, drug discovery and delivery, toxicology detection and cure, and medical devices and components;
- portable, tether-free, “sensor-on-a-chip” devices for close-loop, real-time, monitoring and control in automotive, homeland defense, and “haz-mat” and firefighting; and
- reproducible, reliable and manufacturable green energy technologies, including miniaturized and efficient solar cell and fuel cell systems.

The \$25M grant administered by ESD will support the expansion of the IBM-CNSE partnership under the CSR at the CNSE Albany NanoTech Complex. Project activities include: fitting out 5,000 square feet of new clean room space in the already constructed NanoFab Central building; acquisition and installation of advanced processing equipment, tooling infrastructure, advanced

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300mm wafer semiconductor processing tool systems, testing and measurement systems, wafer handling and monitoring equipment; radio frequency identification system; and expansion of existing systems and server room. IBM will work with CNSE as equal partners to develop and deploy the 28nm transistor computer chip and assist CNSE in the recruitment of new high-tech jobs to support the CSR. Design and planning of the clean room has commenced and CNSE expects to complete the fit-out of the clean room in the 4th quarter of 2009.

The expansion of the CSR will create the innovative environment for leading-edge on-chip (semiconductor) technologies to reach the 28 nm node and smaller. This initiative is also expected to create new manufacturing standards for the industry and opportunities for the attraction and retention of global nanoelectronics manufacturers, suppliers and contractors across the state of New York by assembling new industry-university-government consortia and public-private partnerships to convert breakthroughs in computer chip technology into real business opportunities and revenue-generating ventures. Furthermore, expansion of the CSR is anticipated to spur other support industries such as chemical and gas supplies, tool and facility systems, service and support, plumbing and HVAC, and other service trades. Additionally, the expansion of the CSR is expected to create 325 high-tech jobs in Upstate New York.

Financing Uses	Amount	Financing Sources	Amount	Percent
Capital acquisition & installation	\$66,400,000	ESD Grant	\$25,000,000	7%
Facility upgrade & fit-out	8,600,000	IBM	350,000,000	93%
Personnel, process equipment, leased equipment, consumables, contracted services, electric, gas, and water	300,000,000			
Total Project Costs	\$375,000,000	Total Project Financing	\$375,000,000	100%

Financial Terms and Conditions:

1. The Grantee will reimburse ESD for all out-of-pocket expenses incurred in connection with the project.
2. The Grantee will be obligated to advise ESD of a material adverse change in its financial condition prior to disbursement.
3. Up to \$25,000,000 will be disbursed to the Grantee during the course of the project, no more frequently than monthly, in compliance with the Design & Construction Requirements, assuming that all project approvals have been completed and funds are available. 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.

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4. The Grantee shall provide an annual report, including financial reports and project impact and performance measurements, in a manner prescribed by Empire State Development.
5. ESD may reallocate the project funds to another form of assistance, at an amount no greater than \$25,000,000, 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.

Design & Construction:

The work scope for this project calls for the interior fit-out plus upgrades to the recently built clean room located in the Nanofab Central building on the SUNY Albany campus.

D&C will, at its option, attend construction meetings and monitor construction fit-out progress. D&C will review and approve all change orders and contractor requisitions, and verify that all requirements have been satisfied prior to the approval and release of ESD funds.

The aforementioned project will be reviewed in conjunction with D&C requirements and forms.

D&C will review the completion of construction documents, project bidding and, at its discretion, visit the site before funds are distributed.

Environmental Review:

Pursuant to the requirements of the State Environmental Quality Review Act (“SEQRA”) and the implementing regulations of the New York State Department of Environmental Conservation, ESDC staff performed an uncoordinated review. This review determined the project to be an Unlisted Action, which would not have a significant effect on the environment. It is recommended that the Directors make a Determination of No Significant Effect on the Environment.

Affirmative Action:

ESDC’s Non-Discrimination and Affirmative Action policies will apply. The Research Foundation, its affiliates and/or beneficiary entities, as applicable, and its contractors and suppliers shall use good faith efforts to achieve not less than 10% Minority/ Women-owned Business Enterprise contractor and/or subcontractor participation in the design, programming and pre-construction and construction activities, and provide for meaningful Minority and Female workforce participation during construction.

Statutory Basis – Capital Projects Fund - Nanotechnology:

The project is authorized in the 2009 – 2010 New York State budget. No residential relocation is required as there are no families or individuals residing on the site.

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Albany (Albany County) – The Research Foundation – Center for Semiconductor Research Capital – Capital Projects Fund – Nanotechnology Capital Grant – Determination of No Significant Effect on the Environment

RESOLVED, that based on the material submitted to the Directors with respect to The Research Foundation – Center for Semiconductor Research Capital Project, the Corporation hereby determines that the proposed action will not have a significant effect on the environment.

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