

# Memo



**To:** John Doussard, Business Oregon  
**From:** Cindy Dahl, ONAMI  
**CC:** Robert (Skip) Rung, ONAMI  
**Date:** 4/28/2011  
**Re:** ONAMI Grant Reporting – Investment and Outcomes

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ONAMI has distributed grant funds to the Oregon Research Universities for the purpose of growing capabilities in nanoscience and microtechnologies and accelerating commercialization of new technologies since 2006. The grants have been made under four distinct programs; Gap Grants, Facilities Support, Research Matching Grants, and Signature Researcher Grants. Just over \$14.75 M has been disbursed, yielding a high return to the State of Oregon, as discussed below.

The purpose of this memo is to provide a brief summary of the types of grants made and the return on the State's investment. Attached are tables listing each of the grants made, the recipient, the amount, the date, the purpose, and outcome. The tables are arranged by grant program.

**Gap Grant Program.** The ONAMI Gap Grants program matches technology from the Universities with entrepreneurial expertise from the business community. To date, **21 Gap Grants** totaling \$3.6M have been made to University - Startup projects (**Table 1**). These entrepreneurial projects have garnered over **\$70M in venture and capital funding** (\$5M federal and \$65M private). Five additional Gap Grant projects will be starting before the end of the biennium.

**Shared User Facility Grants.** ONAMI has supported the Shared User Facilities at the universities with funding for equipment and operations. Specifically, the grants create incentives for the Facilities to attract external users, increase external revenue, and partner with Oregon industry to accelerate commercialization. To-date **23 Facilities grants totaling \$2.4M** have been made (**Table 2**). Over **150 external users** are currently listed as clients of the Facilities, resulting in increased revenue to support instrumentation and operations.

**Matching Grants for Research and Graduate Education.** Nanoscience and microtechnology research awards to ONAMI members from Federal and private sources have risen from \$9M in FY2004 before ONAMI was incorporated, to \$43M in FY2010. The total net research awards to ONAMI member researchers from FY05 through the first half of FY2011 exceed \$185M. ONAMI Matching Grants (**Table 3**) allow researchers to add instrumentation and employ graduate students on select projects funded by Federal or private sources. ONAMI has made **57 matching grants totaling \$4.4M** since 2006, leveraging **research awards of \$32.8M**.

**ONAMI Signature Researchers.** Working closely with the Universities, ONAMI identified critical needs in nano- and micro-scale characterization, materials research and commercialization programs. **Twelve Signature Researcher Grants (Table 4)** were defined to assist the Universities in attracting cutting edge researchers to fill these needs. Grant funds were used to help set up laboratories, hire graduate students and post doctorate staff to support the research programs, and to support the new faculty as they established competitive research programs in Oregon. The stature of these researchers, their success in winning federal and private research funding, and the technology development and commercialization that has resulted has been truly amazing.

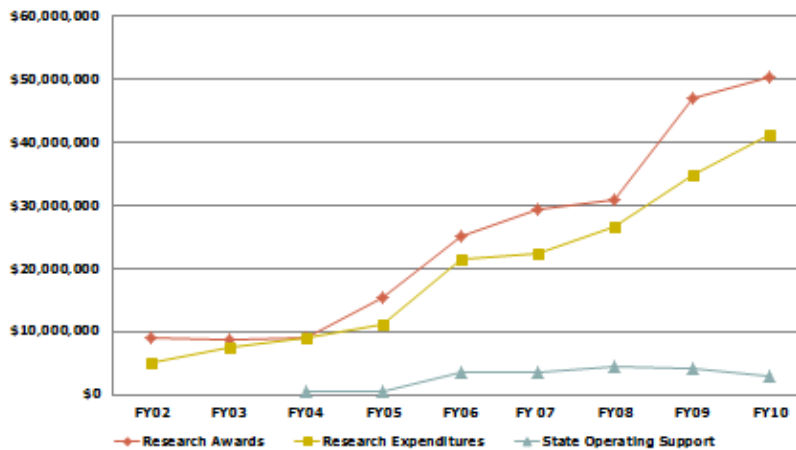
**Jobs Creation.** ONAMI Grants result directly in job creation and retention. The ONAMI Gap Grant companies currently report 86 full-time-equivalent jobs. In addition, \$43M in research grants in FY2010 supports over 1700 jobs (standard models indicate that \$1M in research supports 41 jobs). **Number of people employed = 86 + 1700**

## Summary: Gap Program Metrics

Qtr ending	Pending Funding	Active Gap Projs	Compl. Gap Projs	Projects to date	ONAMI Funds Committed	External Funding
Nov-09	2	11	5	16	\$2.5M	\$15.8M
Feb-10	0	12	5	17	\$2.7M	\$16.8M
May-10	1	11	6	17	\$2.8M	\$67.6M
Aug-10	2	8	8	18	\$3.2M	\$68.2M
Nov-10	3	9	8	20	\$3.8M	\$70.3M
Feb-11	4	9	8	21	\$4.3M	\$70.5M



## ONAMI Research Award History FY02-FY10



**Table 1 - ONAMI Gap Grant Summary**

Date First Awarded	Amount Awarded to Date	Lead Institution	Gap Company, Project Description	Outcome	ONAMI Project Status and End Date
<i>pending</i>	0	OHSU	PDX Pharma	OHSU, PNNL, Battelle Ventures, and PDX Pharma are teaming to develop functionalized nanomaterial for treatment of hyperphosphatemia, a nearly universal and life-threatening complication experienced by chronic kidney disease patients. The iron functionalized nanomaterials already show advantages over several standard and alternative treatments.	<i>pending contracting approval. End date - 2012 (est.)</i>
<i>pending</i>	0	OSU	OnTo Technologies	OSU and OnTo Technologies is developing refurbishing and rejuvenation technologies for advanced batteries. These environmentally friendly processes can produce low cost rejuvenated material for battery manufacturing. OnTo Technologies address an ongoing pain point for the advanced battery industry: materials price. This is the first time that process capability is available to produce battery grade material from end-of-life cells. This Gap funding project will develop safety and performance of lithium-ion batteries manufactured with OnTo's refurbished positive electrode material. The project will produce batteries for testing/customer demonstration using material made at OnTo's facility in Bend and ONAMI facilities in Corvallis.	<i>pending contracting approval. End date - 2012 (est.)</i>
<i>pending</i>	0	OSU	NW Medical Isotopes	OSU, PNNL, and Samaritan Health Systems is teaming with NW Medical Isotopes to address an international shortage of molybdenum-99, used in the detection and treatment of cancer, cardiovascular disease, HIV/AIDS, among others. Rather than rely on the use of high-enriched uranium, which poses a national security issue, the team is developing a procedure to use low enriched uranium as a source material for MO-99.	<i>pending contracting approval. End date - 2012 (est.)</i>
<i>pending</i>	0	OSU	CSD Nano	OSU Faculty and CSD Nano, Inc. are working to demonstrate the commercial viability of a novel anti-reflective coating for glass covers on solar modules. They received an NSF SBIR Phase 1 grant, and are positioned for a Phase 2 grant. The team demonstrated a novel micro-reactor based manufacturing process that provides a high performance coating. The project seeks to produce testing data needed to attract solar cell manufacturers as commercialization partners.	<i>pending contracting approval. End date - 2012</i>
<i>pending</i>	0	UO	Nemametrics	UO and Nemametrics are pursuing a proof of concept project for a microfluidic device designed to accelerate drug discovery using the microscopic nematode <i>C. elegans</i> as a model organism. The electrical signals emitted by the nematode pharynx can be monitored as indicator of drug toxicity. The resulting technology will be an automated, low-volume system providing in vivo assays key to drug development. Customer partnerships are being established.	<i>pending contracting approval. End date - 2013 (est.)</i>
12/1/10	\$99,937	OSU	Applied Exergy--MC-Based Energy Storage System	A remarkably simple and cost effective energy storage system can be realized by using waste heat- Thermal Approach to Grid Energy Storage - TAGES. This approach to energy storage is poised to open up new areas for waste heat utilization, energy recovery, and enhanced power plant operations. The concept uses inexpensive, bulk storage of frozen water slush and conventional technology to store energy from the grid. This thermal approach reconstitutes the electrical energy and places it back onto the grid. Because of the versatility afforded by thermal storage, the concept presented here should be considered scalable platform technology useful across many areas of application. Opportunities being explored include storage of renewable energy (wind, solar) for off-peak use, integration with carbon capture systems, storage of base load energy to meet peak demands, etc.	On-going 9/30/2011

**Table 1 - ONAMI Gap Grant Summary**

Date First Awarded	Amount Awarded to Date	Lead Institution	Gap Company, Project Description	Outcome	ONAMI Project Status and End Date
10/22/10	\$101,856	OSU	MTEK/CH2MH-- Microchannel Electrophoretic Desalination System	MTek, CH2M HILL and Oregon State University are working to develop an innovative, scalable, cost-effective and energy efficient method for removing salt from sea water. The team targets a field replacement for reverse osmosis stage modules in existing facilities, or for use as an alternative desalination module in new facilities. This novel technical approach should develop a membrane-free desalination system using fundamental principles of Electrophoretic Deionization. The team has completed modeling studies which indicate a successful design is feasible, extending recent work at Oregon State University showing proof-of-concept on a laboratory device.	On-going 10/1/2011
6/8/10	\$83,000	OSU	ZAPS Tech--Keck Collaboratory	ZAPS Technologies, working with the Keck Collaboratory at Oregon State University, is working to develop a means to quickly, reliably and automatically measure water quality. The ZAPS / OSU team have been granted funds under ONAMI's Gap program to expand the ZAPS compound library which is expected to enable expansion into new markets. Funds from this collaboration will be used to apply the LiquiID(tm), the first solid-state optical water quality monitoring instrument developed by ZAPS, for rapid detection of TOC, BOD and multiple compounds in large amounts for flowing water.	On-going 10/15/2011
2/1/10	\$238,443	OSU	NWUAV--Fuel Injection Project	NWUAV and the Microproducts Breakthrough Institute (MBI) of Oregon State University are working to develop a novel fuel injector capable of atomizing heavy fuels (JP-5) for use in spark ignition engines. Using microchannel structures designed and developed at the MBI, the team is working to enable use of these fuels for unmanned aircraft engines (produced by NWUAV) and with the engines designed and manufactured by NWUAV. The NWUAV/OSU team has developed critical operating specifications for their fuel injection device, allowing it to function at temperatures and altitudes consistent with typical use cases in the field. The team believes the fuel injection device to be developed will also function well for use of heavy fuels for other applications including motor vehicles and tools, a true breakthrough in the use of heavy fuels in spark ignition engines.	On-going 7/31/2011
1/1/10	\$197,743	OHSU	Puralytics--Optimization of Photocatalytic H2O Purification System	Puralytics and Oregon Health Sciences University are working to advance a unique water treatment capability which uses ultra-violet light and fibers coated with nanomaterials to remove contaminants from water. Puralytics' unique approach to water purification has the potential for removal of pathogens and organic chemicals with energy efficiency much improved in comparison with other methods. Working with Oregon Health Sciences University, the team is working to effectively double the contaminant removal capability of their technology through optimized flow parameters of their photoreactor and development of nanoparticle catalyst materials. Puralytics has also been awarded an NSF SBIR Phase I grant to remove MTBE from drinking water.	On-going 7/31/2011
4/10/09	\$249,991	PSU	Virogenomics/Flash Sensor--Use of Nanoparticles in Electronic Biosensors	Flash Sensor Inc., a subsidiary of Virogenomics, is working with Portland State University to develop a novel device for monitoring the interaction of biological molecules based on microelectronic sensor array technology. Their "Sensor System on Panel" seeks to revolutionize health care with a simple, low cost, point of care tool set for disease detection. The project team was awarded a multi-million dollar grant from the National Institute of Standards and Technology (NIST) for initial development of the biosensor capability, while support from ONAMI seeks to extend the sensitivity and specificity of their device using nanoparticle labels, ultimately leading to performance which meets or exceeds standard assay tests.	On-going 4/30/2011

**Table 1 - ONAMI Gap Grant Summary**

Date First Awarded	Amount Awarded to Date	Lead Institution	Gap Company, Project Description	Outcome	ONAMI Project Status and End Date
2/10/09	\$46,692	OSU	Apex--Microchannel Cooling Tech	Apex Drive Laboratories, Inc. (Apex) is a market-driven company that offers patented electric motor and generator technology suitable for transportation and renewable energy applications. The company designs, builds and markets this new generation of brushless axial flux permanent magnet (AFPM) motors and generators, along with a proprietary controller, for a complete electric drive system. Notable advantages of the system include advanced performance, improved efficiency and reduced cost. Apex is working with Dr. Richard Peterson of Oregon State University (OSU) to develop advanced cooling methods using microchannel technology from the Microproducts Breakthrough Institute, a joint venture of Pacific Northwest National Labs and OSU. The project team aims to dramatically advance temperature control of the Apex electric motor and controller to both improve motor efficiency and increase drive capabilities in a reliable and cost-effective manner.	On-going 6/30/2011
1/1/09	\$185,900	PSU	DesignMedix-Preventive Malaria Drugs	DesignMedix, Inc. is a drug development company focused on overcoming drug resistance, one of the major challenges impacting human health and drug development today. DesignMedix has designed and synthesized a library of novel candidate drugs called reverse chloroquinines (or RCQ's) to combat several important infectious diseases. In the company's most advanced drug development program, lead compounds have been shown to overcome malaria drug resistance in human red blood cells in vitro, and to provide a cure in animal models. DesignMedix has partnered with Dr. Peyton of PSU to develop nanotechnology-based drug delivery methods for malaria prevention and treatment. In this project the DesignMedix / PSU team will select the nanocarriers most appropriate for preventative delivery of malaria drugs, and develop a scale-up process for the cost-effective synthesis of drug candidates in sufficient quantities for safety and oral availability testing. DesignMedix won the 2009 Oregon Entrepreneur's Network "Angel Oregon" competition.	On-going 6/30/2011
1/1/09	\$250,000	UO	Perpetua Power--Advanced Thermoelectric Power for Wireless Sensors	A collaborative project combining world-class thermoelectric technology resources from the University of Oregon, Oregon State University, and Perpetua Power Source Technologies. The team is blending research and development efforts to produce increased thermoelectric energy properties that can improve commercial opportunities for powering remote wireless sensors in the agriculture and environmental monitoring markets using renewable energy solutions. Their product, the Perpetua Power Puck, has an international customer base and wide application.	On-going 12/31/2011
8/4/08	\$250,000	OSU	Trillium--Development of a Microfiber Reactor for Ethanol Fermentation from Xylose	Trillium FiberFuels and Oregon State University developed a microfiber isomerization reactor and system which enables xylose fermentation to ethanol. Trillium's unique approach to generating ethanol seeks to use agricultural residues, such as wheat or grass straw, as the source for this valuable fuel, avoiding use of the edible portion of these plants which have other commercial uses. The reactor and system seek to increase cellulosic ethanol yield by 30-40% over existing methods, thereby dramatically reducing cellulosic ethanol production costs. Trillium FiberFuels has been awarded a Phase I SBIR Grant from the U.S. Department of Energy for their work in this area.	Completed 7/31/2010

**Table 1 - ONAMI Gap Grant Summary**

Date First Awarded	Amount Awarded to Date	Lead Institution	Gap Company, Project Description	Outcome	ONAMI Project Status and End Date
8/1/08	\$250,000	UO	Floragenex-- Microreactor-Based Automated Library Construction System for DNA Sequencing Systems	Floragenex and the University of Oregon partnered to develop a novel gene sequencing process with an automated system for preparing DNA samples for analysis by next generation DNA sequencing systems. Utilizing microreactor technology in partnership with the Microproducts Breakthrough Institute at Oregon State University, the team worked to develop sample preparation methods which provide higher throughput, lower cost and greater repeatability than existing methods of DNA sample preparation. While the project was not completely successful, valuable technology and methodology was developed and will be deployed in future products.	Closed 6/30/2010
7/1/08	\$50,000	OSU	Peregrine Power-- Development of Power Electronics	Oregon State University and Peregrine Power worked to develop methods to fabricate advanced, high temperature packaging for power semiconductors using components made of ceramic materials, shaped by powder injection molding. This novel means for package fabrication strives to apply this cost-effective, precision manufacturing process for electronics packaging in extreme environments, such as found in aerospace, military, automotive, and nuclear power devices. The project saw partial success, but was terminated prior to completion.	Closed 6/30/2010
6/2/08	\$50,074	OSU	CXNLs--Dev. Of Microporous Nanocomposite Membranes	OSU Faculty, collaborating with Secure Materials and Entek, worked to develop a microporous nanocomposite membrane produced from cellulose nanocrystals for use in rechargeable battery separators. The project was a technical success; a commercial partner has not been identified.	Completed 9/30/2008
12/13/07	\$237,131	UO	Dune Sciences--Novel Antimicrobial Coatings Based on Silvagard Na	Dune Sciences and The University of Oregon have developed a novel means to assemble molecular scale building blocks into functional materials and coatings. Working with AcryMed, Inc., the team is working to functionalize AcryMed's Silvagard Nanoparticles and demonstrate their use as an antimicrobial coating. This technology promises to yield high performance, low cost means to modify surface properties. Dune Sciences is the recipient of a Department of Energy phase I Small Business Innovative Research award, and has received funding from the Office of Naval Research.	Completed 11/30/2008
11/1/07	\$249,725	OSU	Inpria--Inorganic Printed & Spin-on Materials	Oregon State University and Inpria are demonstrating application of a new technology that provides highly efficient deposition and patterning of functional materials for device applications at all length scales. Inpria has received a prestigious SBIR award from the National Science Foundation. The team is currently working with customers and raising venture funding.	Completed 2/15/2010

**Table 1 - ONAMI Gap Grant Summary**

<b>Date First Awarded</b>	<b>Amount Awarded to Date</b>	<b>Lead Institution</b>	<b>Gap Company, Project Description</b>	<b>Outcome</b>	<b>ONAMI Project Status and End Date</b>
9/1/07	\$191,809	OSU	Mtek - Production of Biodiesel within a Microreactor	Mtek Energy Solutions and Oregon State University designed and demonstrated a prototype biodiesel microchannel-based reactor. The three-stage, three-step prototype produces biodiesel and glycerol on a continuous basis, using virgin vegetable oil, methanol, and a liquid catalyst. Planned follow-on activities include the design and manufacture of a substantially higher throughput commercializable prototype, and additional research directed towards the development of a device employing a solid catalyst permanently deposited within the reactor. The Mtek/OSU reactor design is targeted towards distributed biodiesel producers in the U.S. and in developing country markets, as well as towards equipment manufacturers serving these markets. The system is intended to compete with traditional biofuel production systems on the basis of its lower capital costs, small physical size, scalability, and favorable operating costs.	Completed 1/25/2008
6/25/07	\$174,994	OSU	ABP- Catalytic Biodiesel Production Using Supercritical Reagents	Project completed. Technical success, but company did not go forward.	Completed 3/17/2008
6/8/07	\$162,221	OSU	Nanobits--Demo of Microreactor-Assisted Nanomaterials	Gap project completed. Successfully demonstrated microreactor-based nanomaterial production. OSU MBI and Nanobits team delivered nanomaterial to their customer for evaluation. Technical success; company did not go forward.	Completed 9/15/2008
2/26/07	\$250,000	UO	Crystal Clear Technologies-- Commercialization of Portable Water Filtration System	CCT and the University of Oregon are partnering to bring a unique and potentially powerful means to remove heavy metals from water to the worldwide market for water purification. With the potential to dramatically improve the cost and quality of water around the globe, this technology has gathered interest from government and commercial partners worldwide CT has also received a Small Business Innovative Research Grant from the National Science Foundation to support commercialization of this technology.	Completed 12/31/2010
12/1/06	\$250,000	OSU	HD+ Microchannel Kidney Dialysis Demonstration	HD+ and Oregon State University are demonstrating fabrication and performance of a microchannel dialyzer for the multi-billion dollar market for hemodialysis. The dialyzer allows for continuous flow treatment which enables a patient to undergo treatments up to 8 hour a day, a situation which more closely simulates natural kidney function and is expected to enable use of the dialyzer for home dialysis. The system design is intended to perform favorably against current solutions with lower blood damage, reduced volume of blood outside the body at a given moment, excellent dialysis functionality, and lower cost. HD+ Received \$50M+ in Venture Funding in 2010, and is positioned for additional funding in 2011.	Completed 10/1/2008
<b>Total Gap Grants to Date</b>	<b>\$3,569,516</b>				

**Table 2 - ONAMI Shared User Facility Grants**

<b>ONAMI Grant Date</b>	<b>Grant Amount</b>	<b>Lead Institution</b>	<b>Recipient Facility</b>	<b>Grant Purpose</b>
4/8/2009	\$10,800	OSU	Microproducts Breakthrough Institute	Matching Grant for External User Revenue
11/25/2008	\$800	OSU	Microproducts Breakthrough Institute	Matching Grant for External User Revenue
6/24/2008	\$11,710	OSU	Microproducts Breakthrough Institute	Matching Grant for External User Revenue
10/10/2007	\$9,370	OSU	Microproducts Breakthrough Institute	Matching Grant for Facility User Revenue
5/17/2007	\$40,590	OSU	Microproducts Breakthrough Institute	Matching Grant for Facility User Revenue
3/23/2007	\$37,555	OSU	Microproducts Breakthrough Institute	Matching Grant for Facility User Revenue
12/18/2006	\$42,485	OSU	Microproducts Breakthrough Institute	Matching Grant for Facility User Revenue
11/9/2006	\$25,000	OSU	Microproducts Breakthrough Institute	Start-up Funding for MBI Facility in Building 11, HP campus
9/1/2006	\$35,000	OSU	Microproducts Breakthrough Institute	Nano Micro Facility Design Studio Tools
6/19/2006	\$385,000	OSU	Microproducts Breakthrough Institute	Matching Grant for Facility User Revenue
2/25/2011	\$7,000	PSU	Center for Electron Microscopy and Nanofabrication	Operations and Maintenance Support for Instrumentation used by Industry
7/28/2009	\$94,354	PSU	Center for Electron Microscopy and Nanofabrication	Matching Grant for External User Revenue
2/18/2009	\$205,646	PSU	Center for Electron Microscopy and Nanofabrication	Matching Grant for External User Revenue
3/23/2007	\$30,649	PSU	Center for Electron Microscopy and Nanofabrication	Matching Grant for Facility User Revenue

**Table 2 - ONAMI Shared User Facility Grants**

<b>ONAMI Grant Date</b>	<b>Grant Amount</b>	<b>Lead Institution</b>	<b>Recipient Facility</b>	<b>Grant Purpose</b>
2/6/2007	\$174,351	PSU	Center for Electron Microscopy and Nanofabrication	Matching Grant for Facility User Revenue
4/13/2006	\$305,000	PSU	Center for Electron Microscopy and Nanofabrication	Matching Grant for Facility User Revenue
2/25/2011	\$13,049	UO	Center for Advanced Materials Characterization, CAMCOR	Operations and Maintenance Support for Instrumentation used by Industry
2/2/2009	\$84,316	UO	Center for Advanced Materials Characterization, CAMCOR	Matching Grant for External User Revenue
8/1/2008	\$240,684	UO	Center for Advanced Materials Characterization, CAMCOR	Matching Grant for External User Revenue
2/16/2007	\$25,000	UO	Center for Advanced Materials Characterization, CAMCOR	Nanonet Instrument Implementation at all three campuses
12/18/2006	\$215,000	UO	Center for Advanced Materials Characterization, CAMCOR	Matching Grant for Facility User Revenue
6/19/2006	\$75,000	UO	Center for Advanced Materials Characterization, CAMCOR	Nanonet Instrument Implementation at all three campuses
6/19/2006	\$300,000	UO	Center for Advanced Materials Characterization, CAMCOR	Matching Grant for Facility User Revenue
<b>Total Facilities Grants Made to Date</b>	<b>\$2,368,359</b>			

**Table 3 - ONAMI Matching Grants**

Date Awarded	ONAMI Award Amount	External Grantor	External Grant Amount	Percent Match	Proposal/Project Name	Lead Institution	Grant Purpose
3/10/2011	\$ 25,000	NIH	\$ 1,250,000	0.02	Development of BN Heterocycles for Biomedical Research	UO	Research and Graduate Education
3/1/2011	\$ 5,000	NSF	\$ 100,000	0.05	Production of Nanoscale Solar Energy	OSU	Research and Graduate Education
1/5/2011	\$ 16,799	Sharp Labs	\$ 61,811	0.27	Installation of ALD	OSU	Equipment Acquisition
10/1/2010	\$ 22,500	NSF	\$ 450,000	0.05	Enhanced PV Efficiency thru Heterojunction Assisted Impact Ionization	UO	Research and Graduate Education
9/1/2010	\$ 3,000	DGIST	\$ 46,000	0.07	Dev Manufacturing Process for CIGS PVs	OSU	Collaborative Research
8/25/2010	\$ 2,625	NWUAV	\$ 35,000	0.08	Dev of Hi Temp Engine for UAV	OSU	Collaborative Research
7/20/2010	\$ 1,590	NSF	\$ 15,895	0.10	Acquisition Wire Bonder	OSU	Equipment Acquisition
7/10/2010	\$ 33,000	DOE	\$ 792,000	0.04	High Resolution Photoelectron Microscopy	PSU	Collaborative Research
7/1/2010	\$ 8,000	Intel	\$ 114,000	0.07	Nanoparticle Deposition to Enhance Sub-50nm Lithography	PSU	Collaborative Research
5/15/2010	\$ 70,000	NIH	\$ 1,500,000	0.05	Design of Modular Receptors...	UO	Research and Graduate Education
4/1/2010	\$ 9,616	Space Charge	\$ 96,163	0.10	Dev of Materials & Processes for ...Capacitors	OSU	Collaborative Research
4/1/2010	\$ 13,500	NSF	\$ 319,000	0.04	Research Experience for Undergraduates	PSU	Research and Graduate Education
4/1/2010	\$ 89,031	DOE	\$ 539,582	0.16	H Storage by Novel CBM Heterocycle Materials	UO	Equipment Acquisition
3/29/2010	\$ 1,200	NSF	\$ 12,000	0.10	Research Exp for Undergrads (Supplement to Novel Dielectrics...)	OSU	Collaborative Research
3/10/2010	\$ 70,000	Murdock	\$ 430,000	0.16	Acquisition of NMF Process Dev Equipment	OSU	Equipment Acquisition
3/1/2010	\$ 84,975	NSF	\$ 614,164	0.14	Development of a Scanning Tunneling Microscope for Optical Spectroscopy	UO	Equipment Acquisition
9/28/2009	\$ 44,987	DOE	\$ 1,400,000	0.03	Direct Power Cell	OSU	Research and Graduate Education
9/1/2009	\$ 120,000	NSF	\$ 750,000	0.16	Acquisition of a Dual Beam Focused Ion Beam Instrument	UO	Equipment Acquisition
9/1/2009	\$ 82,397	NSF	\$ 559,939	0.15	Acquisition of Nuclear Magnetic Resonance for CAMCOR	UO	Equipment Acquisition
9/1/2009	\$ 75,653	NSF	\$ 458,500	0.17	MRI Development	UO	Equipment Acquisition
7/1/2009	\$ 240,000	DOE	\$ 2,400,000	0.10	Center for Inverse Design	OSU	Collaborative Research
6/3/2009	\$ 60,027	DURIP	\$ 121,873	0.49	Instrumentation for Electron Nanocrystallography	PSU	Collaborative Research
4/7/2009	\$ 266,000	DOE	\$ 2,400,000	0.11	Hydrogen Storage Engineering Center	OSU	Collaborative Research
3/24/2009	\$ 13,500	DOE	\$ 271,000	0.05	Acquisition of lab materials NETL	OSU	Equipment Acquisition
1/16/2009	\$ 4,980	Tectronix	\$ 45,800	0.11	Acquisition of Oscilloscope and 2 Waveform Generators	OSU	Collaborative Research
1/1/2009	\$ 9,610	Tektronix	\$ 96,100	0.10	Acquisition of 2 Oscilloscopes & Spectrum Analyzer	OSU	Equipment Acquisition
1/1/2009	\$ 1,000	NSF	\$ 10,000	0.10	REU Supplement for Novel Dielectrics	OSU	Collaborative Research
12/1/2008	\$ 100,000	NSF	\$ 750,000	0.13	Center for Green Material Chemistry	UO	Collaborative Research
11/19/2008	\$ 100,000	NSF	\$ 750,000	0.13	Center for Green Materials Chemistry	OSU	Collaborative Research
11/11/2008	\$ 7,200	NETL	\$ 72,000	0.10	Thermoelectric Materials	OSU	Research and Graduate Education
9/1/2008	\$ 300,000	DOE	\$ 2,400,000	0.13	Microchannel Assisted Nanomaterial Deposition Tech	OSU	Collaborative Research

**Table 3 - ONAMI Matching Grants**

Date Awarded	ONAMI Award Amount	External Grantor	External Grant Amount	Percent Match	Proposal/Project Name	Lead Institution	Grant Purpose
8/20/2008	\$ 105,000	NSF	\$ 210,000	0.50	Acquisition of a Laser Lithography Tool	OSU	Equipment Acquisition
8/20/2008	\$ 11,000	OSU	\$ 110,000	0.10	Acquisition of Tektronix Waveform Generator	OSU	Equipment Acquisition
8/20/2008	\$ 32,826	NSF	\$ 328,256	0.10	Novel Dielectrics for Transparent Electronics	OSU	Graduate
7/1/2008	\$ 40,000	NSF	\$ 527,094	0.08	OSU Yokochi NSF Career	OSU	Research and Graduate Education
7/1/2008	\$ 185,000	NIEHS	\$ 1,850,000	0.10	Defining Nanomaterial-biological Interactions	OSU	Research and Graduate Education
6/2/2008	\$ 59,500	Picosun	\$ 210,200	0.28	Set-up and Startup of a Picosun Atomic Layer	OSU	Equipment Acquisition
6/1/2008	\$ 184,000	NIH	\$ 1,666,858	0.11	Acquisition of Microarrayer, Imager, QCM-D Q-Sense	PSU	Equipment Acquisition
6/1/2008	\$ 45,000	NSF	\$ 435,000	0.10	Oregon Technology Entrepreneurship Consortium	UO	Research and Graduate Education
4/22/2008	\$ 7,500	OSU	\$ 150,000	0.05	HP-OSU Collaboration on Dev. Of Lead-Free Piezoele	OSU	Collaborative Research
4/12/2008	\$ 200,000	Murdoch Trust	\$ 513,540	0.39	Acquisition of TEM/SAXS Instrumentation (Murdoch)	UO	Equipment Acquisition
4/4/2008	\$ 228,000	NSF	\$ 458,000	0.50	Acquisition of an X-Ray Photoelectron Spectrometer	UO	Equipment Acquisition
3/10/2008	\$ 48,000	NSF	\$ 500,000	0.10	Designing Mixed-Valent Transition Metal Oxides for	OSU	Research and Graduate Education
1/22/2008	\$ 200,000	Keck Foundation	\$ 600,000	0.33	Acquisition of TEM Instrumentation (Keck)	UO	Equipment Acquisition
10/29/2007	\$ 25,000	US Dept. Commerce	\$ 250,000	0.10	Development of Metal-Oxide Channel Layer TFTs	OSU	Research and Graduate Education
10/10/2007	\$ 3,500	NSF	\$ 35,000	0.10	Matching Funds for NSF CAREER Proposal	OSU	Research and Graduate Education
8/1/2007	\$ 48,000	Invitrogen	\$ 118,500	0.41	Setup of Donated NMR Spectrometer Systems for CAMCOR	UO	Equipment Acquisition
6/18/2007	\$ 23,945	OSU	\$ 65,000	0.37	Acquisition and Installation of a Sputter System	OSU	Equipment Acquisition
5/31/2007	\$ 139,500	DARPA	\$ 2,400,000	0.06	Acquisition of Pulsed Electro Deposition System	OSU	Equipment Acquisition
5/1/2007	\$ 180,000	NSF	\$ 402,695	0.45	Acquisition of a Maldi-Tof Mass Spectrometer and C	UO	Equipment Acquisition
4/26/2007	\$ 45,000	NSF	\$ 485,000	0.09	Acquisition of Network Analyzer and Oscilloscope	OSU	Equipment Acquisition
4/1/2007	\$ 190,000	NSF	\$ 500,000	0.38	Acquisition of Focused Ion Beam Instrument	PSU	Equipment Acquisition
4/1/2007	\$ 30,000	NSF	\$ 255,000	0.12	Enriching Workforce Training through the Research	PSU	Research and Graduate Education
2/12/2007	\$ 100,259	NSF/Murdock Foundation	\$ 352,330	0.28	Acquisition Variable Pressure SEM/Electron Backscatter Diffract	UO	Equipment Acquisition
2/7/2007	\$ 71,225	NSF	\$ 213,680	0.33	Acquisition of Multiple Source Sputter Deposition System	UO	Equipment Acquisition
11/9/2006	\$ 4,000	OSU	\$ 12,879	0.31	Installation of ENTEK Extruder	OSU	Equipment Acquisition
6/15/2006	\$ 345,000	NSF	\$ 1,246,295	0.28	IGERT: Accelerating the Transition from Student to Scientist	UO	Equipment Acquisition
<b>Total</b>	<b>\$ 4,432,445</b>		<b>\$ 32,756,154</b>	<b>0.14</b>			

**Table 4 - ONAMI Signature Researcher Grants**

<b>Date Awarded</b>	<b>ONAMI Grant Amount</b>	<b>ONAMI Signature Researcher</b>	<b>Lead Institution</b>	<b>Area of Research</b>
11/4/2009	\$250,000	Wassana Yantasee	OHSU, Biomedical Engineering	Nanomaterials in environmental and biomedical applications, including water treatment, sensing, sorbent dialysis, hemoperfusion, and oral chelation therapies. Formerly Principal Investigator at PNNL.
11/2/2009	\$250,000	Greg Herman	OSU, Chemical, Biological and Environmental Engineering	Advance fabrication methods and designs for solid oxide fuel cells, green manufacturing processes for displays and solar cells, novel optical and electrical materials. Formerly with Hewlett-Packard, Sharp Labs, and PNNL
2/4/2009	\$250,000	Suying Xie	UO, Director, CAMCOR High Resolution and Analytical Facility	Materials Characterization and electron microscopy.
1/15/2009	\$300,000	Stacey Harper	OSU Environmental and Molecular Toxicology, and Civil/Biological and Environmental Engineering	Comparative and predictive toxicology applied to novel nanomaterials.
8/1/2008	\$405,000	Drake Mitchell	PSU, Physics	Membrane biophysics, lipid and hybrid lipid-metal nanostructures for pharmaceutical encapsulation and targeting.
7/1/2008	\$400,000	Andrea Goforth	PSU, Chemistry	Bionanotechnology, including development of inorganic imaging agents. Former postdoc at UC Davis.
10/25/2007	\$500,000	John Conley	OSU Electrical Engineering and Computer Science	Solid State Materials and Devices, direct assembly and applications of nanomaterials; former Senior Scientist and Group Leader at Sharp Labs
7/1/2007	\$500,000	Shannon Boettcher	UO, Chemistry	Materials Chemistry; semiconductors and nano/micro architectures for solar photovoltaics. Former postdoc at Caltech.
7/1/2007	\$500,000	UO Presidential Chair in Green Nanoscience	UO	To be named
4/19/2007	\$500,000	Kendra Sharp	OSU Mechanical, Industrial & Manufacturing Engineering	Experimental fluid mechanics, including microfluidics for biological and energy applications. Former faculty at Penn State.
10/1/2006	\$175,000	Landis Kannberg	OSU/Pacific Northwest National Laboratory (currently with Battelle)	Co-Lead of the Microproducts Breakthrough Institute 2006-2008. Environmental heat and mass transfer and energy infrastructure.
6/19/2006	\$350,000	Mas Subramanian	OSU, Chemistry	Inorganic solid state materials, high temperature superconductivity, thermoelectrics. Formerly Research Fellow at Dupont.
<b>Total Grants Made to Date</b>	<b>\$4,380,000</b>			