

**Areas for Industry/University Research Collaboration
2005-2015
11/18/05**

	OGI			OSU			PSU			UO		
	AY 05	AY 07	AY 15	AY 05	AY 07	AY 15	AY 05	AY 07	AY 15	AY 05	AY 07	AY 15
Energy												
■ Artificial Intelligence techniques needed to provide data to manage power distribution that feeds neighborhoods and high voltage power transmission								5	7	3	3	5
■ Carbon nanotubes as conductors in power transmission												
■ Photovoltaic improvement aimed at home or small scale installation							3	3	3	4	5	
■ High voltage power conversion electronics (such as used in modern Wind Generation)												
■ Power consumption and management in semiconductor circuits							3	3	5			
■ Nano-structure formation with lasers												
■ Energy storage devices (large and small) including fuel cells				10	10	10	3	3	3	4	5	
■ Self diagnostic systems that enhance fault tolerance using error isolation, self-repairing, or “learning” techniques								3	5			
■ Seismic testing and qualification of high voltage electrical equipment – Analytical modeling of high voltage electrical equipment subjected to static and dynamic loading							3	3	5			
■ Harvesting Wave Energy				3	5	10						
■ Biodiesel and Bio-hydrogen production				4	6	8						
■ Designing advanced nuclear energy systems as part of a national sustainable energy mix				10	10	10						
■ Micro Energy Devices				10	10	10						
Medical and health care												
■ Bio-mechatronics	3	3	3				3	5	7			

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AY15 assumes additional ETIC investments

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■ Bio-sensing – wearable medical instrumentation	3	3	5				3	3	10			
■ Healthcare delivery for aging population – increasing numbers, in-home care, preventative medicine, remote locations	4	6	8				3	3	3			
■ Human vision system	8	8	8							3	3	5
■ Medical information sharing	5	6	8							3	3	7
■ Design optimization for biofluidic microchips and Labs-on-Chip								3	7			
■ Biomedical optics	7	8	10									
■ Biomedical image analysis and signal processing	4	6	8							3	5	7
■ Neuroengineering	6	6	9									
■ Biomaterials and medical devices	6	6	8									
■ Nanobiotechnology	3	4	8									
■ Tissue engineering	5	6	8									
■ Developing portable medical devices				3	5	10						
■ Medical physics program – medical dosimetry, imaging, and transport. (Joint OHSU/OSU)				3	3	7						
■ Assessing and developing food irradiation technologies				3	3	7						
■ Visualization through Artificial Intelligence				3	4	5						
■ Bio-Informatics				3	4	5						
■ Intelligent aids for operating room teams to improve efficiency and patient safety				3	4	5						
■ Assistive technology: independent living for special care populations										5	5	7
Electronics												
■ Real-time fault detection and defects management												
■ Data mining of large volumes of semiconductor processing data							3	3	7			
■ Post-processing chip test to increase fault coverage with lower cost testers							3	3	10			

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■ Self diagnostic systems that enhance fault tolerance using error isolation, self-repairing, or “learning” techniques							3	5	10			
■ Analog test and quality of digital/mixed test												
■ Power management, analysis, characterization, minimization, device structures												
■ Modeling interconnect, high frequency analog, fault mechanisms												
■ Noise analysis – substrate, interconnect, RLC compiling, etc.												
■ Technologies used by image/display industry												
■ Technologies used for color printing							3	3	3			
■ Seismic qualification (NEBS) of communication electronics							3	3	5			
■ Design and Verification for System-on-Chip (SoC), System-in-Package (SiP), System –on-Package (SoP)							3	3	7			
■ DFM and statistics-based approach for deep sub-micron Ics							3	3	5			
■ High performance graphics and imaging				3	5	10						
■ Innovative learning platform				3	5	10						
■ New devices including transparent electronics, optical and nano devices				5	7	10						
■ Innovative measurement technologies using magnetic, optical and nondevices				3	4	5						
■ Ultra-low power wireless communication devices				3	5	10						
■ New battery free power generation for lower power devices				3	4	5						
■ Physics-based signal processing and data fusion for electromagnetic and acoustic sensor systems							5	5	10			
Software												
■ New ways of accessing databases that can be used by non-technical people							7	7	10	3	3	7
■ Programming a highly parallel heterogeneous architecture							3	3	5	7	7	7
■ X-ray scan and search, quick analysis and evaluation												

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■ Open source software development processes							3	5	10			
■ Hardware/software co-verification							3	5	7			
■ Sensor network applications							5	7	10			
■ Making computing more secure							5	7	10			
■ Educational support for Open Source Community				3	5	10						
■ End-user software for finding errors				5	7	10						
■ Artificial Learning (environmental, biological, military, etc.)				5	7	10						
■ Improving human-computer interface				5	7	10						
■ Innovative learning platforms				3	4	5						
■ Cost-effective production of dependable software										3	3	7
■ Peer-to-peer paradigm in computing, communication, massive data sharing										3	5	7
■ Secure & dependable infrastructe for communication-intensive business										5	5	7
■ High-performance, distributed computing in gird, and peer-to-peer paradigms										7	7	7
Materials Science												
■ Semiconductor -- increasing density, decreasing feature size								3	5	2	3	9
■ Semiconductor – poly or amorphous silicon and non-silicon materials				3	4	5				9+	9+	10
■ Non-semiconductor, supporting biomedical engineering and nanotechnology				3	4	5	3	5	7	9+	9+	10
■ New metals, alloys and composites				3	5	10						
Infrastructure & Transportation Systems												

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■ Transportation solutions that minimize energy use/costs while improving supply chain and logistics issues in lean manufacturing							7	7	10			
■ Ocean and coastal engineering systems, including tsunamis – testing & modeling and improving evacuation procedures				10	10	10						
■ Developing advanced testing and modeling, particularly for rehabilitation				7	10	10						
■ Using technology to improve efficiency of transportation systems				3	5	10						
■ Technology and training to facilitate general aviation single-pilot operations				3	5							
■ Stability and Improvement of Oregon Soils for Infrastructure Rehabilitation under Static and Seismic Conditions (e.g., slope stability in the Willamette Valley, soil/structure behavior of bridge foundations during seismic events, stability of Oregon coastal soils under increased infrastructure development)							3	5	7			
■ Testing of infrastructure systems (e.g., structural performance) under fatigue conditions and seismic conditions (seismic qualification of equipment, post-seismic structural health determination)							3	5	7			
■ Seismic analysis of dynamic load effects on structural components and systems							3	5	7			
■ Assessment of application of innovative materials to transportation systems (e.g., bridges.)							3	5	7			
Sustainable Environmental Systems												
■ Development of open-source software for managing the flow and water quality of the rivers, streams, lakes, reservoirs, and estuaries in Oregon							5	7	7			

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■ Development of open-source software for managing the flows and water quality of the rivers, streams, lakes, reservoirs, and estuaries							5	7	7			
■ Sustainable management of the Columbia and Willamette River basins							5	7	7			
■ Sustainable agricultural practices to minimize ground and surface water pollution							5	7	7			
■ Geo-environmental remediation of contamination sites							5	7	7			
Technology Management												
■ Innovation Management – Innovation for competitiveness; Innovation Management – Driving innovation for rapid penetration of new projects into markets; Innovation Management – Incremental innovations; Innovation Management – Radical innovations; Technology forecasting, roadmapping, evaluation, selection, adoption and diffusion; Emerging Technologies							3	3	10			
■ Product development processes; Supply chain management; Project/Portfolio management; Managing multiple projects; Entrepreneurship and intrapreneurship for innovative technologies; Benchmarking; Productivity improvements; Yield improvements in semiconductor manufacturing							3	3	10			
■ Effective management of the “fuzzy front end” of new products								3	10			
■ Technology outsourcing and policy								3	10			
Manufacturing Systems												
■ Nano/microfabrication				3	5	10						
■ Optimal design and operation of manufacturing systems				3	4	5						

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Biological + Environmental Systems												
■ Environmental Remediation and Bioremediation - Developing physical and biological technology for cleaning up hazardous waste sites				9	10	10						
■ Environmental Biotechnology – using molecular methods to improve biological waste treatment technology, generation of biofuels, and in-situ hazardous clean-up				5	6	9						
■ Environmental Transport and Modeling - Applying mathematical models to study the fate of transport of contaminants in air, soil, surface, water and groundwater				7	8	9						
■ Multiscale Systems – Development of methods to scale processes from the microscale to large scale systems applied to make engineering decisions				5	6	7						
■ Environmental Nanotechnology – Development of nanotechnology for environmental applications, such as: advanced systems for treating drinking water, treatment of waste water for reuse, treatment of air pollutants, creating of chemical and biosensors.				2	3	8						
■ Microbial Fuel Cells - using microbial process to generate energy from organic waste streams				2	3	5						
■ Hydrologic Observatories for Water Resources - applying new technologies, sensing systems, and approaches to efficient water utilization for multiple uses				5	7	10						
■ River Ecoengineering - new, ecologically-friendly approaches to river restoration and management				2	3	5						

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