

**Agency 365 – Washington State University  
2009-2011 Operating Budget Request**

The Land Grant University for the 21<sup>st</sup> Century  
Performance Level Decision Package – Policy Level “CR”

**Contract Research Laboratory Pilot/ASL**

**Agency Recommendation Summary:**

Washington State University requests \$1.3 million for four staff research scientist positions to augment the Applied Sciences Laboratory in Spokane and to convert it into a prototype “Contract Research Organization” to perform research for private businesses and federal agencies. The proposed contract research organization model combines the creativity of academic research with the agility and customer focus of private industry. The Applied Sciences Laboratory model would be a pilot program at WSU Spokane that could be implemented by other disciplines at WSU campuses in the future. The university fully expects that this request will be matched within two years by at least \$6 million in funds from federal and private grants and contracts.

**Fiscal Details:**

By Fund	2009-10		2010-11		2009-11 Biennium
	FTE	Dollars	FTE	Dollars	Dollars
General Fund State	4.0	650,000	4.0	650,000	1,300,000
<b>Total</b>	<b>4.0</b>	<b>\$ 650,000</b>	<b>4.0</b>	<b>\$ 650,000</b>	<b>\$ 1,300,000</b>

**Background:**

Research universities like WSU do fantastic work in pursuing basic research and educating graduate and undergraduate students. These activities are coincident with fueling the new innovation-based economy. Research universities, however, struggle with how to partner specifically and extensively with the private sector and how to bring the expertise of the basic research engine to bear on important, topical and applied problems that need rapid attention. It is the goal of this funding to position WSU as a front runner institution in pioneering and driving the interaction between a state research university and the needs of the private sector.

This will be accomplished by forming, at WSU-Spokane, a “contract research organization” (CRO) that emphasizes problem solving and commercial applications in the physical sciences and engineering. The CRO will be located at the existing Applied Sciences Laboratory, which currently receives state funding and is on the Spokane Riverpoint campus.

A CRO is a concentrated collection of physical laboratories (in strategically defined research areas) with a state-of-the-art research infrastructure, including both personnel and instrumentation, where applied research services can be “purchased” on a contract basis. The vision for the CRO is to transform scientific innovations into practical solutions in a timely and cost-effective manner. In this way it varies significantly from the traditional, basic research done by universities.

The Applied Sciences Laboratory (ASL) has been in existence for four years and is located at WSU Spokane on the Riverpoint campus. The ASL was founded and is guided by Dr. Yogendra Gupta (Institute for Shock Physics at WSU). Since its inception, the ASL has been awarded approximately \$12 million in grants and contracts.

### **Package Description:**

The \$1.3 million will support four permanent staff research scientist positions. It is imperative that funding for exempt staff be included, as this model will not work if regular, tenure-track faculty are hired in these positions. For the model to succeed, it needs “anchors” to contract and perform the work in an efficient manner. These key staff need considerable flexibility not found in tenure-track positions and they must be unencumbered by the traditional metrics of academic success (publications, teaching, etc.) Instead, they will be accountable for delivering a work product efficiently and in a timely manner (similar to a business.)

The Applied Sciences Laboratory CRO that WSU proposes as a pilot at WSU Spokane is intended to be a local and national model for a new type of university/private/government sector interaction. If funded, we expect the return on this investment to exceed 4:1. Importantly, however, local and regional enterprises will be able to access this infrastructure at a significant cost reduction to performing these services in-house. Thus, the return on the investment is compounded at the state level.

The CRO at WSU Spokane will function as a buffer organization between fundamental academic research and the private sector, to bridge these disparate cultures. A CRO is well-suited to perform this function, because it operates more like a business and is staffed by entrepreneurial researchers. Expanding and strengthening the Applied Sciences CRO into a major WSU asset will permit the university to preserve the academic rigor and integrity necessary to fulfill its educational mission while ensuring a meaningful and mutually beneficial partnership with corporations. A CRO pilot will allow the best science that emanates from the basic research enterprise to meld with the most pressing state, regional, and national problems that need to be solved. There will also be new approaches to technology transfer that emphasize the need for basic research to be responsive to industry needs.

Nothing in the state (or the Northwest states, at this time) bridges the gap between the basic research engine and the private/government sector. This funding will thus provide a strong return for the state and position Washington to be a leader in innovative partnerships between WSU and the private sector.

## **Narrative Justification and Impact Statement:**

As with the applied research component of WSU's Institute for Shock Physics (based on the Pullman campus), the ASL builds on over 50 years of sustained research excellence and undertakes a broad range of applied research projects (well beyond shock physics) for government agencies and private industry. Innovations and applications involving materials science, computational modeling and simulations, and optical sciences and related technologies provide the foundation for applied research projects to address technical needs in Energy, National Security, and Advanced Materials.

The ASL, soon to be located in the SIRTI Technology Center (STC Building) at Riverpoint, has the following capabilities that can be exploited with a contract research model:

1. **Nanophase Materials Laboratory** – a laboratory that utilizes a wide range of technologies to synthesize, process, and characterize new nanophase materials.
2. **Advanced Materials Processing** – laboratories for developing, processing, and characterizing novel metallic alloys, such as bulk metallic glasses and novel reactive materials.
3. **High Performance Computing** – a high performance computer that provides tera-flop level computing power for research calculations, modeling, and simulations. This is the first research computer of its kind in Spokane. Thanks to Avista's continued support, it is currently being housed in an Avista facility.
4. **High Pressure Synthesis** – a laboratory that utilizes a wide range of high-pressure technologies to synthesize and characterize novel materials at elevated pressures and temperatures.
5. **Future Capabilities:** The relocation to the Sirti building allows the addition of new capabilities, such as materials and optical characterization, sustainable energy, materials chemistry, and optical sciences and sensors.

Recently funded research partnerships/contracts with private companies include:

- **Avista:** Sustainable energy research
- **Boeing:** Modeling and simulations related to hydrophobicity for next generation aircraft
- **Itron:** Advanced materials research for product improvement
- **Liquidmetal Technologies, Inc.:** Experiments on Bulk Metallic Glass (BMG) composites

Proposals (significant, long-term projects) submitted recently include:

- Defense Advanced Research Projects Agency (DARPA): Reactive Materials Structures
- Department of Defense (DoD): Ultra High Performance Concrete
- U.S. Department of Homeland Security: Explosives Detection and Mitigation

Local businesses can take advantage of the ASL's specialized research equipment. For example, ReliOn, a local company specializing in fuel-cells, used an ASL furnace to heat treat samples. The usage of the ASL equipment allowed ReliOn to achieve their goal with minimal expense. Buying and maintaining such specialized equipment is difficult for small businesses. Additionally, ASL has invested in a technical library with reference materials and databases not readily available for public use. Area businesses may access these materials to further their own research and development efforts. The ASL scientists and staff meet routinely with business and trade groups, and corporate staff locally and

elsewhere to raise awareness of the ASL resources for their needs. In many cases, the ASL was able to put the business in touch with appropriate organizations, even if the ASL could not help them directly.

In addition, the ASL creates research opportunities for faculty and students from other Spokane academic institutions: Two faculty members from Whitworth University are participating in ASL research projects. A student from Gonzaga University is conducting research on the Department of Homeland Security project. Additionally, a recent graduate from Whitworth University is working on an internship on the Boeing project.

The ASL is providing the benefits of a research university to the Greater Spokane Region.

**Outcomes:**

Specific benefits provided by the formation of a pilot contract research organization at the existing Applied Sciences Laboratory may be summarized as follows:

- Approximately \$6 million in grants and contracts would be attracted and expended by WSU within the next two years if this request is funded.
- If funded, WSU expects the return on this investment to exceed 4:1.
- Meaningful partnerships with companies to enhance their future competitiveness and provide new opportunities for utilizing academic research. Local and regional enterprises will be able to access this infrastructure at a significant cost reduction over performing these services in-house. Thus, the return is compounded at the state level.
- Increased scientific stature and national visibility for the region to foster economic growth and attract new companies.
- Creation of well paying, high technology jobs, and opportunities to spin off new companies.
- Applied research will markedly strengthen graduate enrollment at WSU through increased research opportunities and visibility due to collaborations with national laboratories and corporate partnerships.

In summary, the pilot contract research organization represents a new paradigm for 21<sup>st</sup> Century university research and will provide the intellectual and scientific foundation for fostering economic growth through the linkage of academic research to practical applications.

**Calculations:**

FISCAL DETAIL TABLES - CONTRACT RESEARCH LABORATORY					
	2009-10		2010-11		2009-11 Biennium
By Program	FTE	Dollars	FTE	Dollars	Dollars
Instruction					-
Research	4.0	650,000	4.0	650,000	1,300,000
Public Service					-
Primary Support					-
Libraries					-
Student Services					-
Institutional Support					-
Plant					-
<b>Total</b>	<b>4.0</b>	<b>\$ 650,000</b>	<b>4.0</b>	<b>\$ 650,000</b>	<b>\$ 1,300,000</b>
<b>By Object</b>					
Salaries					
Faculty					-
AP	4.0	400,000	4.0	400,000	800,000
TA/GA					-
Classified					-
Benefits		125,000		125,000	250,000
Goods/Services					-
Travel					-
Equipment		125,000		125,000	250,000
<b>Total</b>	<b>4.0</b>	<b>\$ 650,000</b>	<b>4.0</b>	<b>\$ 650,000</b>	<b>\$ 1,300,000</b>

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