

Partnership Opportunities with the Oak Ridge National Laboratory

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ABSTRACT

The Oak Ridge National Laboratory (ORNL) is "bringing science to life" through the creation of knowledge; the invention of new tools and techniques; the scientific analysis of complex situations; and the design, construction and operation of research facilities used by scientists and engineers from throughout the world. ORNL creates and uses partnerships as a means for conducting collaborative research and development (R&D), facilitating access to its capabilities, improving the utilization of its unique science and technological facilities, and assisting in commercialization of technology. This paper will concentrate on seven of the mechanisms used to access ORNL facilities and expertise namely, Cooperative Research & Development Agreements, License Agreements, Personnel Exchanges, Small Business Innovative Research & Small Business Technology Transfer Partnerships, Technical Assistance Program, User Facility Agreements, and Work For Others Agreements. *Cooperative Research and Development Agreements*, also known as CRADAs, create formal teams of researchers from ORNL and private industry for the purpose of collaborating on an R&D area of interest to both partners. *License Agreements* give commercial entities authorization to use ORNL-developed technologies for specified purposes. A *Personnel Exchange* either locates ORNL employees at the site of the partner organization, or, brings the employee(s) of the outside organization to ORNL to enhance their technical capabilities. The *Small Business Innovative Research (SBIR) Program and the Small Business Technology Transfer (STTR) Program* provide government-funded partnership opportunities for qualified small private companies. The *ORNL Technical Assistance Program* can provide a rapid response to a technical question from a business entity. *User Facility Agreements* provide qualified users from universities, industry, or other institution access to ORNL's 14 designated user facilities where both proprietary and nonproprietary research can be conducted. *Work for Others* is a mechanism that gives government entities and commercial companies the ability to pay for predetermined scopes of work to be performed for their benefit.

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Key words: research partnerships, CRADA, SBIR, STTR, license

INTRODUCTION

Even in good economic times such as those most countries are currently experiencing, the fact remains that the amount of resources available to fund research and development activities is finite. Although most experts will agree that past investments in R&D are at least partially responsible for the healthy economies of many countries, what to do with today's profits is still a much-debated issue. Investors would like to be rewarded for the risk they incurred, labor would like to be rewarded for their role in the profitability of businesses, and futurists would like to see continued investment in research and development realizing that the current good economic times are not to be enjoyed at the expense of the future. Thus, companies are faced with the key strategic decision of what to do with their profits. For a variety of reasons most related to an imbalance of organizational power, the answer will be to "satisfice"¹ and not select the optimum solution. This satisficing will result in a need to leverage the funds that are available for research and development. This paper will discuss many mechanisms available to leverage available research and development budgets by partnering with national laboratories. In particular, this paper discusses various partnership mechanisms available with the Oak Ridge National Laboratory (ORNL,) a U.S. Department of Energy facility.

SCIENCE AND TECHNOLOGY PARTNERSHIPS

The ORNL has become a premier partner in R&D activities. Two key assets ORNL possesses are its facilities and its staff. The facilities have resulted from more than a 50-year national investment in research and development. The staff of researchers is undoubtedly the most important asset, although they have been drawn to ORNL by the world-class facilities and the camaraderie with other world-renowned scientists.

ORNL creates and uses partnerships as a means for conducting collaborative research and development, facilitating access to its capabilities, improving the utilization of its unique science and technological facilities, and transferring technology to industry and assisting in its commercialization.

ORNL carries out much of its work through collaborative programs that involve scientists and engineers from other national laboratories, universities, industry and other research institutions. The ORNL has 160 partners in cost-shared R&D. Guest assignments, which range from two weeks to two years, broaden the laboratory's base of expertise and support its goals in scientific cooperation and technology transfer. Each year, ORNL hosts about 3000 guest researchers; about 750 are from industry.

Broad Access to ORNL Facilities and Expertise

ORNL resources are available to sponsors and customers other than the U.S. DOE through a number of mechanisms.

¹ Simon, Herbert A., *Administrative Behavior: A Study of Decision Making Processes in Administrative Organizations*, third edition. New York: The Free Press, 1976.

Cooperative R&D Agreements (CRADAs) allow one or more partners to collaborate on ideas, share costs, and pool the results of a particular R&D program to bring a specific technology to the marketplace. ORNL has participated in more than 270 CRADAs, including more than 100 with small businesses.

License agreements give industry access to ORNL-developed inventions and technologies. ORNL has executed more than 220 license agreements and commercial sales resulting from these agreements exceed \$184 million.

Personnel exchanges can take ORNL employees to other locations, or, may bring outside researchers to the Laboratory to enhance technical capabilities and support research in specific areas.

Small Business Innovative Research (SBIR) and Small Business Technology Transfer (STTR) programs provide partnership opportunities for qualified small firms. ORNL's Small Business Program Office builds awareness of cooperative research and technical assistance opportunities available to small and medium-sized firms and promotes partnerships under the STTR Program.

Technical assistance provides a way for ORNL researchers to respond to inquiries from individuals or organizations seeking to further knowledge, solve a specific problem, or improve a process or product.

User facility agreements provide access to ORNL's 14 designated user facilities, stipulating terms and conditions for the conduct of research by qualified users from universities, industry, or other institutions. Both proprietary and nonproprietary research can be conducted. The diversity of ORNL's resources in science and technology is represented by these facilities:

- Bioprocessing Research Facility
- Buildings Technology Center
- Californium User Facility for Neutron Science
- Computational Center for Industrial Innovation
- High Flux Isotope Reactor
- High Temperature Materials Laboratory
- Holifield Radioactive Ion Beam Facility
- Metals Processing Laboratory User Center
- Metrology R&D Laboratory
- Mouse Genetics Research Facility
- Oak Ridge Electron Linear Accelerator
- Oak Ridge National Environmental Research Park
- Shared Research Equipment Program
- Surface Modification and Characterization Research Center

Capabilities for remote operation of some facilities are broadening access to researchers at other institutions. More information on ORNL's user facilities is available on the Internet at <http://www.ornl.gov/ornlhome/facilities.htm>

Work for Others (WFO) is a DOE mechanism that gives federal agencies, commercial companies, and local, state, and international governments access to research and technical assistance in solving problems and developing working models or prototypes. ORNL carries out more than \$100 million of WFO each year for agencies including NASA, the Department of Defense, and the Nuclear Regulatory Commission and for other customers.

More information about all of these options is available on the Internet at http://www.ornl.gov/ornlhome/work_with_us.htm.

Technology Transfer

ORNL transfers knowledge and technology to its customers through many mechanisms: publications, presentations, personnel, exchanges, and WFO. One key mechanism is the transfer of licensable intellectual property to the private sector for commercialization.

ORNL is in the top 10% among all laboratories, universities, and research institutions, in patents, licenses, and new business starts.² It was the 1998 leader in patents granted to Tennessee companies.

Industry interest and investment in licensing ORNL-developed technology are increasing, as indicated by a significant increase in the percentage of new CRADAs tied to background intellectual property or licenses.

An entrepreneurial, leave-of-absence program gives ORNL researchers the opportunity to be involved in the creation of companies that deploy Oak Ridge technologies.

Economic Development

Partnerships provide an avenue for directing ORNL's resources toward the regional economy. People and technology from ORNL have contributed to the creation of more than 80 companies employing 2,300 people.

Key partnerships that support economic development include the following:

- Construction of the **Spallation Neutron Source** (SNS), a \$1.3 billion research facility, will create a significant number of new jobs and additional sales tax revenues. The SNS project is a collaboration with four other DOE national laboratories that will provide the world's best capabilities for neutron research, which will be used by thousands of scientists each year to explore the structure of materials, from plastics to proteins. The Joint Institute for Neutron Sciences, a facility to which the State of Tennessee has committed \$8 million, will support the work of visiting researchers. More information about the SNS is available on the Internet at <http://www.ornl.gov/sns/>.

² Source: 1996 & 1997 Association of University Technology Managers, Inc., licensing survey

- ORNL and the University of Tennessee are partners in the Science Alliance, the state's oldest and largest academic Center of Excellence. The Science Alliance sponsors the ORNL-University of Tennessee Distinguished Scientist Program, which provides joint appointments to tenured positions at the University of Tennessee's Knoxville campus and research positions at ORNL. Graduate programs and joint institutes in biological sciences, computational sciences, energy and environment, and neutron sciences represent additional tools for combining the resources of these institutions for research and education.
- In collaboration with DOE, the University of Tennessee, and the Development Corporation of Knox County, ORNL has recently broken ground on a \$15 million facility to house the **National Transportation Research Center**. The center will improve access to regional resources in transportation R&D and should attract new industry partners. More information about the center is available on the Internet at <http://www.ntrc.com>.
- The **Oak Ridge Centers for Manufacturing Technology (ORCMT)** represent a national resource for manufacturing technology. ORCMT, a joint effort with the Oak Ridge Y-12 Plant (designated a National Prototype Center), has assisted more than 4,000 businesses nationwide with applied R&D development, design, prototyping, and training. More information about the ORCMT is available on the Internet at <http://www.ornl.gov/orcmt/>.
- The Tennessee Consortium for Mouse Functional Genomics brings together ORNL, the University of Tennessee's medical centers in Memphis and Johnson City, Vanderbilt University Medical Center, St. Jude Children's Research Hospital, and Meharry Medical College in the development of mouse models for human diseases. Collaboration throughout the state, using ORNL's mouse colony, should bring important findings in genetic medical research.

CONCLUSION

The importance of partnerships to the advancement of science is increasing. The ORNL utilizes several mechanisms for facilitating and participating in research and development partnerships with private industry, other government agencies, and other entities desiring to enhance knowledge.

AUTHORS' BIOS

Dr. Terry Payne is the Laboratory Technology Research (LTR) Program Manager at the Oak Ridge National Laboratory. The LTR Program supports high-risk, multidisciplinary research partnerships to investigate challenging scientific problems of interest to the DOE, whose solutions have promising commercial potential. In addition, Terry manages all of the ORNL's participation in SBIR and STTR projects in support of small businesses. Dr. Payne received his Ph.D. degree in strategic management of technology from the University of Tennessee in 1992.

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