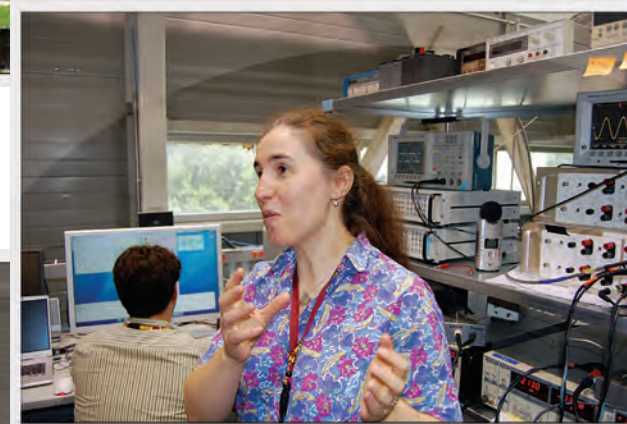




Multiple wide computer screens help control room technicians monitor magnet performance and make adjustments as needed. *Photo by Ray Stanyard*



State support of the lab is critical to its success. In 2004, the Legislature allotted \$7.5 million to upgrade the Magnet Lab's power and cooling infrastructure, which included the addition of this 3-million gallon, chilled-water tank.



Although there are several high magnetic field labs in Europe, 20 percent of the Magnet Lab's users come from overseas. *Photos by Kristen Eliza Coyne*

Growing the knowledge base, growing jobs

The Magnet Lab employs more than 300 faculty, staff and students at its FSU branch. Another 150 plus are affiliated with the lab, many of them faculty members at FSU. While the lab doesn't have any formal classrooms, it is most assuredly a place of learning. In total, undergraduate and graduate students comprise 33 percent of the lab's staff. Many go on to careers in research in academia, at other national labs and in industry.

The Magnet Lab creates jobs not just in Tallahassee, but also across the state. According to the CEFA forecast, the state of Florida investment in the Magnet Lab between 2006 and 2016 will generate \$1.66 billion in output (value of goods and services produced) and \$689 million in income — generating 15,554 jobs across the state economy.



This scanning electron/focused ion beam microscope, one of two at the Applied Superconductivity Center at the Magnet Lab, is used to develop superconducting wires and tapes. *Photo by Ray Stanyard*

Basic, fundamental research is linked to virtually all economic growth and quality of life enhancements throughout the ages. Basic research underpins faster and better computers, life-saving drugs, energy-efficient lights, stronger materials and much, much more.

The Magnet Lab is a basic research facility. That means scientists from other universities, national labs and even countries come here to increase humankind's fundamental knowledge of how nature works. Our researchers — both in-house and visiting — tackle unanswered scientific questions, not necessarily with any practical end in mind. But their findings lay the foundation for the applied research that often follows. It can take decades before basic research leads to practical applications, but as anyone checking their e-mail on a cell phone can tell you, it's worth the wait.

When the great physicist and chemist Michael Faraday looked into the relationship between electricity and magnetism in the 1820s, he couldn't foresee its impact. Yet almost all today's electrical devices — including the generators that create our electrical power — are the applied fruits of Faraday's fundamental discovery of electromagnetic induction. A more recent example is magnetic resonance imaging (MRI), which originated in basic research that started in the 1930s.

“The mission of the Magnet Lab is to provide the highest magnetic fields and necessary services for scientific research conducted by users from a wide range of disciplines, including physics, chemistry, materials science, engineering, biology and geology.”

State support a wise investment

The Magnet Lab is supported by the National Science Foundation (up to \$31 million a year), the state of Florida (about \$10 million a year), and through grants to individual scientists (between \$10 and \$15 million a year).

The Magnet Lab has enjoyed strong state support since the facility was awarded to The Florida State University in 1990. This support was a key reason for the initial award, and it continues to help the lab leverage resources to this day.

According to a 2009 report by the Center for Economic Forecasting and Analysis, for every dollar invested by the state between 2006 and 2016, the Magnet Lab is expected to attract \$4.13 in federal and other sources of money. Over the 11-year time frame, the state's investment in the Magnet Lab will realize a return of \$5.17 for each dollar spent.

High-field magnets — essential tools for probing the mysteries of nature — attract more than 700 visiting researchers to Florida each year. Of that number, nearly 20 percent come from overseas. They stay on average a week and regularly account for more than 3,000 hotel room nights a year.

Raising the profile of the research sector

In 2000, FSU in cooperation with the Magnet Lab and the FAMU-FSU College of Engineering established the Center for Advanced Power Systems (CAPS). This center focuses on advanced power technologies with particular emphasis on transportation systems as well as traditional utility systems. CAPS receives support from the U.S. Navy, Office of Naval Research and the U.S. Dept. of Energy, Office of Electricity Delivery and Energy Reliability.

In 2005, The Magnet Lab and FSU successfully recruited the Applied Superconductivity Center from its previous home at the University of Madison, Wisconsin, where the center had been for more than 20 years. Now a materials research division of the Magnet Lab, ASC brought to Tallahassee more than 30 researchers, several research grants, and \$2.5 million worth of sophisticated laboratory equipment.

FSU's High Performance Materials Institute, established in 2006 and located near the Mag Lab's FSU headquarters, will continue to thrive and develop based in part on strong interdisciplinary research collaborations with the Magnet Lab.



About 4,000 square feet of the lab's 370,000 square feet is devoted to a machine shop, where machinists operate a wide range of machinery. Photo by Kristen Eliza Coyne



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NATIONAL HIGH MAGNETIC FIELD LABORATORY
MAGNET LAB ECONOMIC IMPACT

Dollars & Sense

In 2009, the Magnet Lab commissioned The Center for Economic Forecasting and Analysis at The Florida State University to measure the lab's economic impact on the state of Florida. Center staff determined expenditures on salaries, capital, and direct and indirect expenses. These funds were then put into a Florida regional input-output model, which includes cross linkages between every sector of the full Florida economy. The resulting report found:

- For each dollar the state invests in the Magnet Lab between 2006 and 2016, the state will realize a return of \$5.17.
- From 2006 to 2016, for every dollar invested by the state of Florida, the Magnet Lab is expected to attract \$4.13 in federal and other sources of money. Over the 11-year time frame, the state's total projected investment of \$179 million will net \$739 million in non-state spending.
- The state of Florida investment in the Magnet Lab over the 11-year time frame will generate \$1.66 billion in output (value of goods and services produced) and \$689 million in income, while generating 15,554 jobs across the state economy.
- State funding in the Magnet Lab will leverage an annual average economic stimulus to the Florida economy more than five times as large as if that investment had been spent elsewhere in Florida.



In 2006, the lab upgraded its megawatt capacity from 32 to 56 megawatts. Photo by Larry Gordon

About the Magnet Lab

The National High Magnetic Field Laboratory develops and operates state-of-the-art, high-magnetic-field facilities that visiting scientists and engineers use for research. It's the only facility of its kind in the United States, and only one of 10 in the world.

Sponsored by the National Science Foundation and the state of Florida, the Mag Lab is the largest and highest-powered magnet laboratory in the world, headquartered in a sprawling 370,000-square-foot complex near Florida State University in Tallahassee. The lab also includes sites at the Los Alamos National Laboratory in New Mexico and the University of Florida in Gainesville. Together these three institutions operate the lab.

Most of the Magnet Lab's magnets, designed and built in-house, are unrivalled anywhere in the world.



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