FOR A HEALTHY ECONOMY
That’s the power of research. A power so strong at Boise State University that it recently attracted a $10 million grant from the National Institutes of Health (NIH). The five-year award will be housed within the university’s Biomolecular Research Center and administered by Dr. Julia Oxford, biology professor and center director.

And that’s just one example of the university’s research-related efforts to strengthen economic development by fueling commercial activity, training a robust workforce and increasing the area’s standard of living and overall quality of life.

“Without research, we couldn’t come up with an end product that is useful to society,” said Dr. Mark Rudin, vice president for research and economic development at Boise State. “Research leads to discovery and then, we hope, to applications within the community.”

Those applications are all over the board, affecting individuals, government agencies, medical practice and more.
A sampling of current research activity at Boise State includes:

- Creating self-adjusting vents that equalize heating and cooling in homes or businesses
- Digitizing the marked and annotated books that survive from the library of author Herman Melville
- Developing self-powered thermoelectric sensors that help keep tabs on what’s happening inside a nuclear plant in the wake of a disaster
- Producing a flute CD project inspired by the contemporary music of Slovenian composers Blaž Pucihar, Črt Sojar Voglar, and Peter Kopač
- Exploring electronic chips that enhance the intelligence of both piloted and autonomous vehicles
- Developing data to inform biodiversity conservation policy and planning, with a mission to keep common species common
- Identifying how demographics, geography and other variables affect the well-being of the maternal and child health populations in Idaho

“University research strengthens Idaho’s economy by providing an environment that fosters the inception of new technologies, innovative solutions and viable products,” said Jeff Sayer, Idaho Department of Commerce director. “Idaho is fortunate to be home to three world-class research universities that each serve as an investigative partner in advancing concepts into reality, moving theory into actuality and transforming projections into economic revenue.”

**SOLVING MAJOR HEALTH ISSUES**

Dr. Oxford’s $10 million grant will establish a prestigious Center of Biomedical Research Excellence (COBRE) in Matrix Biology at Boise State. Nationally, COBRE centers augment and strengthen institutional biomedical research capabilities. They support basic, clinical and translational research as well as faculty development and infrastructure improvements.

“An award of this magnitude is recognition of the high-quality research being done by Boise State’s biomolecular faculty investigators and will allow us to increase our biomedical research efforts,” said Dr. Bob Kustra, Boise State president. “It demonstrates that our researchers are contributing to solving the major health concerns of the nation.”

The grant is part of the Institutional Development Award (IDeA) program, which broadens the geographic distribution of NIH funding for biomedical and
Dr. Kristen Mitchell, associate professor of biological sciences, is exploring the connection between liver fibrosis and extracellular matrix overproduction. Mitchell’s research investigates the role of aryl hydrocarbon receptor signaling during myofibroblast activation (which causes collagen to form in the liver) and the development of fibrosis, which is a precursor to cirrhosis.

Several recent accomplishments prepared Boise State for this major award, including establishment of Idaho IDeA Network of Biomedical Research Excellence with several partner institutions; approval for a biomedical research vivarium; and a doctoral program in biomolecular sciences.

In the end, all these efforts allow the university to provide better opportunities for students, which in turn prepare the next generation of researchers, thinkers and skilled employees.

“The applied experiences Boise State students get through hands-on research and internships help develop 21st-century skills, especially critical thinking,” said Mary Andrews, director of economic development in the Division of Research. “Students are experimenting and integrating what they learn into a new hypothesis, and that is one of the most, if not the most, important skills in our economy.”

One example is the university’s Venture College, which helps students learn how to launch actual businesses. The program has essentially taken critical thinking skills outside the traditional classroom, allowing participants to hone skills in real time.

“To me, that is what’s really exciting,” said Andrews. “The maturity they gain by having their hypothesis invalidated, then taking what they have learned and creating a new hypothesis, is invaluable.”

The university’s robust research program also has captured the attention of industries attracted to the possibility of partnering with researchers in the discovery phase, using lab space or hiring students and graduates.

That’s good for the economy and for Boise State students, said biology professor Jorcyk.
“Students need places to intern that are local and a place to work when they graduate,” she said.

Jorcyk, whose research looks at the cellular proteins that cause breast cancer metastasis, notes that research that ultimately benefits the community, and by extension the economy, is more successful and satisfying.

“I was reading an article that said that the reason why we do something contributes to how successful we are,” she said. Thus the more beneficial the work is to the masses, the more likely researchers will be to stick with it and be successful.

**A REAL-TIME ECONOMIC IMPACT**

There’s also a very real immediate impact when a research project is funded by a granting agency, resulting in more money in local pockets.

“If as a university we lead in marketing — partnering with industry in the region — we can have a huge economic impact on Idaho, providing good-paying tech jobs and other employment,” said Dr. Peter Müllner, a distinguished professor of materials science and engineering.

Müllner’s work on magnetic shape memory alloy has generated $3 million in spending since 2004, with funds going toward salaries, supplies and equipment. Financial support has come from the Micron Foundation, National Science Foundation, the Idaho Higher Education Research Council, U.S. Department of Defense and more.

That investment also has resulted in a boost to Boise State’s reputation, attracting researchers from around the world — including China, Poland, the Basque Country, Germany, Switzerland and Spain — to use his unique lab.

“It’s incredible when you see research labs that have good collaboration between science and product development,” said Dr. Trevor Lujan, assistant professor of mechanical and biomedical engineering. “They become a training ground as researchers learn how to prove a concept and make it marketable.”

Lujan noted that the NIH, NSF and other granting agencies are putting more emphasis in the proposal stage on possible patents, licenses and product development. This emphasis on “bench to bedside” research allows an investigator’s work to have a more direct impact on people’s lives.

“It’s shifting the success of our labs with fewer...
degrees of separation between the work we are doing and changes in technology,” Lujan said.

And success breeds success. As Boise State garners more prestigious grants like the NIH COBRE award, it becomes more competitive for other grants.

“By continuing this effort, Boise State is in a better position to attract this type of activity to us, contributing in even bigger ways,” Oxford said.

Oxford believes there is one more reason university research activity should contribute to the bottom line: your tax dollars.

“When we receive grants from federal government agencies like the NIH and NSF, those are your tax dollars at work,” she said. “So we are employees of every single taxpayer and it’s our responsibility to benefit those who contribute.

“As Boise State continues to do important federally funded inquiry, researchers are charged with addressing the most pressing needs of our citizenry.”

Defining economic development is as challenging as ensuring its growth within the community. At first blush, many would say it’s the development of new products, industry or jobs.

That’s a good start. But it goes deeper than that, touching on intellectual property, creative output, knowledge transfer and so much more.

“Economic development is proactively looking for opportunities to maximize and leverage the assets we have here at Boise State University and partnering with industry and community members to advance our quality of life,” said Mary Andrews, director of economic development for the Division of Research and Economic Development.

Those assets can be a number of things, including student research, faculty expertise, labs, field sites, inventions and new product development. It also includes the workforce skills necessary to propel industry to the next level.

Developing those assets requires good, solid research.

“We’re hard pressed to develop intellectual property without basic research,” said Dr. Mark Rudin, vice president for research and economic development. “But it’s not always easy to see the direct link between the two. It’s really a process.”

Grant funding agencies understand that process and recognize its value in key research areas. Their investment may not pay off for a number of years, but they know that financial support can provide the extra “oomph” to keep innovation moving forward.

Economic development has a human element to it as well. It’s about generating the researchers who are taking key roles in the medical, high-tech, and research and development communities.

“It’s about people capital,” Rudin said. “We’re training future scientists, artists, health care professionals and others to discover things for themselves.”

There has been a lot of academic research conducted on the connection between research and economic development. Based on the findings of those studies, Boise State is attuned to the metrics that measure success at the highest levels.

“But we also are an urban university and Boise is our city,” Andrews said. “Community and industry here are our No. 1 priority. In addition to everything else, we want to make sure we have local impact.”