

Washington University

Discovery Science Innovation Fund

INVEST IN DISCOVERY: Donors can support pioneering explorations on the frontiers of science by investing in Washington University's Discovery Science Innovation Fund. The Fund will support basic science — efforts to understand the fundamental biological, chemical and physical elements and processes that govern life on earth and the broader universe beyond. Donors can help unravel the mysteries of the cosmos and reveal the inner workings of the human brain, decipher the fundamental mechanisms of disease, and explore the nature of matter and energy. Driven by a thirst for knowledge and a desire to improve the human condition, basic scientists' discoveries could one day lead to the medical, scientific and technological breakthroughs that will help our society tackle the challenges we face in human health, food and energy production, and environmental sustainability.

An ideal partner for scientific discovery

Washington University has an outstanding history of breakthrough scientific and medical discoveries, nurturing 24 Nobel Laureates in medicine, physics, chemistry and economics and playing pivotal roles in the Human Genome Project, imaging the brain, curing cancer, exploring Mars, tapping the power of photosynthesis to produce clean energy, and much more. The university is world-renowned for biomedical research, and our School of Medicine is one of the top five in the country. We also have notable strengths in chemistry, physics, materials science and energy research. The university attracts the best minds in science and medicine and offers a world-class research environment that fosters a collaborative, interdisciplinary approach, transcending departmental lines and traditional boundaries of scientific fields. In short, Washington University is an ideal partner for donors interested in supporting basic science.

How the Discovery Science Innovation Fund works

The Discovery Science Innovation Fund targets exceptionally inventive basic research that epitomizes scientific ingenuity and has the potential to lead to scientific breakthroughs, yet is too early-stage for federal funding. Washington University faculty working in any branch of science are eligible to apply for three types of competitive awards: New Investigator Awards, Transformational Science Awards, and Technology Awards. Decisions are made based on review by a committee of top scientists from across the university and, in the case of Transformational Science Awards, by external reviewers who are national leaders in the field of research.

Invest in the promise of the brightest young scientists

Often it is the young scientists who have the most innovative “out of the box” ideas — those who don't accept the “conventional wisdom” and strive to take a different, untested approach. These new researchers have the most difficult time securing funding to pursue such ideas. New Investigator Awards (\$150,000 per year for five years) will help the brightest new researchers with the most innovative ideas, providing critical support at a key early stage of development — scientists like these young stars working today at Washington University:

- Chemist *Gary Patti* is a pioneer in metabolomics — using breakthrough technologies to reveal a detailed picture of how individual cells “talk to each other” by exchanging chemical metabolites. His work has already resulted in a promising new drug candidate to relieve pain. He recently discovered that the conventional view of cancer cell metabolism is likely wrong, opening up a promising new approach to developing cancer treatments.
- *Kater Murch*, a new physics faculty member, has devised inventive new equipment to test theories about the fundamental nature of atoms and quantum particles. He has succeeded in measuring the wave nature of light and has shown that in the quantum world time moves both backward and forward

equally. His discoveries could one day be the basis for new technologies to control the basic building blocks of the universe.

- *Martha Bagnall*, a young neuroscientist, is working to understand the mysterious, absolutely fundamental process of how animals maintain a given orientation with respect to gravity. How do sensory input, the brain, the spinal cord and muscles integrate so we can walk upright? Only by understanding this process can we hope to correct serious problems when they develop.
- *Christina Stallings*, a young microbiologist, is studying the molecular behavior of tuberculosis bacteria, which cause the deaths of more than 1.8 million people a year. Combining a range of approaches to answer fundamental questions about how tuberculosis behaves in the body, her team hopes to identify new strategies to combat the disease.

Propel the most transformational discoveries forward

When scientists do make pioneering discoveries, they need funding to build on their initial results so they can truly transform a field and have the greatest impact. This is where Transformational Science Awards (\$500,000 per year for three years), which must go through a highly selective, external peer review process, can help a project toward sustained funding. Examples of such transformational discoveries here include:

- Washington University scientist Jeffrey Gordon founded the field of microbiome research. He discovered that the tens of trillions of microbes living in the gut are major players in human health. So-called friendly intestinal bacteria promote health, but disruptions in our resident microbes are linked to obesity, childhood malnutrition, and myriad other unexplained disorders. His basic discoveries led the National Institutes of Health to launch the Human Microbiome Project.
- Randall Bateman's basic research on protein analysis in spinal fluid laid the groundwork for the first Alzheimer's disease prevention trial, an unprecedented international effort that he now leads.
- Timothy Ley conducted the first whole genome sequencing of a cancer patient and compared it to her leukemia cells, a landmark study that paved the way for personalized disease diagnosis and treatment.

Fund the technology and infrastructure to enable breakthrough research

You can't study what you can't see – and improved technologies for seeing smaller and smaller particles in greater and greater detail can enable breakthrough medical and scientific discoveries. One of the most revolutionary technology developments at Washington University, for example, was the development of the positron emission tomography (PET) scanner, which ushered in the field of brain imaging by revealing what areas of the brain were active during various mental processes. New technologies are expensive, however, requiring capital investments and operating support that cannot be funded by government research grants. Technology and Infrastructure Awards (up to \$10 million) are reserved for the most critically needed capabilities that benefit the research of many investigators. Today, core facilities for basic science are crucial for understanding the biological implications of a vast array of gene variants that will be identified in the National Institutes of Health Precision Medicine Initiative. Shared by hundreds of investigators, these facilities – and the brainpower that staffs them – allow ideas to be explored efficiently and economically. The Genome Technology Access Center, along with centers for Genome Engineering, Informatics, Cellular Imaging and Molecular Imaging, bring powerful technologies to bear on the ability of physicians to tailor treatments to the individual, avoid the distress and debility of failed therapies, and realize the promise of personalized medicine.

To invest in the Washington University Discovery Science Innovation Fund contact Vice Chancellor for Research [Jennifer Lodge](#) and Assistant Vice Chancellor [Patricia Gregory](#). To learn more about the impact of basic science, read about [medical](#) and [scientific](#) breakthroughs at <https://medicine.wustl.edu/news/type/news-release/> and <https://source.wustl.edu/>.