

Northwestern University Discover Fund: Creating New Knowledge in the Physical and Life Sciences

Because Northwestern thrives on intellectual exploration, the pursuit of new knowledge, and the search for creative ways to put our discoveries to good use, we continuously strengthen our investments in innovation and nurture our spirit of discovery.

--*We Will*, Northwestern University Strategic Plan 2011

To push forward innovative high-risk, high-impact research, Northwestern University seeks philanthropic investment in basic research in the physical and life sciences. Philanthropic investments in basic research drive innovation by providing the opportunity to pursue promising new ideas. In the pursuit of answers to fundamental questions about the world and, indeed, the universe, and for the ultimate benefit of humanity, Northwestern University has established the *Discover Fund: Creating New Knowledge in the Physical and Life Sciences*. Northwestern affirms the value of basic research, driven primarily by the desire to increase knowledge and understanding rather than by a concern for immediate application or translation, as the platform for discovery. The definition put forth so compellingly by Vannevar Bush in his 1945 report to President Truman remains true today:

Basic research leads to new knowledge. It provides scientific capital. It creates the fund from which the practical applications of knowledge must be drawn. New products and new processes do not appear full-grown. They are founded on new principles and new conceptions, which in turn are painstakingly developed by research in the purest realms of science. (*Science, The Endless Frontier*)

Dr. Bush's report led to the establishment of the National Science Foundation and the transformational post-WWII growth of the National Institutes of Health. Since then, federal agencies have become the largest source of funding for basic research at universities. Federal support for university research since 1950 has made possible the dramatic increases in health and technological advances we enjoy today.

Over the past decade or more, however, funding allocated for federal support for research has largely stagnated. As a result, innovative, basic research in the United States has become more and more a luxury. With stagnant federal funds and a lack of alignment with industry goals, fundamental research is at peril. As a society we are in danger of losing the advantage that fundamental discoveries provide for solving pressing global challenges. Northwestern Vice President for Research Jay Walsh comments:

We are now facing significant uncertainty in the federal research and development budget. And that uncertainty is affecting behavior throughout the system—tenured faculty are looking differently at what kind of funding they apply for and college students are thinking about what to do with their careers....[yet] basic research has been and will forever be the reason we have ever better medical care [and advances in numerous other fields]. (Northwestern University Research Annual Report, 2013)

In this challenging environment, philanthropic support for basic science research has become increasingly vital to help launch scientific careers, bridge funding gaps, seed innovative ideas, and pursue new research methods that make discovery possible. Donations to the Discover Fund for the Physical and Life Sciences at Northwestern will be used to support basic research performed by our exceptionally promising faculty, postdoctoral fellows, and students as they explore innovative ideas. Support for the Discover Fund will enable Northwestern to leverage the creativity of our scientists

engaged in fundamental investigations in the physical and life sciences across schools by funding their high-risk, high-impact ideas at a stage that may not yet qualify for external funding.

What range of research is the Discover Fund intended to support? Following a two-year strategic planning process, Northwestern identified a short list of areas of distinctive strength where we will focus our resources and investments. These top strengths include nanoscience, neuroscience, chemistry, advanced materials science, biomedical sciences, biomedical engineering, and energy research. In addition to seeking funding to advance these particular strengths, we remain open to funding basic research in a broad spectrum of fields in the physical and life sciences with the goal of identifying truly innovative ideas, addressing intractable questions, and seeding emerging fields.

Focus of the Discover Fund: The Discover Fund for the Physical and Life Sciences will provide initial funding to launch bold new fundamental research programs. Seed funding for basic research allows scientists to pursue promising new findings through the inherently non-linear process of scientific experimentation. The freedom to take risks and follow up on promising, often unexpected, results leads to big, even serendipitous discoveries, such as the ones that led to the development of penicillin, X-rays, or the Big Bang model of the formation of the universe. The return on investment can be dramatic: top scientists who receive seed funding to pursue a promising new idea often go on to win federal funding at ten or more times the initial investment. The Discover Fund will be used flexibly to meet the most pressing needs of high-priority innovative research, including student research stipends, graduate and postdoctoral fellowships, travel to collaborating institutions, conferences, materials and reagents, workshops, and visiting scientists.

Northwestern is recognized as a national leader in research core facilities. To advance new discoveries in physical and life sciences research, we also need to continually renew that infrastructure of shared instrumentation. Technological advances in equipment and methods, such as new means of observing neurons in the brain or revealing the structure of complex proteins, lead to major advances across an entire field. To that end, we will leverage the Discover Fund to strengthen and expand our instrumentation capabilities. Economies of scale are realized when expensive equipment is located, managed, and maintained in centralized shared facilities. Dedicated, highly skilled personnel in such facilities provide necessary expertise to assist researchers in the most effective use of complex equipment and analysis of the data produced via this equipment. State-of-the-art equipment makes possible new methods that are essential to innovative basic research.

Structure and Process:

Faculty of all ranks, from junior faculty starting a new lab to the senior investigators making radical changes in their research directions or forging new partnerships, will be encouraged to apply for funds for basic research ideas that expand beyond the realm of the traditional. In addition, in order to foster Northwestern's renowned interdisciplinary culture, teams that cross disciplines will also be encouraged to apply, with the ultimate goal of enabling our faculty to follow their curiosity and take risks that offer the potential to lead to new discoveries. The Discover Fund will provide tiered levels of competitive funding as follows:

Seed Fund (\$50,000–\$100,000): Support for single investigators or a limited number of collaborating investigators, renewable for up to 3 years.

Team Fund (\$200,000–\$500,000): Support for interdisciplinary teams, renewable for up to 3 years.

Infrastructure Fund (\$500,000–\$1,000,000): Support for critical research infrastructure in shared facilities.

To offer sustained funding for such projects, larger investments to the Discover Fund will be held in a quasi-endowment, where the fund will benefit from investment income and both principal and income from the fund can be flexibly expended in support of the Seed, Team, and Infrastructure Funds.

The Office for Research, led by Vice President Jay Walsh, will administer the Discover Fund. The Office has broad responsibility for research development, managing more than sixty shared facilities and more than three dozen University Research Centers, each directed by an internationally renowned faculty member. All applications will be reviewed by a two-tier review process: peer review by internal (Seed Fund) or external (Team Fund and Infrastructure Fund) subject matter experts and then by a team of senior-level administrators overseen by the Vice President for Research. Review criteria will include intellectual merit, potential to advance fundamental science, strength of the research plan, the qualification of the researchers to carry out the research plan, and the potential to achieve sustainability beyond the initial Discover Fund investment. Equal consideration will be given to meritorious applications that address mainstream grand challenges and to proposals for less common research that is unlikely to be eligible for external funding.

The Office for Research will lend programmatic and administrative expertise to the nascent initiatives, advising investigators on designing research programs, building effective teams, managing funds, securing external funding, and effectively communicating research goals. We would note that research teams impacted by equipment funds would include not just Northwestern faculty, but also collaborating scientists from other Chicago-area institutions who share access at internal rates to each other's specialized core research facilities through the Open Access Initiative.

Anticipated balance between endowment and expendable funds:

We expect that a significant fraction of the fund will be expendable so that the philanthropic funds are put to immediate use. Such use is fully appropriate and impactful for each of the three types of support indicated above. We have found, however, that some donors wish to have an enduring impact and thus we foresee endowing a fund in those cases. An endowment of \$25M, which could be named in honor of the donor or designee, would support up to approximately fifteen teams per year at ~\$80,000/yr. An endowment of \$2M would support one seed grant per year.

Contributions to the Discover Fund for the Physical and Life Sciences at Northwestern are expected to provide the much needed support for basic research ideas in order to further advance scientific knowledge and understanding that ultimately leads to the improvement of lives, communities, and the world.